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Welcome to Omoku



Omoku City is located in Orashi Region of Rivers State in south-south Nigeria. The town can be said to be the second largest urban centre in Rivers State. It is the traditional and administrative headquarters of Ogba/Egbema/Ndoni Local Government Area of Rivers State and the domain of the Oba (Eze-Ogba) of Ogbaland – one of the surviving ancient monarchs in Rivers State.

It is a melting pot of cultures and this is demonstrated by the traditional ways of the people as well as the influence of the other Nigerian ethnic groups. Omoku is a city in the Niger Delta region that invites one and all to enjoy its diversity and unforgettable charisma. It is a city of contrasts, proud of its illustrious, deep rooted history whilst being at the cutting edge of all the latest social and technological developments. It is a city *open to all*, accessible to everyone, it is a city which can be enjoyed by all residents and visitors alike.

Omoku is a city for encounters and contrasts. The legacy left by the cultures and modernization which have reached these shores in the past still remains alive. Business and trade coexist with leisure and culture. Omoku is a city that has enjoyed relative peace since recent past. It has a rich cultural life with festivals, concerts, shows and exhibitions all year round. A city like this can be enjoyed with all five senses. Dialogues flow smoothly, ideas float back and forth easily, lines of communication are always open and people feel at their ease. Omoku invites you to indulge your passion for the art of encounters.

Today, the population of Omoku is an admixture of oil workers, civil servants, subsistent farmers, petty traders, and traditional craft-makers from all parts of Nigeria as well as expatriates. Omoku is about 90km from Port Harcourt, the capital of Rivers State. The town is located in the heart of the rain forest zone at the Northern apex of the Niger Delta basin. Its climate is therefore humid. There is usually heavy rainfall between the months of May and October and harmattan between December and February in the town.

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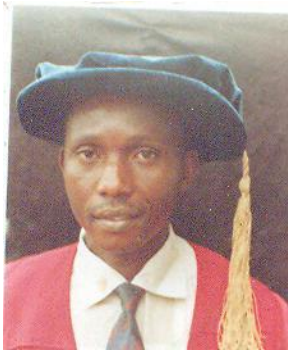
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Keynote Speakers

Professor Samir Alredaisy, a leading international Scholar is Chair of Environmental Geography at the Faculty of Education, University of Khartoum, Sudan. He was born in Dongola, Sudan in November 1959. He got his education in government schools, University of Khartoum and University of Wales as PhD scholar. Dr. Samir Alredaisy also had spent ten years in Saudi Arabia as Assistant Professor in the Teachers' College of King Saud University in Riyadh. He got training into map skills, statistical analysis, environmental, regional planning and medical geography. Prof Alredaisy published many papers inside and outside his country in almost all fields of Geography Education. Particularly he had treated environmental issues in a geographic context including communicable diseases of Malaria, Typhoid and Tuberculosis. His published works could be found in the World Web sites. Prof Samir Alredaisy has also published about 17 textbook during the last 15 years including most of the major branches of Geography and supervised many Postgraduate students. In addition, Samir Alredaisy is interested into GIS where he teaches a course to the undergraduate students in the Faculty of Education and some other Sudanese Universities. Last year, he participated in the workshop on sustainable water management program in Kenyatta University, Kenya which continued for two weeks. The project presented in the workshop was about strategies for sustainability of water supply in rural communities of arid Sudan. As representative of the Faculty of Education in the Graduate College Board of the University of Khartoum, Prof Alredaisy had created good relations with many of the University's Professor. He also has good relations with some scientific Journals such as Arab World Geographer in Canada and Sudan Studies of Britain in addition to being the vice editor of the Journal of Faculty of Education, University of Khartoum. Samir Alredaisy was also appointed as Head of Department of Geography in 1997 and secretariat of the Research Board in 1996 and in 2010.



Lawrence Ogbo Ugwuanyi is a distinguished African scholar, philosopher and administrator. He is a Senior Lecturer and Head, Department of Philosophy and Religion, University of Abuja. He has lectured for seventeen years in Nigerian universities, was a lecturer at the Department of Philosophy, Ambrose Alli University, Ekpoma, Nigeria (1994-2003), and Senior Lecturer in Philosophy at Delta State University, Abraka, Nigeria (2003-2006). He received PhD. From the University of Ibadan; M.A. from University of Nigeria, Nsukka and B. A. (Hons) graduating as best student from Urban University, Rome. He was a Visiting Scholar to the University of South Africa (2005), has coordinated panels at 7th Iberian congress at Portugal (2010) and at 4th ECAS conference in Sweden (2011); presented at conferences and workshops in South Africa, Senegal, Ghana, Burkina Faso, South Korea, Brazil, Portugal and Iran. Some of the workshops were organized by SEPHIS and CODESRIA.

First published at 20 with *Success in Life* which sold over 15,000 copies in the first edition, he has also published *Peace of Mind* (1991), *Life is a Treasure* (1996), *Elements of Philosophy and Logic* (1997, co-author), *Qualitative University Education* (1998) and *The Poverty of Jealousy* (2011) and a forthcoming poetry collection entitled *Let Them Not Run* (in Press). Dr. Ugwuanyi has over 30 academic publications the latest of which include (2011) "Aligning and Harnessing the Gains of Globalization to an African Advantage: Towards "Glo-fricanization" in *African Engagement: Africa Negotiating Multi-Polar World*, eds. Ton Dietz, et al, (Brill: Africa-Europe Group for Interdisciplinary Studies); (2010) "An Insight into the Dilemma of African Modernity and a Theoretical Response" (e-published <http://cea.iscte.pt/ciea7/>); (2010) "An African Theory of Citizenship and Its Curative Potential for Civil Conflicts Arising from Regionalism and Inequality", (eds.) Sparh, R. W & Ferriera, F.A.A, (IASK) Oviedo, Spain

He was an active member of the then Organization of African Unity club and was the Nigerian delegate to two conferences of the body tagged OAU of the People and held at Ouagadougou in 1998 and Abidjan in 2000. He is a member of the English Academy of Southern Africa, South African Association of General Literary Theory (SAVAL) as well as Africa Institute of South Africa, Pretoria. He has written for *The Nigerian*

Observer (1995-2004), *Daily Independent* (2006-2008) and currently writes for *The Spectator* include (2009-2011) and is the founding president of the Nigerian section of the World Education Fellowship (WEF), the 85-year-old non-governmental organization that promotes education all around the world and is rated in UNESCO category B.



Hanna David (née: Ehrenstein), PhD was born in Jaffa in 1952 to a father immigrating to Israel from Vienna in 1938, and Hungarian mother, a survivor of Auschwitz. The second in a 4-child family she had insisted on starting nursery school at the age of 13 months, together with her 13-months older brother, and since then showed deep interest in public speaking, making friends and initiating social intercourses; somewhat later she started reading and has not stopped since. At age 15 years she became a youth-writer of “MA’ARIV LA’NOAR” – the youth edition of the then most published daily Israeli paper, which had led her to publishing of Hebrew and English short stories, and translating to Hebrew, mainly from German. At age 18 she graduated from the Ultra-Orthodox girls’ high-school in Ramat Gan and started her mathematics, physics, Hebrew literature and high-school teaching certificate studies at the Hebrew University in Jerusalem. In 1975 she received her MA from the Jewish Theological Seminary in New York, and soon afterward started her family. Hanna David received her PhD, “magna cum laude”, in educational psychology (minors: didactics of mathematics and education) from Ludwig Maximilians Universität, München, She worked at the Tel Aviv University between 1976 and 2004.

Prof. David’s interest in giftedness started when she was 11, with the birth of her brother who, like all males in the family, was gifted. While still in high school she became an expert of accelerated teaching for Ultra-Orthodox boys whose parents wanted them to get “secular” education in addition to the religious one they received in school. Teaching and modernizing the gifted became Hanna’s recognized expertise in 1995, when she started teaching the course: “the gifted child in the regular classroom” at the Talpiyot Teachers’ College in Tel Aviv. Since then she has taught in 3 other high education institutions, and instructed many students in the field of gifted education.

In the last 15 years, Prof. David has become a popular modernizer for gifted students, with or without disabilities; a known expert of gifted education in Israel and abroad, an often invited lecturer in national and international conferences and meetings; an expert evaluator for the European commission, and a prolific writer of 10 books and over 90 articles.



Professor Raphael C. Njoku is Graduate Chair of African History at University of Louisville, United States of America who holds doctorates from the Vrije University at Brussels (2001) and Dalhousie University (2003). He is a specialist in African History and Politics, African Social and Economic History, African Culture and Development. Professor Njoku is the author of the famous work *Culture and Customs of Morocco* (Greenwood, 2005), and *African Cultural Values: Igbo Political Leadership in Colonial Nigeria 1900–1966* (Routledge, 2006). He is also co-editor of *Missions, States and Colonial Expansion in Africa* (Routledge 2007). He has also published 20 articles in scholarly journals, edited volumes, and encyclopedias. With a fellowship from the New York based Schomburg Center for Research in Black Studies, he is currently working on a new book project entitled *Symbols and Meanings of African Masks and Carnival of the Diaspora*.

As a scholar, Professor Njoku had been devoted to the search for answers to contemporary Africa's issues. Africa today poses more questions than answers. To the world, Africa pleads for understanding—yes, a crucial understanding about its culture, its peoples, and its setbacks. Until it is understood at what point the “rain of depredation” started beating the people, it might be difficult to reverse the precarious situation of the continent today. His mission is to continue to search for answers to the Big Puzzle through research and teaching while hoping that a better knowledge of the people, their culture, their psychology, and their worldview hold the key to Africa's future.



Gerhard Berchtold is Professor, Dean and Vice-Director of International Strategic Development of Universidad Azteca-Mexico. Gerhard Berchtold earned degrees in International Management, Higher Education Management, Environmental Decision Making, Environmental Technology, Business Administration, Public Administration, Environmental Policy, Education, and Law. An Austrian scholar, management consultant, environmental policy advisor and an expert on environmental technology, waste and environmental management, Prof. Berchtold was professor and director of the School of Environmental and Waste Management at Universidad Central de Nicaragua. Since the 1980s, Professor Berchtold has held a wide range of professional management and policy management experience, as well as distance education management and lecturing, research and consulting experiences especially in the areas of waste management, environmental policy, soil and groundwater remediation, general management and strategic and transnational higher open and distance education management. Professor Berchtold has linguistic proficiency in German, English, Italian, Spanish and French. He has served the Austrian national Parliament (1990-2002) and the European Parliament (1995-1996) as consultant and assistant, was a full-vote member of the Austrian Superfund Commission (Altlastensanierungskommission 1995-1999) and

headed the environmental legislation working-group of the branch of waste and waste water management within the Federal Economic Chamber of Austria WKO (2000-2005), he used to be the administrative and political director of an independent fraction of the Tirol State Legislature (2005-2008). He has won awards including the Austrian annual prize for environment and public administration proposals, *Oekomanager 2000*, and is also a Salzburg Seminar alumnus (Environment and Diplomacy, 1994). He has published numerous publications and contributed substantially to both, environmental and waste management at the operational level in terms of projects, facilities and technologies, as well as to formulation, development and implementation of environmental law.



Professor A. M. Wokocha
Registrar/Chief Executive
Teachers Registration Council
Nigeria

Addison Mark Wokocha is a distinguished African scholar and administrator. He started his academic pursuit at St. Stephen's U.N.A. School, Omoku in 1955 and passed out of the School with a First School Leaving Certificate (F.S.L.C.) in 1962. The young Omoku enthusiast was at Baptist High School (B.H.S.), Port Harcourt from 1963 to 1969. Mark-Addison, as he is fondly called by friends, passed out of B.H.S. with the West African School Certificate (WASC) in grade 1. In 1972, he became an undergraduate at the University of Nigeria, Nsukka where he bagged a B.Sc. (Hons.) degree in Agriculture, with a bias in Plant/Soil Science in 1976. With a burning desire for academic excellence, Wokocha continued his academic pursuit at the University of Port Harcourt in 1982, where he pursued a Master of Arts (Ed.), majoring in Philosophy of Education, a Degree he acquired in 1984. Not satisfied yet, in 1986, the young man went back to the University of Port Harcourt for a Doctor of Philosophy Degree (PhD) in Philosophy of Education which he obtained in 1989. Between the years 2000-2001, Wokocha obtained D.Litt. Educational Philosophy from St. Clements University, South Australia.

Professor Wokocha, an author of international repute, has displayed class and competence at the different positions held in the last 10 years of academic career at various tertiary institutions in Nigeria. He joined the services of College of Arts and Science, Port Harcourt, and rose to a Principal Lecturer in 1988. In 1989, he joined the services of Faculty of Technical and Science Education, Rivers State University of Science and Technology, Port Harcourt. Two years after, precisely in 1991, Wokocha became Lecturer 1. In the same Department. Considering his academic dexterity, the University in 1993 promoted him to the rank of Senior Lecturer, a position he held until 1996 when he was promoted Associate Professor (Reader). The academia was made a Professor in 1998. In that University, Prof. Wokocha served as the Head of Department of Educational Foundations and the Director of the Centre for Continuing Education among others.

The amiable intelligentsia was appointed Provost, Federal College of Education (Technical) Omoku in 1998. As a Provost, he transformed the College within a very short time such that in the year 2005, the Rivers State Government appointed Professor Wokocha as Provost, Rivers State College of Education, Port

Harcourt. Wokocha has remained an External Examiner at several Nigerian Universities, Colleges, Polytechnics and other teacher training institutions across the Country from 1990 to date. He served in several State and Federal Boards including Rivers State Hospital Management Board, National Business and Technical Examination Board (NABTEB) Benin City, Governing Council of Teachers Registration Council of Nigeria (TRCN) and Council of Nigerian Institute of Management. He is a Fellow, President and Chairman of Council of the Institute of Management Consultants, Chairman, Advisory Board of Development Africa Consortium, Fellow Institute of Corporate Administration of Nigeria, Fellow of FCE (T) Omoku and Paul Harris Fellow Rotary International. Professor Wokocha has also served as the Chairman of Committee of Provosts of Federal Colleges of Education, and the National Chairman of Committee of Provosts of Colleges of Education in Nigeria. He is a member of the Prestigious Nigerian Academy of Education.



Hassan Danial Aslam, a leading Asian scholar and Management Consultant is President of Human Resource Management Academic Research Society. He is author in the field of Business Management, Human Resource Management research and Educational learning. He has published three international books which include "Dissertation Writing Skills", "Performance Issues of Teachers in Higher Education" and "Offshore Risk Mitigation model". Along with international published books he is author of various research papers in international refereed journals which include the critical areas of performance evaluation & development of teachers in higher education of Pakistan, student learning achievement, formal and non-formal education, academic leadership and individual to organizational learning. He is seasoned managing editor of two international journals (*International Journal of Academic Research in Business and Social Sciences* & *International Journal of Human Resource Studies*) having well-known repute among international publishing societies. Mr. Hassan Danial is also serving as Senior Lecturer and Chair in Human Resources Management in the Faculty of Management Sciences at Islamia University of Bahawalpur, Pakistan where he is performing his duties by conducting various researches and teaching human resource development subjects like learning and development, organizational learning, education management etc. He has been working as education consultant and human resource advisor in various institutes of Asia and Middle-East. His major contribution to the research field includes projects like "*District literacy survey 2010*" in Pakistan and "*Academic Performance Learning difficulties and learning environment for Saudi students*" which proved to be a major policy document in Government think tanks of Pakistan and Saudi Arabia.

Programme of Event(Draft)

Monday 5th September

08:00 – 09:30	Registration
09:30 – 11:45	Welcome Ceremony
11:45 – 14:30	Special Sessions
14:30 – 14:45	Lunch Break
14:45 – 16:45	Special Sessions
16:45 – 17:15	Coffee Break
17:15 – 18:00	Plenary Sessions
20:30---10:30	Welcome Cocktail

Tuesday 6th September

08:30 – 10:00	Special Sessions
10:00 – 10:30	Coffee Break
10:30 – 13:30	Plenary Sessions
13:30 – 14:45	Lunch Break
14:45 – 16:45	Plenary Sessions
16:45 – 17:15	Coffee Break
17:15 – 18:45	Plenary Sessions

Wednesday 7th September

08:30 – 10:00	Special Sessions
10:00 – 10:30	Coffee Break
10:30 – 13:30	Plenary Sessions
13:30 – 14:45	Lunch Break
14:45 – 16:45	Plenary Sessions
16:45 – 17:15	Coffee Break
17:15 – 18:45	Plenary Sessions

Thursday 8th September

08:30 – 10:00	Special Sessions
10:00 – 10:30	Coffee Break
10:30 – 13:30	Plenary Sessions
13:30 – 14:45	Lunch Break
14:45 – 16:45	Plenary Sessions
16:45 – 17:00	Coffee Break
17:00 – 18:00	Special Sessions/Communiqué
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DRUGS CONSUMER PROTECTION

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Abstract

The United States food and drug laws provide the highest level of consumer protection in the world. But, instead of the huge number of legal measures taken by governments to eradicate this scourge, drugs consumer protection remains a field which still have a lot of unsolve problems, all around the world: in Europe, Asia, Afrika and so on.

Keywords: Drugs, Consumerism, Consumer Protection, Contaminated Drugs, Counterfeit Drugs, Orphan Drugs

INTRODUCTION

Consumer protection is a general concept that involves protecting people from buying things and services that are unsafe or fraudulent. Consumer protection is one of the major social policies promoted by any modern state. Because of the importance it represents for the contemporary economy, it is an independent policy, with own objectives, priorities and tools. The speed which events follow each other today is increasingly. That's why consumerism is expanding more and more too all the sub-branches of the economy. In this way, the scope and action of consumer protection is extremely large, reaching all the economic sectors.

Consumer protection and product safety include the efforts made by the government, the nonprofit organizations, businesses and individuals, to create, protect and enforce the rights of the consumers who buy products/services. While the idea of consumer protection is not new, the interest in consumer rights legislation has flourished in tandem with society's technological and economical advances. For instance, the mass commercialization of products during the industrial revolution spawned laws in the late 1890s and early 1900s regarding food purity. The rise in consumer credit, as well as the product safety awareness, stimulated the consumer protection legislation during the 1960s and 1970s. A relatively new field reached by consumer protection is those of the pharmaceutical products, more exactly, the drugs industry.

DRUGS CONSUMER PROTECTION IN THE US - A BRIEF HISTORY

The best known consumer protection organization in the United States is the Consumer Product Safety Commission (CPSC). The CPSC is an independent federal regulatory agency created by the Congress in 1972. Its charter is to "protect the public against unreasonable risks of injuries and deaths associated with consumer products." The CPSC has jurisdiction over about 15,000 types of products - everything from appliances to toys. The organization helps manufacturers to develop voluntary standards, to prevent accidents and injuries, to make research regarding potential product hazards and to educate consumers to choose safer products, reporting accidents and injuries related to consumer products.

In addition to the CPSC, in the United States, several other agencies are responsible for protecting the public. The U.S. Department of Transportation regulates car, truck and motorcycle

safety. The U.S. Department of Treasury regulates alcohol, tobacco and fire arms. The U.S. Food and Drug Administration (FDA) is responsible for the safety and efficacy (whether a product actually does what it says it does) of drugs prescription, medical devices, cosmetics and food. In the field of health care, the FDA is the major agency responsible for consumer protection.⁵

Keeping food and drugs pure and safe is an old problem, as long ago as in 1202, King John of England proclaimed a law that prohibited bread from being contaminated with any ingredients, such as ground peas or beans. In 1785, Massachusetts was the first state to pass a food adulteration law. In 1820, a group of well-known physicians met in Washington D.C. to establish the U.S. Pharmacopeia. This was a list of purity and content standards that all the drugs must meet. The U.S. Pharmacopeia still exist today. Sometimes on drug labels, consumers can see the letters USP, after the drug name. This means that the drug conforms to the standards and formulas of the U.S. Pharmacopeia.

Federal regulation of drugs began in 1848 with a law that sought to prohibit the entry of contaminated drugs into the United States. In 1862, President Lincoln established the Bureau of Chemistry, a division of the Department of Agriculture that later become the Food and Drug Administration. In the first ten years of the twentieth century, the Congress passed a series of laws to insure the purity of serums and vaccines, prohibit the interstate transport of contaminated or mislabeled food, drinks and drugs, and required federal inspection of meat packers. These laws were passed to eliminate such dangerous practices as using poisonous preservatives and dyes in meat and manufactured foods, to restrict false claims made for worthless or dangerous patent medicines.

Another aspect of consumer protection in the health field has come to prominence in the late 1990s. With the popularity of managed health care plans and the rise of for-profit health care organizations, the question has arisen over whether federal legislation is needed to establish a patient's bill rights. Such legislation would seek to strengthen consumer confidence in the health care system, by ensuring that the system is fair and responsive to the consumers' needs. In the absence of federal legislation, laws governing consumer protection in the health arena are implemented on a state-by-state basis.

THE ROLE OF FDA (FOOD AND DRUG ADMINISTRATION) IN PROTECTING THE US CONSUMERS

Unfortunately, fraud in the health care industry has a major frequency. FDA cannot ensure the safety and effectiveness of products that are not FDA approved and come from unknown sources and foreign locations, or that may not have been manufactured under proper conditions. These unknowns put patient's health at risk, if they cannot be sure of the products identity, purity and source. For these reasons, FDA recommends the consumers to obtain medicines only from legal sources.

Today, the FDA's jurisdiction extends to foods, drugs, cosmetics and medical devices. These products must be proven safe and effective before they are sold in the United States. Companies wanting to sell a new food product must prove that their manufacturing process destroys harmful bacteria and adds no harmful chemicals to the food. The FDA also regulates the labeling of food and is responsible for the truth of such claims as "low fat" or "cholesterol free" on labels. Currently, naturally occurring herbal supplements do not fall under the control of the FDA. As these supplements become increasingly popular, they generate debates in the health care

community about whether they should be regulated in a way similar to drugs, in order to protect consumers from contaminated products and false claims.

In the area of drugs and medical devices, the FDA requires both, animal and human testing, before a product can be licensed and sold. Drugs and devices must not only be secure for the patients..... they must actually do what they claim to do. In other words, if a medicine claims to heal diabetes, the company intending to manufacture it must show through extensive studies that it actually does heal diabetes in most patients.

The FDA also protects people from dangerous medical devices such as x-ray machines, by setting standards of operation. It also sets standards for handling blood and other body fluid and tissues that may transmit disease.

Because the FDA requires human testing of experimental drugs before they can be licensed and sold to the public, the United States has signed the Declaration of Helsinki, a human rights document which assures that the rights of patients receiving experimental drugs are protected. The FDA enforces that all organizations testing drugs in the United States abide by the conventions of the Declaration of Helsinki. The basic provisions include:

1. Drugs should not be tested on people until they have been adequately tested on animals;
2. An independent committee, the Institutional Review Board in the United States, must approve each separate experimental study involving people;
3. People conducting the study must be scientifically qualified and approved;
4. Every participant in the study has the right to understand the expected goals, risks, benefits and potential hazards of participating in the study and may withdraw from the study at any time for any reason. This is called "informed consent";
5. The participant's privacy must be maintained in any published information arising from the study;
6. The organization performing the study must accept financial responsibility for treating any serious or unexpected problems arising from a person's participation in the study.

Drug industry is one of the most profitable branches of the world economy. From one year to another, the supply of drugs is increasingly in terms of assortment. The number of manufacturing firms is also increasing because of the high demand. Along with them, in step with the traditional medicines so well known by the consumers, today appear increasingly on the market new drugs, both synthetic and homeopathic, most of them unknown. Are we consumers properly and fully informed regarding the consumption of these products?

Today, tens of millions of people in the United States depend on prescription of medications to sustain their health - as many as 3 billion prescriptions are written annually. Too many people, however, suffer unnecessary injuries and some die as a result of preventable medication errors. U.S. statistics show that at least one patient dies every day due to medical errors and each year about 1.3 million are in one degree or another prejudiced. These errors - in the U.S. - are ranked on the 5th place in the "top" of medical malpractice processes and lead to damage hundreds of millions of dollars, brought to the medical and pharmaceutical authorities.

In 1992, the FDA began monitoring medication error reports that are forwarded to FDA from the United States Pharmacopeia (USP) and the Institute for Safe Medication Practices (ISMP). The Agency also reviews MedWatch reports for possible medication errors. Currently, medication errors are reported to the FDA as manufacturer reports (adverse events resulting in serious injury and for which a medication error may be a component), direct contact reports (MedWatch) or reports from USP or ISMP. FDA receives medication error reports on marketed

human drugs (including prescription drugs, generic drugs and over-the-counter drugs) and nonvaccine biological products and devices.

The American Hospital Association lists the following as some common types of medication errors:

- incomplete patient information (not knowing about patients' allergies, other medicines they are taking, previous diagnoses and lab results);
- unavailable drug information (such as lack of up-to-date warnings);
- miscommunication of drug orders, which can involve poor handwriting, confusion between drugs with similar names, misuse of zeroes and decimal points, confusion of metric and other dosing units and inappropriate abbreviations;
- lack of appropriate labeling as a drug is prepared and repackaged into smaller units;
- environmental factors, such as lighting, heat, noise and interruptions, that can distract health professionals from their medical tasks.

The Division of Medication Errors and Technical Support include a medication error prevention program staffed with pharmacists and support personnel. Among their many duties, program staff review medication error reports sent to the USP Medication Errors Reporting Program and MedWatch evaluates causality and analyze the data to provide feedback to others at FDA. The U.S. Food and Drug Administration (FDA) believes that many of these medication-related risks are manageable if parties committed to the safe use of medications work together. FDA and the Institute for Safe Medication Practices (ISMP) have launched a national education campaign to eliminate the use of ambiguous medical abbreviations that are frequently misinterpreted and lead to mistakes that result in patient harm. The campaign seeks to promote safe practices among those who communicate medical information. The mission of the Safe Use Initiative is to create and facilitate public and private collaborations within the healthcare community. The goal of the Safe Use Initiative is to reduce preventable harm by identifying specific, preventable medication risks and developing, implementing and evaluating cross-sector interventions with partners who are committed to safe medication use.

Potential partners in Safe Use include: Federal agencies, Healthcare professionals and professional societies, Pharmacies, hospitals and other health care entities, patients, caregivers, consumers and their representative organizations.

In the U.S, about 10 billion dollars are spent on drugs each year. That's why, The Food and Drug Administration has prepared a list of the top 10 health frauds. These are: fraudulent arthritis products, spurious cancer clinics, bogus AIDS cures, instant weight-loss schemes, fraudulent sexual aids, quack baldness remedies or appearance modifiers, false nutritional schemes, unproven claims for the muscle stimulators and so-called cures for Candidiasis hypersensitivity. Dishonest promoters frequently promise quick or painless cures, promote products made from a special or secret formula, present testimonials from satisfied patients, claim that their products are effective for a wide variety of ailments and claim to have the cure for disease that are not yet understood by medical science.

At the same time, the Medication Guides - paper handouts that come with many prescription medicines - are another way FDA use to protect the consumers of drugs. The guides address issues that are specific to particular drugs and drug classes and contain FDA - approved information, which can help patients avoid serious adverse events.

FDA requires the Medication Guides to be issued with certain prescribed drugs and biological products, when the Agency determines that:

- certain information is necessary to prevent serious adverse effects;

- patient decision-making should be informed by information about a known serious side effect with a product;
- patient adherence to directions for the use of a product are essential to its effectiveness.

In the US, The National Council against Health Fraud can also help the public taking legal actions against such fraudulent schemes. This organization offers referral to lawyers, a registry of expert witnesses, information on defense witnesses and maintains a list of unproven, fraudulent and potentially dangerous treatments.

DRUGS CONSUMER PROTECTION IN THE EUROPEAN UNION

According to the German periodical "Die Welt", in a survey done among a number of 127 hospital doctors, only half were able to indicate the correct dose of medications for some disease, 31% of them not being able to even suggest a dose. According to the periodical, about 25,000 patients die annually in Germany, as a result of drug dosing errors.

Drug overdose is one of the major causes of death among young people in Europe. There were almost 100,000 reported overdose deaths between 1990 and 2002 in Western Europe (EU15), with 8000 to 9000 deaths per year since 1996. Various studies have shown that patients who visit emergency departments of hospitals or ambulatory people are often victims of medical errors. A number of studies have emphasized that government regulation often produces undesirable or unintended side effects of the pharmaceutical industry.

The European Medicines Agency (unofficial acronym: EMA) is a European agency for the evaluation of medicinal products. From 1995 to 2004, the European Medicines Agency was known as European Agency for the Evaluation of Medicinal Products. Roughly parallel to the U.S. Food and Drug Administration (FDA), but without FDA-style centralization, the EMA was set up in 1995 with funding from the European Union and the pharmaceutical industry, as well as with indirect subsidy from the member states, in an attempt to harmonize (but not replace) the work of existing national medicine regulatory bodies.

Based in London, the EMA was born after more than seven years of negotiations among EU and replaced the Committee for Proprietary Medicinal Products and the Committee for Veterinary Medicinal Products.

The EMA operates as a decentralized scientific agency of the European Union and is responsible for the protection and promotion of human and animal health. The agency is composed of the Secretariat (management board), scientific committees (one each for human, veterinary and herbal medicinal products as well as orphan drug designations) and scientific working parties. The EMA is organized into four units: human medicine, veterinary medicines and inspections, communications and networking, administration. The Management Board provides administrative oversight to the EMA: including approval of budgets and plans, selection of the executive director. The Board includes two members per member state, two from the EEC and two from the European Parliament.

To require centralized approval for eligible products, a company submits an application to obtain a marketing authorization from EMA. A single evaluation is carried out through the Committee for Medicinal Products for Human Use (CHMP) or through the Committee for Medicinal Products for Veterinary Use (CVMP). If the relevant Committee concludes that quality, safety and efficacy of the medicinal product is sufficiently proven, it adopts a positive opinion. This is sent to the European Commission to be transformed into a marketing authorization valid for the whole European Union. The EMA's Committee on Orphan Medicinal Products (COMP) administers the granting of orphan drug status. The fourth committee at EMA is the Committee on Herbal Medicinal Products (HMPC). It assists the harmonization of

procedures and provisions concerning herbal medicinal products laid down in the EU Member States and further integrating herbal medicinal products in the European regulatory framework.

Since July 2007, there is a committee dealing with the new pediatric legislation in Europe (the PDCO). From July 2008, all the new applications for the marketing authorization of new pharmaceutical products have to either include data from pediatric studies (previously agreed with the PDCO), or to demonstrate that a waiver or a deferral of these studies has been obtained by the PDCO. From January 2009, this obligation was extended to most variations of already authorized products (for example, for new therapeutic indications).

The majority of existing medicines throughout the European Union's member states remain authorized nationally, but the majority of genuinely novel medicines are authorized through the EMA. The EU is currently the source of about one-third of the new drugs brought into the world market each year. But, the drugs market situation is not much better in Europe, than in the US.

Generally, there are two main types of dangerous imitations which could appear on the market.

- ▶ Products resembling food - these are where a trader supplies non-edible products, which could easily be confused with food, because of their appearance, smell or texture. There have been a growing number of products being put onto the marketplace that look like foodstuffs but are not in fact edible. The EU Directive (87/357/EEC) concerns the supply of products which, appearing to be other than they are, endanger the health and safety of consumers.

- ▶ Products resembling other products – most unsafe products that are made available to resemble other products, are counterfeits. As well as being poor value for money, these can be very dangerous as they are submitted to the same rigorous safety checks as genuine products.

There are a number of products that can be confused with other products. Some traders design their products in such a way that consumers confuse them with other products. Examples include novelty lighters made to look like other products, or household items designed to look like medical products.

The most common types of products that are confused with other products are counterfeits. Counterfeiters spend money trying to copy packaging and labels in order to determine consumers to buy fake goods. Although counterfeiters spend money trying to copy genuine packaging and labels, they do not spend money on making sure that the products they sell are safe for the consumers.

China is the source of most counterfeit products and of the most counterfeit drugs on the world market, with a market out of control authorities. The increasing supply has come to worry even in the European Union, which repeatedly drew attention because these medicines present a real danger to the health of those who use them.

Things are similar for the products sold on the black market or through online advertisements. In the case of drugs advertisements, it is possible to find fakes since their vendors rely on the fact that there will not be many consumers who will call the police or will notify the Consumer Protection organizations. Through advertisements, people can buy Viagra and other drugs to increase potency, without side effects. The Commission in Brussels warns about putting up for sale on the Internet these drugs, because most of them are not authorized by the European Medicines Agency. Indeed, it seems that at least half of the drugs sold online are "suspicious".

These are just a few reasons why, the EU officials have begun to take decisions that try to combat this phenomenon. Worried about counterfeit drugs trade size, officials of the Council of Europe have decided to organize in Strasbourg regular courses for police, tax collectors and inspectors. The consumer protection courses analysis issues that are meant to help people in fighting effectively against the import or export law of counterfeit pharmaceutical products,

throughout the European Union. At present, counterfeit drugs are found in small proportion in the official market, for example, in pharmacies.

European Directorate for Quality Medicines show that counterfeiting of medicines, from their manufacture, is a serious crime that puts lives in danger and affects consumer confidence in the medical systems. That's why the Council of Europe proposes courses of training in detecting and combating drug counterfeiting, training specialists in all the EU countries.

Another way to combat this phenomenon is to help consumers to make informed choices.

These days, buying prescription drugs from the Internet is easy all over the world. But to find a safe source for those medicines is not. More and more people are turning to the Internet for cheaper drugs that are easy to get, but medicines purchased from these Web sites often come with the risk of harming the consumers and their families. These sites use to sell drugs that are counterfeit, contaminated or simply, unsafe.

By being informed about the dangers of buying drugs on the Internet, we can protect ourselves and our families from the risks posed by rogue Web sites. Over the years, the risks of buying from a rogue site don't stop at the loss of money. Lives have been lost due to people buying medicines from sites that send dangerous drugs without medical oversight that may have been tampered with, expired, or even fake.

Knowing which Web sites are safe and which ones are not, can be confusing. To help consumers making an informed choice, and as part of its mission to protect the public's health, The National Association of Boards of Pharmacy (in the US) has reviewed and continues to review, thousands of Web sites to determine if they maintain safe pharmacy practices. NABP recommends the consumers to use only sites accredited through the Verified Internet Pharmacy Practice Sites.

DRUGS CONSUMER PROTECTION IN NIGERIA - SHORT OVERVIEW

The National Agency for Food and Drug Administration and Control (NAFDAC) is a Nigerian government agency under the Federal Ministry of Health that is responsible for regulating and controlling the manufacture, importation, exportation, advertisement, distribution, sale and use of food, drugs, cosmetics, medical devices, chemicals and prepackaged water. The organization was formed in 1993 to checkmate illicit and counterfeit products in Nigeria, under the countries health and safety law.

Contaminated and counterfeit drugs are a problem in Nigeria. In one 1989 incident, over 150 children died as a result of paracetamol syrup containing diethylene glycol. The problem of fake drugs was so severe that neighboring countries - such as Ghana and Sierra Leone - officially banned the sale of drugs foods & beverages products made in aside Nigeria.

Such problems led to the establishment of NAFDAC, with the goal of eliminating counterfeit pharmaceuticals, foods & beverages products that are not manufactured in Nigeria and to ensure that available medications are safe. That's why, in December 1992, NAFDAC's first governing council was formed.

NAFDAC replaced an earlier Federal Ministry of Health body, the Directorate of Food and Drug Administration and Control, which had been deemed ineffective, partially because of a lack of laws concerning fake drugs. NAFDAC has various basic functions. The Agency is authorized:

- to regulate and control the import, export, manufacturing, advertisement, distribution, sale and use of drugs, cosmetics, medical devices, bottled water and chemicals;

- to conduct appropriate tests and ensure compliance with standard specifications designated and approved by the council for the effective control of quality of food, drugs, cosmetics, medical devices, bottled water and chemicals;
- to undertake appropriate investigation into the production premises and raw materials for food, drugs, cosmetics, medical devices, bottled water and chemicals and to establish a relevant quality assurance system, including certification of the production sites and of the regulated products;
- to undertake inspection of imported foods, drugs, cosmetics, medical devices, bottled water and chemicals and to establish a relevant quality assurance system, including certification of the production sites and of the regulated products;
- to compile standard specifications, regulations and guidelines for the production, import, export, sale and distribution of food, drugs, cosmetics, medical devices, bottled water and chemicals;
- to undertake the registration of food, drugs, medical devices, bottled water and chemicals;
- to control the exportation and issue quality certification of food, drugs, medical devices, bottled water and chemicals intended for export;
- to establish and maintain relevant laboratories or other institutions in strategic areas of Nigeria, necessary for the performance of its functions.

NAFDAC has made several achievements over the years, including:

- the creation of 6 Zonal and 36 state offices for easier accessibility, which are being equipped to function effectively;
- the organization of workshops to enlighten various stakeholders, such as: (a) pure water producers (b) the Patent and Proprietary Medicine Dealers Association (PPMDA) and (c) the National Union of Road Transport Workers and National Association of Road Transport Owners (NURTW & NARTO);
- raising awareness not just in Nigeria, also in other countries like India, China, Pakistan, Indonesia and Egypt;
- holding meetings, in concert with the Chairman, House Committee on Health and his members, with Ambassadors of countries identified with exporting fake drugs into Nigeria and solicited their support to stop the trend;
- making NAFDAC activities more efficient to reduce delays in - for example - registration and inspection;
- holding consultations with national and international stakeholders leading to various areas of assistance, including the areas of staff training, equipment donations and information sharing from the United States Food and Drug Agency (USFDA), Environmental and Occupational Health Science Institute (EOHSI), South African Medicines and Medical Devices regulatory Agency (SAMMDRA).

Despite the establishment of NAFDAC, the sale and use of fake drugs in Nigeria did not end.

DRUGS CONSUMER PROTECTION IN ROMANIA

In Romania, the issue of promoting the interests of drugs consumers is heavily disputed. Officials of the National Authority for Consumer Protection (NACP) accused - since 2007 - drug companies, that they practice unethical techniques to promote their products, going to hide their side effects and misleading advertising. The charges were launched at the World Consumer Day, with the title "Unethical promotion of medicinal products". The Romanian Association of International Medicines Manufacturers said that, the accusations of The National

Authority for Consumer Protection on unethical promotion of medicines were not supportive since the rules for promoting drugs in Romania are identical to those in the EU, rated at the highest international standards of ethics. These rules were developed by the National Agency for Medicines (NAM) and the Ministry of Health since early 2001, although at that time Romania was not a member country and he not even begun the accession negotiations - sustain the Romanian Association of International Medicines Manufacturers (ARPIM). In April 2006, these rules were included in the Medicines Act (95/2006). In addition, the international pharmaceutical companies doing research and discovering new medicines joined in the ARPIM, have a code of ethics that comes to supplement the regulations developed by the NAM and the Ministry of Health. This code builds on code EFPIA (European Federation of Pharmaceutical Industries and Associations, an organization which is affiliated ARPIM), i.e., promotional activity carried out by these companies in Romania meets the same rigorous ethical standards that we observe in all the EU countries. Also, each organization receives regular checks on the topic of the international teams sent by the parent company.

FAKES AND DRUGS SALES

The problems facing the drug industry in Romania are complex. As the importance of prescription drugs in the Romanian health care system and national economy has increased, there has been a concomitant increase in the attention needed at the access to these pharmaceuticals. At all these problems we have to add the ignorance of the consumers in buying drugs. This clearly shows that we, consumers, are not properly and fully informed about the diverse drugs offer.

For example, all of us have used Algocalmin at least once in a lifetime. Algocalmin market in Romania is estimated at over \$ 11 million annually. Low price has turned it into the pain killer no. 1 for the Romanians. Few of the consumers know, however, that the substances designed in this product can attack the links between the bones and joints, or can dissolve the calcium in the body. That's why, all the substances that exist in Algocalmin and their effects should be presented in the leaflet that accompanies the product. But what did not provide this leaflet are the reactions that occur over time and may alter the consumer's health. Even if this situation has been publicized, it has not stopped the production and sale of this product.⁶

Even if the consumers keep in their mind the health recommendations, The European Agency for the Evaluation of Medicinal Products did not restrict the use of Algocalmin. However, most European countries have banned him for many years.

In similar situation are the antibiotics which cure one or more disease, but have adverse effects on other parts of the organism. There are medicines in whose composition are substances that are used to manufacture drugs, falling under the Romanian Law no. 143 / 2000, on drug trafficking and consumption: Codeina, Morphynum, Diazepam, Nurofen, Paracetamol Sinus etc. Their repeated use creates a highly addiction and is superfluous to mention that even in this case, in Romania does not exist an authority able to promote the consumer interests.

Under the name of ethno botanical plants- this should not be as harmfully as the traditional medicines are - market has become a billion euro business. The consumption of these legal drugs has increased in Romania four times in the last year. As a result of this consumption - many young people have suffered from personality disorders, others died after they consumed these, but no one from the competent authorities did intervene. Who is guilty of these tragedies?

Not enough information? Handling consumers? Who must intervene in these cases? Who takes responsibility for the health and the life of consumers?

All the Romanian pharmacies sell not only drugs, but also cosmetics on whose label is inscribed: "Dermatologically tested." If the product has the words "Dermatologically Tested" on the packaging, it means that it has been tested on human skin. This however does not necessarily mean the product (or it's ingredients) are automatically "bunny friendly".

Take the example of self-tanning creams, which contain chemicals that protect us from sunburn, but in fact, they use chemicals which can disrupt the endocrine system and the skin cells. Another situation where the authorities should intervene to protect consumers is establishing the drugs price. Although these products are considered to be a necessary evil, all consumers should have access to them. Unfortunately, due to the high trade margins charged by pharmacies, some people no longer afford to buy these drugs.

Another concern represents the sale on the Internet of false medicines, sales which are growing in all the EU countries. A recent survey undertaken in Romania has identified 170 fake or unauthorized drugs, distributed on the Internet. But their actual number is much higher. Most products sold in this way proved to be Viagra, growth hormones, sleeping pills, antibiotics, insulin and contact lenses. In Romania, we don't have to look far to find a healthy product that's totally bogus - or a consumer who's totally unsuspecting. Promotions for fraudulent products show up daily in newspaper, magazine ads and in TV promotion campaigns.

Counterfeit drugs are "false copies" of famous brands of medicines, pharmaceutical preparations which may have similar ingredients to the original. After the investigations, the Romanian authorities detected cases with frauds where quite different ingredients were used than the original products, aggravating and not improving the patient's state which used that treatment. Some contained just chalk powder, starch or flour, but they found drugs and pills designed to mislead patients into thinking that "pills" would have a beneficial effect.

Another huge concern for the Romanian consumers is the expired drugs. That's why, regular inspections of the products and the removal of items that are within 60 days of their expiration dates, is needed. But, we can't forget to remind the consumers to check the "sell by" and "expiration" dates, and to notify the Romanian Authorities for Consumer Protection immediately if they find expired products.

In Romania, both - NAM and the Ministry of Health - have specialized inspectors who work across the country to receive, verify and investigate any complaint of violation of the existing rules received from consumers, institutions, organizations or businesses. Monitoring shall be made by the Ethics Commission ARPIM. This commission is investigating the situation immediately detected and, when appropriate, punishes members who have violated professional ethics.

ARE THESE DRUGS REAL? ARE THEY SAFE? IS THAT A MORAL SALES STRATEGY?

All over the world, drugs consumer protection remains an idealistic issue, said Ray Moynihan who, together with Alan Cassels - a pharmaceutical policy researcher - wrote a best-seller about the health care budgets which are being bankrupted by drugs industry. By examining ten disastrous drug-related cases that have jolted public trust in medicine and hugely tarnished the luster of a once admired industry, the authors underlined an ingenious marketing strategy. That strategy has succeeded in hugely increasing demand for drugs - mostly by healthy Americans.

Selling Sickness reveals how widening the boundaries of illness and lowering the threshold for treatments is creating millions of new patients and billions in new profits, in turn

threatening to bankrupt health-care systems all over the world. As more and more of ordinary life becomes medicalized, the industry moves ever closer to a special dream: "selling to everyone."

The book's prologue contains the germ that sprang into action validating the authors' premise: that the pharmaceutical industry (Pharma) is no longer focused on selling cures for disease, but rather on marketing drugs to the worried well. Pharma's unprecedented profit margins attest to the power of suggestion - especially when re-enforced repeatedly through direct-to-consumer advertising. The authors use ten examples to illustrate how "the vast web of interrelationships between doctors and drug companies" and the absence of independent review, enables Pharma to achieve its goal of selling sickness to an ever widening circle of healthy people. This monolithic corporate influence has resulted in the perversion of the practice of medicine and the goal of the healing profession. Indeed, adverse drug effects are creating chronic diseases requiring additional drugs.

Moynihan and Cassels show how Pharma has used "weapons of mass seduction" to gain public trust and decisive influence over the medical profession, medical practice guidelines, public health policies and both, scientific journals and mass media. It succeeded in gaining control over medical practice and public expenditure through strategic, systematic and systemic corporate sponsorship. Indeed, this industry has succeeded in shaping our very perceptions of health and sickness to promote "lifestyle" medicines.

Pharma seems to have adopted the marketing strategy of the cosmetic industry and is creating discontent and anxiety about perceived imperfections, using psychological weapons to prey on people's fear of sickness, aging, loneliness, death - all calculated to create a demand for its latest pill. This immoral sales strategy disregards the fact that drugs have risks and adverse side effects that are often catastrophic. To overcome this problem, industry has turned medicine on its head. Instead of relying on evidence for the presence of disease and evidence a favorable risk/benefit ratio to justify a medical intervention, doctors are prescribing drugs based on corporate sponsored "public awareness" campaigns that create "illness."

"Public awareness campaigns are turning the worried well into the worried sick - underlined the authors. Mild problems are painted as serious disease, so shyness becomes a sign of social anxiety disorder and premenstrual tension a mental illness called premenstrual dysphoric disorder..... so, healthy middle aged women now have a silent bone disease called osteoporosis and fit middle-aged men a lifelong condition called high cholesterol." Cholesterol-lowering drugs bring in revenues more than \$25 billion a year.

Four of the ten cases are exclusively directed at women. The case of hormone replacement therapy (HRT) as a "treatment" for menopause, encapsulates what is fatally wrong with the marriage of convenience between doctors and industry. Science writer Barbara Seaman, co-founder of the National Women's Health Network and author of *The Greatest Experiment Ever Performed on Women*, is recognized as "the first prophet of the women's health movement" because she was one of the first who recognize that HRT was dangerous and for decades continued to challenge the promoters of HRT by pointing to evidence of its carcinogenicity. Somehow, Seaman was not mentioned in the book.

Selling Sickness shows how the combined effort by industry funded medical opinion leaders, PR companies, celebrities, subservient regulatory agencies, an uncritical media and a chorus of industry-supported patient "advocacy" groups have helped to promote the medicalization of "conditions" stemming from the human condition. Selling Sickness dovetails the release of the powerful film version of John le Carre's fictionalized book, *The Constant Gardner* (2000). At a minimum the film raises serious questions about the immoral dumping of lethal drugs on Third World populations and the integrity of industry-sponsored clinical trials conducted in those underdeveloped countries. Both are aimed at general audiences, persuasively

demonstrating how industry's control of medicine is perverting the healing profession from improving health to doing great harm.

Drug companies are systematically working to widen the very boundaries that define illness and the markets for medication grow ever larger. Mild problems are redefined as serious illness and common complaints are labeled as medical conditions requiring drug treatments. Runny noses are now allergic rhinitis, PMS has become a psychiatric disorder and hyperactive children have ADD. When it comes to conditions like high cholesterol or low bone density, being "at risk" is sold as a disease. That's why, *Selling Sickness* is considered a spirited journalistic exposure of the methods used by the pharmaceutical industry to expand the market for its products. These include the redefinition of risk factors - such as raised cholesterol and blood pressure, or reduced bone mineral density - as diseases afflicting substantial sections of the society and always requiring treatment.

CONCLUSION

The paper suggests the present state of the approximation of laws in the EC medicinal products market and shows the deficiencies of harmonization in different areas of drug safety law (marketing authorization, post-marketing control, coordination procedures). But even where the level of legalization and approximation of laws is high, different safety decisions are taken by national authorities. The approximation of laws does not automatically produce uniform safety decisions across the European Union. Drug law can only set a framework for consumer protection. It can't totally programme individual safety decisions.

Therefore we propose a European Medicinal Products authority which should be provided with the competence to decide on the manufacturing of new medicinal products. The consumer/patient interest in optimal drug safety should be integrated into the procedure of decision-making by a right of participation. Knowledgeable experts, authorized by consumer organizations, should be members of the advisory committee of this authority. This may be a step that would help to solve the critics on drugs safety.

But, is it really possible to solve the drugs safety issues? Literature in this area is so contradictory and the market reality shows something else. There have been a lot of rumors about health care reforms. Instead of these, until every year thousands of people are injured by dangerous and defective drugs means that, the policy which protects the consumers' interests has proven ineffective.

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OVERCOMING THE GENDER GAP IN MATH, SCIENCE AND TECHNOLOGY: A 21ST CENTURY VIEW

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Abstract

Any country wishing to be an integral part of the 21st century financial, academic, and social community needs to reach full participation of women in science and technology at all learning stages and all advanced positions. When this is not the situation, 50% of the work force is not fully contributing to the modern world, which is in a constant need for more highly qualified professionals. Participation of young girls in math and science classes, as well as in computer competence, has already been improved in many countries that started studying the problem of under-presentation of females in so-called "masculine" areas. In many more countries young females excel in math, science and technology in high school and college (e.g. the United Kingdom, The United States, Israel). Other countries invest a lot of effort in order to reach equity in achievements of girls and boys (e.g. the Scandinavian countries), but in spite of their affirmative action regarding many aspects of public life, and their laws helping to reach gender equity in the private arena, gender gaps in educational achievements still exist. On the other hand, in the ex-USSR new republics there has been a long tradition of full participation of women in all professions,

and without any special intervention areas such as medicine and engineering have been equally divided between males and females for many decades. In this lecture I am to present the situation regarding gender inequity in math, science and technology at all educational and professional levels and to suggest effective ways to close existing gender gaps in school, university and "real life".

INTRODUCTION

Nigeria has proceeded far beyond the "raising of awareness of gender equity" stage in many life aspects. In the last 20 years literacy has increased in Nigeria substantially in general and among women in particular (Eze, 2010; Jaulmes, 2007). Here is the list of the main institutions that have contributed to dealing with the gender issue both in education and employment in Nigeria:

- I. Committee on the Elimination of Discrimination against Women (2004a, 2004b, 2007);
- II. UNICEF: launch Girls' Education Initiative in Nigeria (Jaulmes, 2007; UNICEF, 2008, 2011);
- III. Nigerian Association of University Women (2009). A group of graduate women interested in improving the mental, social, and physical lives of women and girls in Nigeria. Its main activity: empowering women to excel in life;
- IV. The Center for Development and population activities (2011);
- V. Business and Professional Women – Nigeria (2011).

In addition, education and employment of women in Nigeria, as well as the women's situation, are discussed in many newspapers on a regular basis. For example: Eze's (2010) article or the *Afrique en langue* article (Education-Nigeria: Ensuring education for girls, women, 2011). More extensive, scientifically-based reports have been published in journal articles about this issue. For example: Ukpore (2009) wrote about "Sustainable development in Nigeria: Roles of women and strategies for their improvement", and Ojobo (2008) wrote about "*Education: A catalyst for women empowerment*". Let us cite Ojobo's abstract, as it both summarizes the problem of gender gaps in education in Nigeria and offers a way to solve it:

The article] examines the place of education as a catalyst for women empowerment in Nigeria. The paper, using primary and secondary sources of data, has shown that in spite of all the laudable goals and objectives of education, Nigerian women still suffer a lot of constraints and inhibitions which militate against their personal and national development. The paper therefore recommends, among others, the involvement of women in educational policy formulation, extensive enlightenment campaigns, the discarding of stereotypical division of work into men's and women's job, and women must organize themselves to meet the challenges of a positive and meaningful role in the struggle for personal and national emancipation, development and progress (ibid, p. 75).

PERSONAL VERSUS NATIONAL NEED FOR HIGH QUALITY PROFESSIONALS IN SCIENCE, ENGINEERING AND TECHNOLOGY

A modern country needs as many students as possible specializing in math, science, and technology in order to compete with the world economics, supply work places for the less educated or contribute to the national economics by attracting foreign investments and increasing exported goods. This is one of the main reasons for encouraging more women to be a part of the high-level professional work-force (Eidelman, 2006). This obviously contributes to national strength; there is high positive correlation between participation of females in the work force and the wealth of the country. Nigeria scores no. 32 in the world in its Purchasing Power Parity (*The World Factbook* 2010), which means it has a potential of becoming a rich country with a much higher life quality for all its citizens when more women take part in developing its economics and turning its natural treasures into financial advantages. At the same time, education and high prestige positions also contribute to the well-being of females as individuals and as a group.

Women have proved themselves to be able to "make it" in all influential areas, even at the highest possible levels, such as politics, business or science. It can thus be concluded that we are far beyond the stage of proving that "it is possible". The aim of each county must now be increase dramatically the percentage of these women, a target that is to be achieved only by intensive intervention for the benefit of large sub-populations of women who have not yet reached the point where they advance relying only on their merit; they still need some external help. Let us describe some potential ways of helping the less privileged women.

One such group is underprivileged university students. This is the majority of the female population, who neither take part in the educational opportunities offered nor participate in the upper level of the work market, namely, in occupations that are neither manual nor clerical, and have but very limited progress opportunities; women from the economic, ethnic, and geographical periphery.

One such intervention that has already proven to be of great help for underprivileged talented, ambitious and diligent women is a mentoring program tailored especially for them.

MENTORING PROGRAMS: BACKGROUND AND REVIEW

At the turn of the 21st century a substantial reform has occurred in the structure of higher education: learning in academic institutions has become more accessible to larger sub-populations, as more academic and communal colleges have opened their gates to students from underprivileged backgrounds. Girls living in the periphery, minority girls, girls from immigrant families, as well as girls from traditional families have mostly benefited from this "educational revolution".

However, for many high ability female college students the opportunity to get a higher degree does not reflect their true potential. In many cases the teaching staff in the college is still young and inexperienced in nurturing gifted, talented students, or consists of retired university professors who teach part-time and dedicate most of their resources to research. In addition, many of these excellent students, coming from a traditional background, are not used to attracting special attention and care, especially from male instructors. For such a student the mentoring option, especially by a female mentor, might be of great help both as a part of the teaching and learning process and for helping design the student's professional future.

Mentoring of each of the sub-groups of talented students has the potential to make a change, the result of which is extending the educational as well as the career limits of underprivileged female students.

Mentoring programs have been developed in many EU member countries during the 90s in the academia as well as in the industry. The European Commission has sponsored a

“Mentoring for Women in Europe” program, and there are already positive results in three European countries – Germany, Finland, and Sweden. The percentage of women leadership positions in these countries has increased since the funding of this project. The “Mellow – Life Long Mentoring Of Women in and/or towards technical jobs”, which is also sponsored by the European Community, is a part of the “Leonardo-da-Vinci” program in the Netherlands, England, Ireland, and Germany. In addition, there are training programs in the fields of engineering, which take place in Greece, Spain and Finland. For schoolgirls summer camps have been offered, and for female university students – special summer university courses.

Engineering associations, industrial companies, universities, the government and other organizations have been giving constant support to the British project: “Women into science and engineering [WISE]” (WISE, 2010). The WISE Annual Awards are given in recognition of companies and individuals who have actively addressed the issue of promoting Science, Engineering and Construction to girls and young women. Among the WISE awards are: The WISE Excellence Award; WISE Partnership Award; WISE Outreach Award, and WISE Special Judges Award. *Trish Goodchild*, the winner of the 2010 WISE Outreach Award, said that “The Outreach Award in particular is given to a University who has implemented and is determined to sustain a set of successful outreach strategies to support and encourage more female students into STEM subjects”. However, the success of this program has also to do with the fact that the effort to reach females who are to be a part of this British program starts already in primary school (ibid). Indeed, it is much easier to succeed when starting early, but it is never too late to start.

Coaching and mentoring women has been carried out in Switzerland both by Swiss universities and by The Swiss Association for Women Engineers [SVIN] (SVIN, 2010). Here is the organization's credo:

The Swiss Association of Women Engineers (SVIN) is a not-for-profit, professional organization for individuals with an interest in engineering. The members of our national organization are engineers from various branches and allied fields, corporations and persons interested in supporting the aims of SVIN. SVIN is dedicated to the advancement of women in engineering fields, business, education and industry and strives to motivate young women to pursue a career in engineering.

In addition to the activities aimed at older females, *the Swiss Association of Women Engineers* has initiated the “KIDSInfo” setup for children, focusing on young girls (KIDSInfo, 2010). Its latest activity has been the 2nd festival for children “*Hérisson sous gazon*”, on June 19, 2010, at Charrat, Valais. Girls participating in the festival had an opportunity to experience “everyday electricity”, such as building electrical circuits, understanding how everyday tools work, and most importantly – breaking the male stereotype of dealing with machines and instruments and fixing them when necessary. Mentoring programs have been taking place in industrial institutions throughout Europe. For example: Telekom has established a mentoring program of its own. Activities like “A girls' technology day” have been organized in many industrial research centers in England, Germany, Austria, Finland, and Sweden.

HOW CAN A MENTORING PROGRAM HELP?

Mentoring as means of under-represented populations to gain participation in the main-stream education system and reach higher levels of employment has been known for many decades. A mentor for underprivileged female college students has many tasks, educational, psychological, and social. Here are the main ones.

I. Identifying the high abilities of the mentees at the earliest possible educational stage and making plans for their fulfillment. Let us start with an [is "example" the word that's missing here?]. If the mentor discovers that her mentee has a special gift for languages, she should encourage her to develop this gift in order to acquire proficiency in a few languages before getting the degree. This will enable the student to continue her studies in one of the linguistics departments, in an MA translators track or in a literature department where her languages knowledge will be considered an asset. It will also give her more possibilities in the market place, allowing her to choose to become a literary, technical or legal translator, or perhaps to prefer simultaneous translation. In any case – being proficient in a few languages will increase both her opportunities and her potential salary.

II. Raising the awareness of the students of their real educational and professional situation. many underprivileged young women do not even know that there are huge differences between university and college education, that an academic degree does not necessarily mean getting a job where education will be taken into consideration that most first degrees are not professional degrees and that different higher education institutions are valued differently with regard to their quality. The first task of the mentor working with a BA college student or with a female university student whose expectations do not go far beyond getting a degree in a non-scientific subject should be helping her to know these simple facts. The mentor should be very clear in explaining that a first degree from a second rate college is usually sufficient just for clerical, administrative jobs, while a good university could serve as an "open ticket" for a better education and a wealthier future.

III. Being role-models for the students. Role-models must not necessarily be of the same gender, ethnic group or religion, but it is preferred that they be similar in as many components as possible to their mentees. For example: a female older woman from a traditional background who is a wife and a mother, in addition to being a successful academic, can be a living example to a young woman from a traditional family, where the main task of women is perceived as raising a family.

IV. When possible, meeting the student's family member who might hinder her aspirations in order to "soften" their objection gradually. It is highly recommended, especially for students from a rural background, that the female mentor visit the mentee's parents. In that case the resistance to leaving home, acquiring a high-prestige family, or the delaying of marriage, which usually accompany higher education, might lessen, making the student's life easier.

A PRACTICAL ISSUE: COST AND BENEFITS OF A MENTORING PROGRAM

In many existing mentoring programs, aimed to raise the participation of girls and young women in math, science and technology, the mentors have volunteered to their task without any payment (CyberMentor, 2009; MentorING, 2008; Mentoring an der TUM, n.d.; Schneiderdorfer et al., 2003). In all these programs the mentees contribute to the mentors as they are all good students willing to participate in science and engineering studies at the earliest possible stage. Thus the cost of the mentoring program will be minimal. A young diligent female student who is happy to get all the advantages an older professional can give will be eager to help the mentor in any possible way. The mentor, on the other hand, will be obligated both to the high

education institution where she works and to the future advancement of good students in the various fields of knowledge.

SUMMARY

A mentoring program is just one idea for helping young underprivileged high ability women to reach the full extent of their potential. As many other mentoring programs have been successful both abroad and in Israel, it is time for that special effort to be invested in a large population that has been underprivileged in spite of their proven abilities and high motivation. The program is based on the good will and willingness to invest in the next generation of young women who are both intelligent and diligent, and as such can be enriching not only to the mentees but to their mentors as well.

GENDER AND EDUCATION

The State of the Art in Math and Science

Participation of women in high prestige occupations, especially in the areas of technology and “hard” science, has been low in spite of efforts made by many concerned countries. The under-representation of women has focused in the areas of mathematics, technology, physics and engineering (*Amancio, 2005; Braithwaite & Tacitus, 2001; Frauen in der Informations Gesellschaft, 2000*). The main obstacle to learning high level science and technology has been a lack of mathematics knowledge (e.g. Hassi et. al, 2010).

Gender Differences in Participation and Achievements in Math, Computers and Technology, and Science

Math and science are the keys to technology. Therefore it is crucial to bridge existing gender gaps in these two areas in order to maintain access to underrepresented groups to technology-related occupations.

Gender Differences in International Examinations in Grades 4 and 8 Math and Science

Findings from international examinations.

In Mathematics

In 2007 36 countries participated in The Trends in International Mathematics and Science Study (TIMSS) at grade 4, and 48 participated at grade 8. Among 4th grade students, significant gender differences favoring boys were found in 12 countries; gender differences favoring girls were found in 8 (Mullis et al., 2008, Exhibit 1.5). In grade 8 significant gender differences favoring boys were found in 8 countries, favoring girls – among 16 (ibid, Exhibit 1.5). More careful analysis of TIMSS 2007 reveals that in regard to the actual results, gender differences have been reduced in the last two decades substantially, and in many countries their direction has turned over and girls score significantly higher than boys. However, if we look at the "Self confidence in learning mathematics" result (ibid, Exhibit 4.11) we shall see that among high self confidence math students, substantial gender differences favoring boys have been discovered in most countries participating in the TIMSS 2007. Only in 4 countries, Kazakhstan, Kuwait, Qatar and Tunisia, more girls than boys belonged to this category, while in 22 countries, including countries where the actual achievements of girls were higher than those of boys, boys scored higher regarding self confidence in math learning.

A similar picture has been revealed among 8 grade math students: only in Bahrain, Cyprus. Qatar and Saudi Arabia girls were the majority among "high self confidence in math

learning" students, while in no less than 26 countries there was a significant difference favoring boys in "high self confidence in math learning" (ibid, ibid). This could have been understood had boys scored higher in math in these countries, but that was not the case. Of the 26 countries with boys having a majority among high self-confidence students in math learning, in most cases there was no actual reason for this high self confidence, as only in 8 countries boys scored better than girls (ibid, Exhibit 1.5).

We can conclude that girls' self confidence in math learning must be improved even when they actually do very well in school. It has been proved that belief in one's own math ability is the single component influencing more than any other the actual achievements among junior high school students (David, 2009). Thus girls who do not believe in their math ability have worse prospects to go on learning it than those who believe in their ability to improve and develop in this area.

In Science

Of the 36 countries participating in the science part of the TIMSS 2007 at grade 4, significant gender differences favoring boys were found in 8 countries; gender differences favoring girls were found in 6 (Martin et al., 2008, Exhibit 1.5).

It is of special importance to note that the advantage of boys in math, even at an early stage – grade 4, is highly correlated with advantage in science. Of the 8 countries, where significant gender differences favoring boys were found among grade 4 science students, 7 were also in the 12-country list with significant gender differences in mathematics. The eighth, El-Salvador, which had also significant gender differences favoring boys in science, had also quite large gender differences in math among grade 4 students (9 points), though this difference was non-significant (Mullis et al., 2008, Exhibit 5.1; Martin et al., 2008, Exhibit 1.5).

Of the 6 countries where girls scored higher than boys in science in grade 4, 4 – Armenia, Qatar, Tunisia and Kuwait – also had gender differences favoring girls among 4th graders in mathematics (ibid).

In grade 8 significant gender differences favoring boys were found in 8 countries, those favoring girls – in 16 (Martin et al., Exhibit 1.5).

CONCLUSIONS

1. Islamic countries have higher gender differences favoring females in math and science.

In actual achievements

Grade 4 science: Of the 6 countries, where gender differences favoring girls were found, 4 were Muslim: Algeria, Qatar, Tunisia and Kuwait; 2 are mainly Christian, with other influencing religions: Georgia with about 10% of Muslims, and Armenia with a variety of minorities, including Kurds who practice [Sunni Islam](#) (ibid);

Grade 4 math: gender differences favoring girls were found in 8 countries, 5 of which were Muslim: Tunisia, Kuwait, Qatar and Yemen (Mullis et al., Exhibit 1.5).

Grade 8 science: gender differences favoring girls were found in 16 countries, 8 of which were Muslim: Egypt, Jordan, The Palestinian Authority, Saudi Arabia, Kuwait, Oman, Bahrain, and Qatar (Martin et al., Exhibit 1.5).

Grade 8 math: gender differences favoring girls were found in 16 countries, 7 of which were Muslim: Jordan, Kuwait, Saudi Arabia, Bahrain, The Palestinian Authority, Qatar and Oman (Mullis et al., Exhibit 1.5).

In self-confidence

Grade 4 math

Among high self-confidence grade 4 students, significant gender differences favoring girls were found in the TIMSS 2007 only in 4 countries – all Muslim: Kazakhstan, Kuwait, Qatar and Tunisia (Mullis et al., 2008, Exhibit 4.11).

Grade 8 math: significant gender differences favoring girls regarding high self-confidence in math were found in 4 countries, 3 of which were Muslim: Bahrain, Qatar and Saudi Arabia (ibid).

Grade 4 science: Among high self-confidence grade 4 students, significant gender differences favoring girls were found in the TIMSS 2007 in 10 countries – 5 of which were Muslim: Algeria, Kazakhstan, Kuwait, Qatar and Tunisia (Martin et al., Exhibit 4.11).

Grade 8 science: Among high self-confidence grade 8 students, significant gender differences favoring girls were found in the TIMSS 2007 only in 4 countries – all Muslim: Bahrain, Kuwait, Qatar and Turkey (ibid)

2. Gender differences favoring boys are not necessarily larger in countries where achievements are higher

There has been found no correlation between gaps in achievements and the achievements themselves. Let us see some of the findings.

Grade 4 mathematics:

Of the 8 countries with gender differences favoring girls in grade 4, four had scored much higher than the international mean (Singapore Russian Federation, Kazakhstan and Armenia); the other 4 – all Arab countries – scored under it (Mullis et al., 2008, Exhibit 1.5).

Grade 8 mathematics:

- The country which scored the highest in the world in the TIMSS 2007 – Singapore – had a significant gender difference of 15 points favoring girls.
- Of the 16 countries with significant gender differences favoring girls, 5 scored above the international mean and one, Thailand, scored exactly at the international mean – 453 (ibid). On the other hand, of the 8 countries with significant gender differences favoring grade 8 boys only one – Australia – had achievements higher than the international mean. It can thus conclude that in most cases increasing the level of girls has a contribution to the country's mean, and in well-educated countries an increase in girls' achievements is accompanied by an increase in boys' achievements.

Grade 4 science:

Of the 6 countries with gender differences favoring girls in grade 4 one –Armenia – had scored well above the international mean (Martin et al., 2008, Exhibit 1.5).

Grade 8 science:

Of the 14 countries with gender differences favoring girls in grade 8 two had scored well above the international mean and who more just a little under it (ibid). It seems, thus, that while the correlation between gender differences favoring girls and the actual scores is negligible in math, it is a little higher in science.

3. Something is rotten in Denmark: Being "Western" does not necessarily mean having small gender differences in educational achievements

The TIMSS 2007 show that only non-Western countries had overcome the gender gap favoring boys in grade 4 and 8, both in math and in science. Let us examine the results in detail.

Grade 4 mathematics

Of the 8 countries where gender differences favoring girls have been found among 4 grade students there was not even one western country: of the 6 Muslim countries 4 were Arab (Tunisia,

Yemen, Qatar and Kuwait); the other two were both ex-USSR countries (Kazakhstan and Armenia), Kazakhstan is also Muslim. The remaining two countries were Singapore and the Russian Federation (Mullis et al., 2008, Exhibit 1.5).

Grade 8 mathematics:

Of the 16 countries where significant gender differences were found, there was not even one Western country (ibid).

Grade 4 science:

Of the 6 countries where significant gender differences were found, there was not even one Western country (Martin et al., Exhibit 1.5).

Grade 8 science:

Of the 14 countries where significant gender differences were found, there was not even one Western country (ibid).

4. Do gender differences increase with age? Will gender differences in achievements, favoring boys, in grade 4 predict similar or even larger differences in grade 8?

In 2007, gender differences favoring boys were found in 12 countries among 4 grade students in mathematics, but only in 8 countries among 8 grade students (Mullis et al., exhibit 1.5). A somewhat different picture was found in the science part of the TIMSS 2007: in 8 countries gender differences favoring boys were found among 4 grade students; in grade 8 the number increased to 11 (Martin et al., 2008, Exhibit 1.5). It is of special importance to note, that most countries where gender differences favoring boys existed in grade 4 did not prove to be able to close them in grade 8 (ibid). Furthermore, in most cases these gender differences became larger in grade 8 (ibid).

SUMMARY

*Unlike what we have all been taught to believe, high achievements do not necessarily result in widening gender differences in math and science achievements. In many more cases increased achievements have been shown in countries where gender differences have been decreased.

* Trying to decode the mystery of the reasons for gender differences in achievements by finding common characteristics of countries where gender differences favor girls requires is far beyond the scope of this work, if at all possible.

* As most studies about gender differences in general and educational gender differences in particular are conducted and published in the US, it is possible – maybe even likely – that these studies do not reflect the situation in other countries.

* In spite of the fact that there is no simple correlation between gender differences in math and science at grade 4 and those at grade 8, the connection between them should not be ignored. From an educational point of view it means that preventing gender differences or closing them when they already appear at the earliest possible age helps to avoid such differences at a later stage.

The Main Objective: Improving the Education and Employment of Women in IT Society

A straight line can be drawn along the path from early education to future occupation in the areas of science and technology. When we look at the global picture, the data is far from being satisfactory. Let us look first at the European situation. Europe can be divided according to participation of women in technology and science, both in industry and in the academia, into three main groups: 1. The German-Flemish Group, which includes Germany, Austria, Switzerland, Belgium, The Netherlands, and to some extent Denmark. This group scored the worst regarding

female achievements in high school in science and technology, female participation in "typically male" academic areas and female participation in high prestige careers in these fields. 2. The Southern countries – Greece, Turkey, Portugal, Spain, and to some extent Italy. They have scored the best in all abovementioned educational and occupational stages. 3. France and Scandinavia – except for Denmark (to some extent except for Norway as well) – they have average scores regarding female education and occupation level. England, Scotland, and Ireland belong to this group as well – they are characterized by mixed results, namely high level of gender differences in some areas, low level of such differences in others, and average gender differences in the remaining fields. Let us see what happens in these three groups at all educational levels, with some examples of particular countries within each educational and occupational level.

There is an accepted assumption, which we have already shown to be true when discussing gender differences in math and science at age 10, that until the age of 12 girls do at least as well as boys in all subjects, including mathematics and science. According to this assumption, at age 12, because of social-cultural pressures, girls, particularly the more talented, start to underachieve in mathematics (e.g. Arnot, et al., 1998; Bailey, et al., 1997; Boaler, 1997; Campbell, & Sanders, 1997; Lundenberg, 1997; Wilgosh, 1998; Zorman & David, 2000). As a result, the percentage of girls studying enough mathematics to enable their further education in prestigious professions is smaller than that of boys. Let us see what has already been done to improve this situation at the various stages of education.

SCHOOL PROGRAMS

Because of the necessity to encourage girls – at the youngest possible age – to participate in extra-curricular math and science activities, a number of programs have been developed in Europe for primary and junior high school girls. Let us survey them briefly.

Teaching single-sex classes. The National Association for Single Sex Public education (NASSPE) has recently reported that

In March 2002, when NASSPE was founded, only about a dozen public schools offered single-gender classrooms. As of January 2011, there are at least 524 public schools in the United States offering single-sex educational opportunities. Most of those schools are COED schools which offer single-sex CLASSROOMS, but which retain at least some coed activities (NASSPE, 2011).

The program was developed in the US for primary and junior high school girls. Its aims: to raise the level of self-esteem among girls; to raise the assertiveness level of girls; to improve cooperative work among boys.

Gender-Responsive Pedagogy (GRP)

The Forum for African Women Educators – FAWE – developed the Gender-Responsive Pedagogy (GRP) model to address the quality of teaching in African schools. The model trains teachers to be more gender-aware and equips them with the skills to understand and address the specific learning needs of both sexes. It develops teaching practices that propagate equal treatment and participation of girls and boys in the classroom and in the wider school community.

The credo and main objectives of the program are as follows:

The GRP model trains teachers in the design and use of gender-responsive:

- Teaching and learning materials.
- Lesson plans.
- Language in the classroom.
- Classroom interaction.
- Classroom set-up.
- Strategies to eliminate sexual harassment.
- Management of sexual maturation.
- School management systems.
- Monitoring and evaluation.

Gender-Responsive Pedagogy was initiated in 2005 and has been introduced in Burkina Faso, Chad, Ethiopia, The Gambia, Guinea, Kenya, Malawi, Namibia, Rwanda, Senegal, Tanzania, Uganda and Zambia.

Impact of FAWE's GRP model

- Improvement in girls' retention and performance.
- Greater participation of girls' in the classroom.
- Improved gender relations within schools.

Over 6,600 teachers have benefited from FAWE's GRP training since 2005 (Gender-Responsive Pedagogy, 2005).

A whole school policy approach to gender reform. Different aspects of the program were developed in England (Acker, 1988; Arnot et al., 1998; Ruddock, 1994) and in Norway (Imsen, 1996; Undheim et al., 1995). Its main objectives are establishing a school policy that focuses on equity at all functioning levels. Wilson (2003) had presented her program for overcoming the shortage of women in computer science. Her program consists of two main parts: 1. Improve the recruitment for potential computer scientists 2. Encourage college students to take computer studies as a major. According to her, the first part is the more important one; when it is not done on time it is usually too late to correct it later. It includes:

- Programs concentrated on working with girls in elementary and middle schools to teach computer skills and thus to bolster confidence in computer competence,
- Programs directed toward role modeling and mentoring for middle and high school girls showing successful women in the field of computers.
- Summer programs directed at reducing the male "stereotyping" of computer problem-solving activities by involving girls in an "all-girl" computer camp.

Some of the efforts purported to reduce the attrition of women in college computer courses are:

- Formation of peer support groups among the women studying computer science, with "upper-classwomen" mentoring "under-classwomen",

- Use of cooperative learning techniques rather than the competitive/individualistic approach to writing computer programs,
- Offering supplemental class sessions for those with lesser computer experience,
- Making connections with other disciplines to have more practicality in computing assignments.

A program for attributional retraining to improve the performance of talented girls in math, physics, and chemistry (Heller, 1998, Ziegler, Dresel, & Schober 2000) was developed in Germany. The "Assessing women in engineering" organization (2005, n.d.) has dealt with most of the important issues regarding encouragement of girls, adolescent females and young women to study math, engineering and technological issues. The organization supplies written materials on the following topics:

1. Attribution Theory
2. Career Development Theory for Women in Engineering
3. Cooperative Learning
4. Family Influence on Engineering Students
5. Gender Differences in Math Performance
6. Gender Differences in Science Achievement
7. Mentoring and Women in Engineering
8. Psychological Sense of Community for Women in Engineering
9. Self-Efficacy and Women in Engineering
10. Psychological Sense of Community for Women in Engineering
11. Self-Efficacy and Women in Engineering
12. Visual Spatial Skills

Ort to the 21st century (Rom, 1996) was developed in Israel. Its aims: to educate more girls and boys towards a degree in engineering, and to advance girls in hi-tech. The program functions successfully up to now; the percentage of girls participating in math and science in Ort schools is not smaller than that of boys (Loten, 2005).

COMPUTERS: A NECESSITY TO THE IT WORLD

Starting as Early as Possible

Improving the employment situation of women in the IT society is one of the main objectives of each developing as well as developed society. Therefore, let us first look at the already existing European programs aimed at supporting and encouraging young girls and professional women at the various stages of their schooling and career. These programs are to serve as models to be fully or partially adopted.

A popular way to enhance maximal exposure of all students – with a special focus on girls – to educational and recreational web-sites, is to be up-to-date and to supply the information about available web-sites to the students. For example – a short list of those that might be interesting for girls: There is evidence that while being exposed to the Internet decreases reading ability among boys, that is not the case among girls (DeBelle & Chapman, 2006; Vigdor & Ladd, 2010). Girls benefit from computer games as much as boys do, while preparing themselves to have better future occupations, to serve in higher level positions, and to improve their financial situation. In countries where computers are comparatively expensive, and schools do not offer free use of them, here is some advice that might increase participation of girls in computer use.

Support girls who want to indulge in computer games by ensuring they get equal time to that of the boys. That can be done by allotting half of the available computers to girls (Furger, 1998), by forming – when students need to work with a partner – only girls' or boys' pairs, so that the boys wouldn't take control of the computer while letting the girls watch them, and by encouraging girls to deal with the more technical parts of the work with the computer, e.g. installing new programs, preparing floppy disks for the entire group, and especially learning new programming languages.

In addition to these means, all teachers, headmasters and counselors should participate in special gender-equity in-service training, as the positive attitude of the school's staff towards science education at the primary education stage is crucial for the success of such a program.

SUMMARY

The way to gender equity in math, science, computers and technology, at all educational and occupational levels, is still long. Only when a country adopts a national program aimed to decrease the gap, only when all girls, adolescent females, young women and older women have access to the program most suitable for them – only then will the prospects to bridge the gap increase. Without the talent, diligence, ambition and motivation of 50% of the population no education, cultural or financial system can flourish. Thus, it is the task of the educators to persuade all authorities involved that while better education for females is indeed expensive, the benefits to come from it are much higher and long-lasting than any other investment.

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3

ETHNOBOTANICAL STUDY OF TRADITIONAL MEDICINAL PLANTS IN GINDEBERET DISTRICT, WESTERN ETHIOPIA

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Abstract

Ethiopia, is a country characterized by a wide range of climate and ecological conditions, possesses enormous diversity of fauna and flora. Semi-structured interviewees, observation and guided field walks with informants were employed to obtain ethnobotanical data in Gindeberet district, western Ethiopia. A total of 120 informants (84 males and 36 females) were selected purposefully from six sub districts. A total of 26 species of medicinal plants were collected and identified for treating 36 human ailments. The medicinal plant preparations were administered through oral, dermal and nasal routes. Oral application (33 preparations, 67.3%) was the highest and most commonly used route of application followed by dermal application (15 preparations, 30.6%). The most commonly used plant parts for herbal preparations were leaves (28%) and roots (28%) followed by barks (14%) and fruits (14%). Gindeberet district is rich in its medicinal plant composition and the associated indigenous knowledge. Encouraging the local herbal medicinal practitioners to enhance the use of traditional medicine and licensing the work of the practitioners are recommended.

Keywords: Ethnobotany, Medicinal Plants, Traditional Healers, Gindeberet

INTRODUCTION

Ethiopia, is a country characterized by a wide range of climate and ecological conditions, possesses enormous diversity of fauna and flora (Pankhurst, 2001). The country possesses a wide range of potentially useful medicinal plants, more extensive indeed than available in many other parts of the world. Popular knowledge of plants used by humans is based on thousands of years of experience. By “trial and error”, people learnt how to recognize and use plants, including those with a magic-religious function. In Ethiopia, even though the traditional medical practitioners are the best sources of information about the knowledge of the medicinal plants, it was found very difficult to obtain their traditional medicinal information as they considered their indigenous knowledge as a professional secret, only to be passed orally to their older son, at their oldest age (Jansen, 1981). However, the local indigenous knowledge on medicinal plants is being lost at a faster rate with the increase of modern education, which has made the younger generation to underestimate its traditional values. In addition the increase in population growth rate would result in the intensification of agriculture in marginal areas which would lead to deforestation with decrease in number or loss of medicinal plants in the wild (Phankhurst, 2001). Dawit (1986) estimated that 95% of traditional medical preparations in Ethiopia are of plant origin. Medicinal plants are the base for the development of new drug and the survival of till human kind as well as other livestock.

In Ethiopia little emphases has been given to traditional medicinal studies over the past decade (Debella, 2001). There for it can be said that ethno botanical studies are merely at the start in Ethiopia through there have been some attempts in investigating medicinal plants uses and

there is as yet no in depth study on the relation between medicinal plants and indigenous knowledge on sustainable management of such plant resources. Modern healthcare has never been and probably never will provide for the foreseeable future adequate and equitable health service anywhere in Africa, due to the financial limitations related to rapid population growth, political instability and poor economic performance (Anokbonggo, 1992).

Due to incomplete coverage of modern medical system, shortage of pharmaceuticals and unaffordable prices of modern drugs, the majority of Ethiopian still depends on traditional medicine. The problem of ensuring the equitable distribution of modern healthcare has become more serious, as the gap between supply and demand has continued to widen. According to Sebsebe and Ermias (2001), there is a considerable global interest in tapping the accumulated knowledge of traditional medicine, and therefore, researches are being carried out in many countries with the aim of increasing the use of traditional medicine to the welfare of the human population. The same document also explains that basic and applied researches on medicinal plants are interconnected and the basic research is primarily important in realizing new knowledge and serving as bases for applied research.

STUDY AREA

The study was conducted in Gindeberet district within the Oromia regional state of Ethiopia located at about 270km from Addis Abeba, the capital city of Ethiopia. The district had an elevation ranging from 1400-2800 m.a.s.l. with an average annual rainfall of about 1700-2000 mm and the mean maximum temperature ranges between 20° C and 26° C. Our studies focused on the sub-districts Mudhii, Kaachisii, Harbu Guba, Bidaru Gobata, Haroo Berbaboo and Mukadiima.

METHODS

Based on methods given by Gidey (2010), semi-structured interviewees, observation and guided field walks with informants were employed to obtain ethnobotanical data. For this study purposive sampling was employed to identify potential informants. According to Storck *et al.* (1991), the size of the sample depends on the available fund, time and other reasons and not necessarily on the total population. Accordingly, a total of 120 informants (84 males and 36 females) were selected purposefully with the help of local administrators and local elderly people from six sub districts of the Gindeberet district (Table 1). Recommended traditional medicine practitioners were identified as potential informants and subsequently participated in personal interviews. Interviews were based on a checklist of questions prepared before hand in English and translated to the local language (Afan Oromo). Information regarding local names of medicinal plants, methods preparation, part(s) used, diseases treated, dosage used and route of application was recorded at the spot. Observations were made on the morphological features and habitats of each medicinal plant species in the field. Based on ethnobotanical information provided by informants, specimens were collected, numbered, pressed and dried for identification and plates of each traditional medicinal plant were collected. Identification was done in the field as well as by comparison with authentic specimens, illustrations and taxonomic keys.

Table 1: Sample Respondent Selection in Gindeberet District, Oromia Western Ethiopia

Sub districts	Population			Sample taken			
	M	F	Total	M	F	Total	%
Mudhii Baroo	360	392	752	14	6	20	2.65
Kaachisii	345	298	643	14	6	20	3.10
Harbu Guba	375	225	600	14	6	20	3.33
Bidaru Gobata	261	194	455	14	6	20	0.43
Haroo Berbaboo	380	295	775	14	6	20	0.25
Mukadiima	296	244	540	14	6	20	3.70
Total	2017	1748	3765	84	36	120	13.46

Note: M-male, F-female

RESULTS

The gender distribution of traditional healers was 84 (70%) and 36 (30%) for males and females, respectively and 50% were illiterate. Most of traditional healers were married (50.8%) and 71.7% were older than 46 years (Table 2). A total of 26 species of medicinal plants were collected and identified for treating 36 human ailments (Table 3). The medicinal plant preparations were administered through oral, dermal and nasal routes. However, oral application (33 preparations, 67.3%) was the highest and most commonly used route of application followed by dermal application (15 preparations, 30.6%) (Table 3). The most commonly used plant parts for herbal preparations in the area were leaves (28%) and roots (28%) followed by barks (14%) and fruits (14%). 72.5% of the healers were rural residents (Table 3).

DISCUSSION

Plant diversity remains indispensable for human well being in providing a significant number of traditional and modern remedies required in healthcare. Indigenous people in Ethiopia by large employed plant based traditional medicine to get cured from different ailments. Nearly 80% of the Ethiopian population still relies on plants to prevent and cure various health problems (Dawit and Ahadu, 1993) because of lack of certain infrastructures like hospitals and health centers. In the present study most of the traditional healers were rural residents. This is partly because modern medicinal services are either unaffordable or unavailable to the vast majority of the rural people due to their skyrocketing cost coupled to lack of transport to and from health care centers. The use of traditional medicine is still wide spread in Ethiopia, and its acceptability, availability and popularity is no doubt as about 90% of the populations use it for health care needs (WHO, 2002). According to Konno (2004), easy accessibility, efficacy on treatment and affordable cost in getting health services are main reasons in preferring traditional medicine to modern medication. Medicinal plants are the main, often only source of traditional medicine for the rural population and are of high demand in the health care systems of this population when compared to modern medicine. Traditional healers were found to play an important role in the primary health care system of the rural people as they treat resource people who had little access and could not afford the cost of modern medication.

The study revealed that majority of the traditional healers were older than 46 years. Very few youths were involved in the sale and administration of herbs in the study area. In Ethiopia, it

is very difficult to obtain their traditional medicinal information as they considered their indigenous knowledge as a professional secret, only to be passed orally to their older son, at their oldest age (Jansen, 1981). Derogatory attitudes towards traditional medicine practitioners had forced healers to keep their knowledge and practices to themselves. The distribution of knowledge and services of medicinal plants are hierarchically placed. Most of the traditional healers are males and are married. This showed that they have family to support with the income realized from the sale and administration of the herbs.

Oral application was the highest and most commonly used route of application followed by dermal (Table 3). Dawit and Ahadu (1993) indicated oral as the main route of application used in northern Ethiopia, which accounted for 42%. Moreover, this is in agreement with the result of various ethnobotanical researchers elsewhere in Ethiopia (Kebu *et al.*, 2004; Ermias, 2005, Fisseha, 2007 and Gidey, 2010). Both oral and dermal routes permit rapid physiological reaction of the prepared medicines with the pathogens and increase its curative power (Fisseha, 2007). Majority (94%) of these preparations are drawn from mixtures of different plant species with different additive substances like honey, butter, oil, milk, salt, bread etc (Table 3) for the treatment of single ailment. Similar result was also reported elsewhere (Mirutse, 1999; Bayafers, 2000 and Fisseha, 2007). Dawit (1986) has also identified the additive substances in herbal remedy preparations with their possible benefits. The most commonly used plant parts for herbal preparations in the area were roots and leaves. Previous reports in Ethiopia have shown that leaves were the most commonly used and followed by roots to treat various health problems (Bayafers, 2000 and Mirutse, 1999). High threat to the mother plant comes with root, bark and stem harvest. Medicinal plant harvest that involves roots, rhizomes, bulbs, barks and stems have serious effect on the survival of mother plants (Dawit and Ahadu, 1993). Traditional medicinal plants were harvested mainly for their leaves and roots. Twenty six species of medicinal plants were collected and identified for treating 34 human ailments. The mode of administration was mainly through oral and dermal. Gindeberet district is rich in its medicinal plant composition and the associated indigenous knowledge. Encouraging the local herbal medicinal practitioners to enhance the use of traditional medicine and licensing the work of the practitioners are recommended. Local peoples' indigenous resources should be maintained.

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Table 2: Background Characteristics of Respondents

Items	Alternatives	Count	Percentage
Sex	Male	84	70
	Female	36	30
Age	26-35	17	14.2
	36-45	17	14.2
	46-55	33	27.5
	>56	53	44.2
Religions	Protestant	53	44.2
	Ethiopian Orthodox	67	55.8

Residence	Rural	87	72.5
	Urban	33	27.5
Education status	Illiterate	60	50
	1-4	33	27.5
	9-12		
Marital status	Single	13	10.8
	Married		
	Divorced	14	11.7
	Widowed	29	24.2
		61	50.8
		13.3	
	16	11.7	
	14		

Table 3: List of Medicinal Plants, Diseases Treated, Ingredients added, parts used and Rout of Administration of Remedies

Medicinal plants	Diseases treated	Ingredients added	Parts used	Method of administration
<i>Brucea anti dysenteriae</i>	Dysentery Snake bite Tooth ache Jaundice	Honey Butter Butter None	Fruit Leaf Bark Fruit	Oral Dermal Oral Oral
<i>Calpurnia aurea</i>	Eye disease Snake bite Vomiting Stomach	Leaf Milk None None	Leaf Leaf Root Bark	Dermal Oral Oral Oral
<i>Justicia schimperiana</i>	Gonorrhoea Malaria Rabies Headache	<i>Croton macrostachyus</i> None <i>Brucea antidysenterica</i> None	Leaf Leaf Leaf Leaf	Oral Oral Oral Oral
<i>Acacia mellifera</i>	Sexual incompetence of male	Root and barks of <i>Amaranthus cruentus</i>	Root	Oral
<i>Croton macrostachyus</i>	Skin disease	<i>Hagenia abyssinica</i>	Fruit	Dermal
<i>Embelia schimperii</i>	Tape worm	None	Fruit	Oral
<i>Allium sativum</i>	Closed wound Cold Cough Headache Malaria Skin disease Sour throat	None Honey Honey Oil <i>Girardinia diversifolia</i> <i>Girardinia diversifolia</i> None	Bark Bark Root Bark Root Root Bark	Dermal Oral Oral Dermal Nasal Dermal Oral

<i>Hagenia abyssinica</i>	Tape worm	Water	Leaf	Oral
Lepidium sativum	Male heart ache	<i>Schinus molle ginger</i> Honey	Seed	Oral
<i>Catha edulis</i>	Skin disease	Honey	Seed	Oral
<i>Citrus auratifolia</i>	Inflammation of lung	None	Root	Oral
<i>Phytolacca dodecandra</i>	Abortion	<i>Apodytes dimidiata</i>	Root	Oral
	Anthrax	<i>Apodytes dimidiata</i> <i>Apodytes dimidiata</i>	Root	Oral
	Itchy		Root	Dermal
<i>Ricinus communis</i>	Cold	Water	Root	Oral
	Dysentery	Water	Root	Oral
	Itchy	Oil	Root	Oral
<i>Dodonaea angustifolia</i>	Tape worm	Salt	Leaf	Oral
<i>Ekebergia capensis</i>	Cold	Salt	Leaf	Oral
<i>Eucalyptus globulus</i>	Skin diseases	None	Leaf	Dermal
<i>Capparis tomentosa</i>	Evil eye	<i>Dumoga birbira</i>	Bark Root	Dermal
<i>Myrsine africana</i>	Tape worm	Injera	Seed	Oral
	To relieve menstrual	Milk	Seed	Oral
Linum usitatissimum	Dandruff	Water	Seed	Oral
<i>Englerina Woodfordioides</i>	Syphilis	Butteg	Seed	Oral
Plantago lanceolata	Open would	Water	Leaf	Dermal
	Wart	Food	Leaf	Dermal
<i>Schefflera abyssinica</i>	Itching	Butter	Leaf	Dermal
	Teeth ache	Milk	Shoot tip	Dermal
<i>Solanum indicum</i>	Ear pain	None	Fruit	Dermal
	Gonorrhoea	None	Flower	Oral
<i>Trigonella abyssinica</i>	Skin disease	<i>Vicia faba</i>	Fruit	Dermal
		<i>Brucea antidysenterica</i>		
<i>Apodytes dimidiata</i>	Anthrax	<i>Phytolacca dodecandra</i>	Root	Oral
<i>Amaranthus cruentus</i>	Jaundice	Bread	Fruit	Oral

4

DEREGULATIONS AS AN ANTIDOTE TO POVERTY: A THEORETICAL PERSPECTIVE

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Abstract

This paper opens with a thorough review of the literature on poverty. It brings out the various opinions on the subject, including those advanced by different scholars and of course, the I.B.R.D (World Bank). It goes ahead to shed light on the concept of deregulation, especially as understood by the recent Nigerian experience; bringing out the shape of the Nigerian economy before the discovery of oil at Oloibiri, after the discovery and what we have today. Furthermore, it highlights the need for deregulated economy in Nigeria, when it became apparent that the country could no longer forge ahead due to over bloated government expenditure and the consequent galloping inflationary trends. Finally the efforts of the present administration with respect to:-investment drives-deregulation of various sectors of the economy are equally discussed and a caution on why deregulation should be implemented with care is also highlighted.

INTRODUCTION

Definition of poverty are multi-dimensional and it is poverty difficult to find acceptable one. However, it has been argued that the definitions of poverty are greatly influenced by value judgment and belief system, it therefore follows that each country has its own definition of poverty based on their conditions. Thus, this study would adopt definitions that have relevance to the Nigerian situation. Its definition covers different aspects of human, social, economic and institutional dimensions.

Poverty in developing nations, as defined by international organizations, means having a household income of less than U.S \$1 and \$2 per day critics of this definitions argue that income though an important element in the definition of poverty , does not include the total resources used for existence some experts state that poverty can be defined in absolute or relative terms. Absolute poverty refers to the situation in which a person lacks those things that help to sustain human life, the lack of basic human needs such as food, shelter and clothing (Jegede, 1985). The World Bank defines poverty in absolute terms from voices of perceptions of the poor as pronounced deprivations in well being, such as lack of adequate food, shelter and clothing. Ill-health, to be illiterate, not cared for and not schooled. The definition also broadens to include vulnerability, exposure to risk, voicelessness and powerlessness (Williams, 1992). This all embracing definition covers both the material deprivation and other forms of deprivations. Individuals who experiences these conditions are regarded as being poor or living is poverty.

The National Poverty Eradication Councils of Nigeria defines poverty as “a condition in which a person or group of persons are unable to satisfy their most basic and elementary requirements of human survival in terms of good nutrition, clothing, footwear, energy, transport, health, education and recreation” (Jansen 1978). The definitions of the World Bank and the National Poverty Eradication Councils of Nigeria focus on lack of basic needs, vulnerability, voicelessness and powerlessness. These aptly describe the nature of poverty in sub-saharan Africa in general and Nigeria in particular.

On the other hand relative poverty refers to the situation in which to enable him participate in the national and desirable patterns of life that exist within a given society at a given time (Walter, 1985). It should also be defined as a condition of having fewer resources or less income than others within a society or country (Livingstone, 1992. Relative poverty is based on two assumptions. First that poverty can be defined and understood within the broader socio-economic context of the society in which the individual lives. The second assumption is based on the extent to which a society has a set of cultural values and norms. Any poverty line must be

drawn is to the standards of living in a society at a given time (Iniodu, 1997). Based on these assumptions this paper asserts that the definition of poverty changes overtime even within a particular country since standards of living in a society is not static, but rather dynamic. The foregoing definitions have their limitations however. There is the controversial issue of who or what institutions constructs the definition of poverty and the corresponding line since poverty is characterized by different social divisions, there will always be dispute as to the question of definition (Worika, 2004). The operational definition of this concept will focus on that of the World Bank and the National Poverty Eradication Council of Nigeria.

The effects of poverty are corrosive. It destroys aspiration, hope and happiness. In Nigeria and in other poverty stricken nation, this is the poverty that one can feel (Lucas & Joseph, 1982). Poverty also affects one's disposition to participate in community affairs – and self-satisfaction (Worika, 2004). These devastating effects compel various governments in the world to design policies and strategies that could impact positively on poverty.

In Nigeria for instance, different administrations have adopted various poverty eradication programmes. The first was the National Accelerated Food Production Programme and the Nigerian Agricultural and Co-operative Bank established by the Yakubu Gowon Administration in 1972. Obasanjo set up the Operation Feed the Nation (OFN) in 1976. The programme Assigned university students to the rural areas to educate the rural farmers on how to use modern technology in farming processes. Nigeria had the Green Revolution Programme floated by Alhaji Shehu Shagari in 1978 and Go Back to Land Programme by Mohammedu Buhari. General Babangida established the Directorate of Food, Roads and Rural Infra-structure (DFRRI). The people's Bank of Nigeria and the Community Bank of Nigeria were created to provide small loans to the rural poor. The wife Mrs. Maryam Babangida came up with the Better Life Programme to improve the living standards of the rural women. In the same vein, Abacha with the wife set up Family Support Programme and the Family Economic Advancement Programme". It is of note that these programmes did not achieve their desired goals for the average Nigerian remains poor and hopeless up till this day.

The Obasanjo's administration has also tried to tackle poverty, employing certain strategies which include: Youth Empowerment Scheme, Rural Infrastructural Development Scheme, Social Welfare Services National Resources Development and Conservation Scheme and Institute Arrangement for Coordinating the Implementation of National Poverty Eradication Programme (NAPEP) (Eid & Langheire, 1999).

The Government has also established the National Co-ordination Committee to implement these programmes. These strategies cover the different dimensions of poverty in Nigeria which are expected to be Nigerian owned and Nigerian-driven in the light of the principles of the World Bank on the nature of poverty reduction strategies that countries should adopt (Thomas, 1978).

THE CONCEPT OF DEREGULATION

Picking from a paper written by Lucky Worika of the Faculty of Law of the Rivers State University of Science & Technology, Port Harcourt, deregulation is not synonymous with increase in prices, even though that may be one of its short-term consequences. Deregulation, strictly speaking, means the removal of regulation. In economic parlance, it is somewhat synonymous with de-control or de-monopolization. In the downstream petroleum industry, it would mean reduced governmental interference with refining and marketing of petroleum products and how the industry subsidy on petroleum products. But there would be more entrants into the sector. Our over-bloated and inefficient Nigerian National Petroleum Corporation (NNPC) together with its subsidiaries would cease to have a monopoly of the downstream sector.

Imagine that, it was the NNPC drilling for crude oil and gas in Nigeria and that there was no shell Agip, ELF, Chevron, Mobil and the rest of them. However efficient would we have been? And yet, what you have in the upstream sector is more or less this analogy. With more players in the industry there would be more rational and efficient allocation of resources in the short-term effect is to stabilize prices with increased and improved variety of the quality and quantity of petroleum products is circulation for the ultimate consumer.

Furthermore, it would make our petroleum prices far more competitive both locally and internationally. There would be better value for money. Smuggling would be discouraged as those who have perfected the business of smuggling our scarce products for financial gains would not find it any more economically gainful. Government needs not spend extra moneys policing the country's borders, or sleeping with one eye open.

The truth is that there are stiff opposition to deregulation from various sectors of the Nigeria economy. The question now is this. Why is it so difficult to make an economic more competitive and deregulation so hard to achieve? Why so many governments try, but almost as many fail? Since all citizens stand to benefit from a more competitive market for products and services, the coalition and supports competition should be very wide. More often than not, however such a coalition does not materialize and the political support for pre-competitive policies simply is not there. Why? This question is important not only in transition economics and in emerging countries, but in industrial countries as well. In fact almost everywhere, except possibly in the U.S., and the UK which have started long ago a process of vast deregulation. New Zealand and Ireland followed their example with flying colours.

Lack of corruption is typically the outcome of regulation. Taxi cabs in European cities are expensive because the number of licenses is strictly controlled. By keeping prices artificially high, few licenses create rents, and the incentive to appropriate them. A fraction of these rents is appropriated by the taxi drivers themselves and a fraction by the public officials who allocate the licenses, either in the form of votes in local elections or of bribes. As a result of deregulation taxis in Ireland are cheap.

Example of the benefits from deregulation abound. For some time after its airline had been deregulated, flying from New York to Los Angeles 5hrs flight was much cheaper than flying from Zurich to Frankfurt (a ½ hour trip). And so the US compared with a domestic long-distance call in France. Whenever a electricity industry for instance, various and firms join forces in opposing deregulation. Workers, as well as management, oppose deregulation because it eliminate their rents-the wagers of electrical workers are high precisely because they are able to appropriate a fraction of the rents created in an uncompetitive electricity market. But what if the instead of fighting the electricity industry alone, liberalizes all markets at once with a big bang? Then electricity workers will realise that what they stand to gain as consumer from lower prices throughout the economic more than compensates the loss of liberalizations buy in workers and make deregulation easier.

Deregulating product markets has an additional benefit it makes deregulating the labour market much easier. In the labour market, deregulation take the form of labour protection laws which increase worker's power when they bargain with forms. Bargaining is mostly about the distribution of excess rents between the form and its workers. In a competitive industry, there is little to bargain about. Evidence gathered by some scholars show a strong positive correlation across countries between the degree of competition in the product market and the extent to which labour market regulations protect workers.

In some cases however, regulation works in the opposite direction: it keeps the price of public services artificially low, rather than too high. This is a case for instance of railway fares throughout continental Europe, which are subsidized by the government: fares are too low but

taxes are too high. The general message is that piece meal deregulation is destined to fail. To gather enough political support, deregulation must hot the entire economy, not selected industries, one by one. And, to the extent that deregulation eliminates subsidiaries to monitories, it should be accompanied by tax cuts for all.

THE NIGERIA ECONOMY: AN OVERVIEW

The oil-rich Nigerian economy, long hobbled by political instability, corruption, and poor macroeconomic management, is undergoing substantial economic reform under the new civilian administration. Nigeria's former military rulers failed to diversify the economy away from over dependence on the capital intensive oil sector, which provides 20% of GDP, 95% of foreign exchange earnings, and about 65% of budgetary revenues. The largely subsistence agricultural factor has not kept up with rapid population growth, and Nigeria, once a large net ex[porter of food, now must import food. In 2000, Nigeria is likely to receive debt-restructuring deals with the Paris Club and a \$1 billion loan from the IMF, both contingent on economic reforms. Increase foreign investment combined with high world oil prices should push growth to over 5% in 2000-01 (Worika, 2004).

DOMINATED BY OIL

The oil boom of the 1970s led Nigerian to neglect its strong agricultural and light manufacturing bases in favour of an unhealthy dependence on crude oil. In 2000 oil and gas exports accounted for more than 98% of export earnings and about 83% of federal government revenue. New oil wealth, the concurrent decline of other economic sectors, and a lurch towards a statist economic model fueled massive migration to the cities and led to increasingly widespread poverty, especially in rural areas. A Collapse of basic infrastructure and social services since the early 1980s accompanied income had plunged to about one quarter of its mid 1970s high, below the level at independence. Along with the endemic malaise of Nigeria's non-oil sectors, the economy continues to witness massive growth of informal sectors economics activities estimated by some to be as high a 75% of the total economy.

Agriculture has suffered from years of mismanagement, inconsistent and poorly conceived government policies and the lack of basic infrastructure. Still, the sector accounts for over 41% of GDP and two-thirds of employment. Nigeria is no longer a major exporter of cocoa, groundnut rubber and Palm Oil, trees, is stagnant at around 180,000 tons annually; 25 years ago, it was 300,000 tons. An even more dramatic decline in groundnut and palm oil production also has taken place. Once the biggest poultry producer in Africa, corporate poultry output has been deregulated downstream petroleum process. And the government still intends to pursue the deregulation of state refineries despite significant internal opposition, particularly from the Nigerian labour congress.

INVESTMENT

Although Nigeria must grapple with its decaying infrastructure and a poor regulatory environment, the country possesses many positive attributes for carefully targeted investment and will expand as both a regional and international market player. Profitable markets outside the energy sector, like specialized telecommunication providers, have developed under the governments reform programme. However, to improve prospects for success, potential investors must educate themselves extensively on local conditions and business practices establish a local presence and choose their partners carefully. The Nigerian government is keenly aware that sustaining democratic principles, enhancing security for life and property and rebuilding and maintaining infrastructure are necessary for the country to attract foreign investment.

SUMMARY

If globalization and integration of are understood as the integration of national economic and the elimination of borders, this corresponds with a natural tendency in human beings, as the social beings we are. In this regard, a correct vision of globalization as a March towards great integration, should emphasise the complementarity of economics, balancing the weakness and strengths of the different countries and regions. This in turn, would lead to a more equitable world not denying a health measure of competition. But is this what is happening under the current globalization process?

Since globalization or deregulation as it were involves competition between highly unequal forces-due to disparate levels of economic and technological development, and financial power- it is much more about the control of some economics over other. The result, until now, has been the expansion and deepening of poverty, thus widening the gap between the rich and poor.

In spite of claims about the virtues of the free trade, the form of globalization being presently advanced is based on an administered market. While some efforts are aimed at promoting the elimination of trade barriers, a myriad of other measures are devised to severely restrict some form of trade for instance, exports of agricultural products from developing countries like Nigeria.

Paradoxically, while globalization generally promotes the elimination of obstacle to the free movement of merchandise and capital, new walls are being created to prevent the free movement of labour in search of employment and better living conditions. This leads to inequalities exacerbated by the effects of globalization this, immigration is an issue where developing countries must press to get their views taken into accounts so that it can be tackled with a spirit of shared responsibility by rich and poor nations alike.

The effect of current globalization-related policies is dramatic. Four decades ago, the 20 richest capital basis, than the 20 poorest. This gap has now doubled. On the other hand, while some countries in Asia and Latin trade growth, African exports have actually declined over past decades. Significantly, this can not even be explained by a lack of integration in world trade-many countries have simply suffered due to the structure of their economics, and particularly, their reliance upon primary commodities, whose prices have fallen.

Thus, it has become increasingly clear that vital development objectives are served by the present process of either globalization or deregulation as it were. The failure of the Seattle summit to launch the "Millennium Round" in November 1999 signaled the intensification of the debate on the merits of globalization. Therefore, we should ask ourselves whether globalization must proceed in the terms it has been pursued until now.

There is a growing concern that globalization also creates economic and social dislocations that are largely ignored by trade protagonists. In deed, the encouragement of privatization, deregulation, lower trade barriers and soon is far from proving to be the best way forward for developing countries such as Nigeria.

It has been suggested for example, that the success of the East Asia tiger economics was supported by largely protectionist policies. At any rate, the subsequent deregulation of financial systems made them far more vulnerable to financial crises- the painful consequences of which we witnessed at the end of the 1990s, the observed increase in financial volatility, through for example, speculation capital flows, is suggested by some to have in fact, reduced economic growth in some world regions, through the resultant uncertainties.

CONCLUSION

Globalization and deregulation trends have broadened and deepened the breach between the rich and the poor between highly industrialized countries and developing countries, especially the least developed one's consequently, large numbers of people are finding themselves uprooted and pushed asides by the forces of this process, often hindered in their search for jobs and better living conditions. The motto appears to be Yes to merchandise, no to human being! The right answer is not held either by those totally opposed to world economic integration-which is the natural result of the evolution of human beings on by those who defend the process in its present form. The facts are demonstrating that it is necessary to reassess the matter with a holistic approach. This new vision must lead us to a new conception of the institutions that act as promotes or refer of this process, such as the international monetary fund, the World Bank and the World Trade Organization. These realities also involve the oil market, and OPEC, an organization of developing nations.

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THE ROLE OF TECHNICAL SCIENTIFIC RESEARCH EDUCATION IN SUSTAINABLE DEVELOPMENT AND CONSERVATION IN THE REPUBLIC OF THE SUDAN

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Abstract

In this paper, the review is vital for the development of scientific and technological research also highlights the efforts made sporadic in this area. And try to put some solutions and recommendations that help the

advancement of scientific research to resolve issues in the Sudanese society as the quantity and quality. Despite the obstacles, the movement of scientific research did not stop completely, because a number of researchers still believe in the inevitability of continued scientific research to benefit the maximum of what is available (and the efforts of individual) to attain the objectives of development, prosperity and keep pace with scientific development. The reality, which must be viewed seriously and considering it is that scientific research has become a pedestal only to build a modern state in today's world, and became the backbone for all plans developed nations and even developing countries. And enter the world in the era of World Trade Organisation (WTO) and intellectual property Guanyin and the demands of globalisation for the next century that followed, we will find ourselves irrelevant desert plant that the blood on our present situation did not change ourselves. It must employ scientific research to address the backlog of cases over the years such as the issue of poverty and human capacity development and exploitation of natural resources of the country and the fight against desertification and settling of scientific technologies for the stability of the pastoral communities, and others. The ramifications in the fields of science and technological abounded to the point where it became impossible to take in all its aspects and its subsidiaries and became to be the selection of research needed by the various communities and the selection of educational curricula have efficacious in both the vertical (specialised) or horizontal (destruction). These thoughts came together and a hint of shame and sometimes pour sometimes without reference to party or institution. It is about frameworks general extrapolated to infer and devise solutions and treatments. I hope those who care about the subject of research and funding in the current international situation, which stripped the developing nations of the features that I found of Southeast Asia and other developing her country's tradition of innovations and products to developed countries.

Keywords: Sudan, Education, Technical Scientific Research, Sustainable Development.

INTRODUCTION

A booming economy, high population, land-locked locations, vast area, remote separated and poorly accessible rural areas, large reserves of oil, excellent sunshine, large mining sector and cattle farming on a large-scale, are factors which are most influential to the total water scene in Africa. It is expected that the pace of implementation of water infrastructure will increase and the quality of work will improve in addition to building the capacity of the private and district staff in contracting procedures. The financial accountability is also easier and more transparent. 'Global Change' consists of the linked and interacting phenomena of rapid, modern and widespread change in land cover and land use; atmospheric composition; climate; biological diversity; economic organisation; population size; distribution and consumption patterns; and trade patterns. Together these factors pose a great challenge to human development. Global change research is a large, interdisciplinary and worldwide effort to find solutions to these challenges, in order that human development may be sustained and equitable. Africa is particularly vulnerable to many of the negative consequences of global change. Every aspect of the water, energy, health, agriculture and biodiversity agenda is impacted in some significant way.

Many hundreds of Africa-based researchers are already engaged full- or part-time on global change research. In addition, there are similar numbers of researchers based outside Africa, focused on global change research relating to Africa. A rich set of overlapping networks links global change researchers in Africa to each other and to the global community. These networks should form the basis of future coordination efforts. There are key constraints to the development of a larger, more productive and better distributed (both in terms of countries and topics). Global change research community in Africa is the lack of adequate dedicated, accessible and stable funding sources to support this research area. Secondary constraints of insufficient highly skilled human resources, and in-continent access to certain technologies, could be resolved within a decade if funding were available. Specific recommendations include:

- Strengthen the existing networks rather than creating completely new sets, supplementing them where necessary. An overarching structure that caters for human sciences with a more development focus as well as for biophysical sciences with a longer-term focus is suggested.
- Establish centres of excellence in aspects of global change research in south, east, central, west and North Africa, using existing concentrations of researchers in most cases.
- Focus international collaborative research campaigns on large, complex key uncertainty areas in Africa, including (for example, and among others) the processes and model characterisation of tropical and subtropical rainfall; climate land-surface feedbacks; hydrological cycle impacts in the presence of elevated CO₂; impacts and adaptation of biodiversity; responses to changes in vector-borne diseases and the emergence of novel diseases.
- Increase the availability of small to medium sized competitive research grants for African researchers in global change.

HOLYQURAN

Allah says in the Quran in Surah Baqarah (verses 30, 31, and 32) the name of God, most Gracious, most Merciful (thy Lord said to the angels, I will create something on the ground, Khalifa. They said wilt thou place therein one who will make mischief therein and shed blood, we praise and sanctify you said I know what ye know not, and science Adam all the names, then presented them to the angels, saying: "Tell me the names of these if ye are truthful". They said, Glory to know us only. You are the knowing the wise), In Surah al-Rahman (verses 1, 2, 3, and 4) (Rahman, aware of the Quran, the creation of man, his knowledge statement), and in the Al-Alaq (verses 1, 2, 3, 4, and 5) (Read in the name of your Lord who created, created man from a clot, Read and thy Lord is Most Generous, who taught by the pen, Taught man did not know), and in Al-Zumar (verse 9) (security is submissive during the hours of the night prostrating and standing warns the hereafter and hopes for the mercy of his Lord say: Are those who know and those who did not know but remember the men of understanding), and in Surah Taha (verse 114) (Exalted be Allaah, the True King and be not in haste with the Quran before its revelation to thee and say the Lord Archived note), and in the Al-Furqan (verse 59) (who created the heavens and the earth and all that is between, in six days and then mounted the Throne, Rahman was asked by the experts), and in Fatir (verse 28) (and the people and animals and cattle as well as different colours but fear Allah from His servants who have knowledge. Allah is Mighty, Forgiving), and in all contentiousness (verse 11) (O you who believe if you have been to make room in assembles spread out and make room. For you and when ye are told to rise up, rise up. God raises those who believe and those who were given a science degrees and the God of what ye do), and in the Thunder (verse 12) him (each person out of his hands and his successor, who protect him from command of God that God does not change the condition of a people until they change it themselves and if God wanted a people worse, not due to him and money instead of Him and the) the truth of God's great and I am so we shall indeed be of two witnesses.

Of the functions of people to people is the earth and spread peace in the boundaries. And the entrance is no doubt that scientific research aimed at building and his philosophy is to take human-cantered and works by the creation and development of what would provide a good and well-being and tranquillity and peace. The ways to achieve the philosophy of scientific research are many and multiple and must be followed and surpassed all odds and bumps and to overcome obstacles and pave the tract, which is investigating the hopes and in coordination and

cooperation locally, regionally, and the Arab world or the African continent and globally with all the developed nations and institutions and organisations of the United Nations.

And scientific research to which we aspire to be now be subject to the needs of society and the aspirations of the future near and far and uses various forms of knowledge and technical links between development and research. It must be directed to the original research to study the circumstances and the country's natural resources and develop and make maximum use of local resources and development capabilities and technologies inherited and resettlement of the global matching techniques to solve economic and social issues. Scientific research as a means of human to find scientific facts for itself and its environment and society or the universe to find solutions to the issues they are facing and the difficulties that hinder the march of life. It is also a way to double the value or yield or potency of its natural resources or his efforts to the moral and material and equipment, machinery and equipment used, either inherited or imported. The first and foremost, the scientific research is the elitism of life that has no or limited extent or a certain time depends tender. And conclude by saying the Almighty in Surah Al-Isra (verse 85) (and Isilonc Say: "Spirit is by command of my Lord: but a little bit of science) the truth of God Almighty.

Sharif interview: Abi Darda, may God bless him, "I heard the Messenger of Allah peace be upon him says: ((wire way intended to be where God is the easy way to do good, and the angels to put wings to a seeker of knowledge satisfaction with what he does, and the world to pray for forgiveness of his art in heaven, and on the ground, even whales in the water, and preferred the world worshiper like the superiority of the moon and other planetary scientists and heirs of the prophets and that the prophets did not leave behind dinars and dirhams but left behind the flag, is taken abundant share)). Narrated by Tirmidhi and Obodawd.

BACKGROUND

Sudan deals with science and technology since a long time, especially in the most important aspects of research and development. It did not identify specific policies or plans for science, technology and scientific research in Sudan in the post-independence period in spite of direct interest and activity, which is done by scientists and experts such as the Sudanese Arquette Conference for the overall development

The first composition of structural and institutional framework for science technology and scientific research establishment of the National Council for Research in 1970 as a government responsible for policy, planning and programming has been included under his five boards specialising in agricultural research and scientific and technological research, medical research, renewable energy research and the economic and social research. And be under the umbrella of some national committees in the environment, population and genetic engineering. It also established some of the centres and units to conduct scientific research in disciplines that are not available to universities and other research centres and the most important dimension of the Remote Sensing Centre and the Centre for Documentation and Information.

The new world order and the globalisation agenda of the twenty-first century are controlled by the revolution and the Sultan of information and amazing and successive developments in science communications, electronics, biotechnology, genetic engineering and computer science. All these challenges require the use of scientific research in order to survive competition and does not have a will of its strength does not have a decision in his or her liberty in all its dimensions. I have the latest scientific advances by the end of the twentieth century new

phenomena, including the authority of informatics and the authority of the international media and social change and systems in a sophisticated modern technology, production and management. It is more complicated systems using modern technologies and the accelerated globalisation of information and knowledge become the methods of scientific research of the basics and requirements of sustainable development of any country seeks to true independence. Because the people have the information and improve their use will have an advantage in the selection of appropriate technologies and in reducing the cost of production and raising rates and competition in foreign markets and meet the challenges of globalisation in all fields.

All of this, the experience accumulated around us and our needs of actual and our well-defined should be our starting point to develop a strategy applied scientific research to which we aspire, otherwise we will apply to us the rule which says ((those who seek not what we want, and who want not what we need, which we need can not access it)). This paper dealt with the subject of scientific research in the Sudan, also highlights the efforts made sporadic in this area. And try to put some proposals and recommendations that help the advancement of scientific research in order to achieve its objectives and even going in the right direction, which can achieve sustainable development and in line with the requirements of globalisation.

The National Research Council in 1981 the first plan for science and technology and scientific research in the form of a programme known as ((the programme of building a science of modern)) in between 1981 and 1990 included the sub-programmes to exploit science and technology and to encourage scientific research and building science cities. In 1989 established the Ministry of Higher Education and Scientific Research and became a ministry responsible for setting policies of science and technology, scientific research and has developed a new management structure of the National Centre for Research and issued law in 1991 with the aim of the Centre to conduct scientific and applied research. And entrusted the National Centre for Research to conduct scientific and applied research for economic and social development within the framework of state policy and under its auspices, and in coordination and integration with the institutions of scientific research in Sudan menu such as:

- (1) Centre for research and industrial consultancy.
- (2) Agricultural research corporation (and forests).
- (3) The research of livestock.
- (4) The geological and mining research.

ENTRANCE

At a time when the pace of the Western world strides in the field of scientific research until they reached the maximum range in recent years, the country has been developing, including Sudan in the early stages, its features are not clear yet. It may be appropriate to begin the article for reasons including:

- One can take a closer look and comprehensive review in this area during the past decades.
- Second defend economic, social and technical, which is moving towards wider horizons the better and the worst.
- Third - tech machines, which jumped from steam to nuclear reactors and equipment to lightning satellites.
- Fourth globalisation and the consequence of openness are difficult to control it. That is why the world's post-year 2000 will be governed, including the decisions taken

today, and decisions taken by the views at the top of the state bodies in the development of policies, strategies and plans. Those decisions should be taken along the lines of solid base of knowledge and skill. Knowledge and skill that needed to research and application, research and application need for political and professional experience and knowledge and practice.

Modern scientific research began in Sudan and establishing a laboratory chemical in the second year of this century (Welcome Chemical Laboratory) and cotton research stations, followed by several research centres, all linked to areas of scientific and technological and related ministries and various government departments. After independence, turned institutions and scientific schools and the College of Gordon to form the University of Khartoum and obtained scientific research has attached great importance especially after the increase in graduates from the University of Khartoum and open the opportunity for many of them to engage in scientific research, this was a breakthrough for the development of scientific research in various levels and the response to a number of issues and try to address the problems associated with its evolution.

Scientific research in Sudan: The scientific research in the broad meaning is to harness science and technology for the benefit of society. We have met all platforms scientific (meetings, seminars, conferences, workshops, etc.), whether regional or global, which discussed the major challenges that science and technology has become the way real disposable in today's world to achieve economic and social development and that the difference between the developed and underdeveloped countries is due primarily to the difference between them in the scientific and technical capabilities. No way for these countries to achieve economic and social development only through science and technology and scientific research. Among the most important factor in increasing production and development is the scientific and technological progress and the ratio of the strong relationship between economic and social development and scientific and technological progress. Known to Sudan to deal with scientific research with the beginning of this century has been established plant (Welcome) in 1902 to take control of Epidemiology and parasites. In 1904 established the first station of the Agricultural Research. And established the Kitchener Medical School 1924 and then the School of Veterinary and Agriculture in 1938 and the interests of geology. The objective of this research in the colonial era to provide simple needs in the fields of agricultural, health and mining, but linked, in particular raw materials and make it suitable for export was also associated with imported goods in order to make it fit with local needs. Expansion of scientific research in the fields of agriculture and veterinary medicine, forestry and fish thanks to these colleges and professors to become a stand-alone there is a College of Graduate Studies at the University of Khartoum.

About the history of scientific research in Sudan: Scientific research aims to find solutions to the problems facing the human to follow the scientific methods of the Organisation based on a systematic consideration of sound. This concept began scientific research in the modern sense Sudan with the beginning of this century, and the research efforts, individually and in limited areas of improved goods and raw materials as well as in some of the veterinary services and quality control. The unit veterinary quarantines the first nucleus for scientific research in Sudan, where the user defined the British administration in 1900 in the interest of military veterinary time and paid attention to study some common diseases in the bovine animal plague and prevention.

In 1902 established a laboratory (Welcome), where the active and clear in the fight against diseases and insects harmful to humans and animals and plants, has contributed to the lab to discover some of the endemic diseases, especially schistosomiasis in Sudan. In 1904 established a separate unit for agricultural research included in 1912 to the benefit of knowledge of Sudan and had been cooperating closely with the lab (Welcome) and in 1919 turned into agricultural research

to the Department of Agriculture and confined their efforts in the period to monitor the quality of the crops and protect them from pests. In 1934 opened the Kitchener Medical School and later joined to the rest of the sections of Gordon Memorial College to form the (Khartoum University College in 1951). The 1938 milestone in the history of scientific research in Sudan, where was established the School of Veterinary Medicine and School of Agriculture and have evolved later to the colleges of Agricultural Sciences and Veterinary Science and the graduates of those schools are leading the Sudanese first in the field of scientific research in agriculture, veterinary science and was almost a kidney impact in enriching scientific research in Sudan qualified cadres and the development of curricula and research methods.

Not only research activity in Sudan on the human and veterinary medicine and agriculture, but efforts have been made in multiple areas of research in science and engineering in different branches in industry, food, construction, geology, mining and areas of economics, sociology and the humanities, etc. The owner of that official efforts by non-governmental scientific associations in various fields and made some magazines and scientific journals limited distribution and the country began to hear about conferences, seminars and scientific seminars. The independence of Sudan at the beginning of 1956 witnessed the beginning of a new stage in quality and quantity of scientific research and approaches and decisions of the College of Khartoum university marked the birth of the University of Khartoum, which recognised the nuances of scientific world and provide for scientific research potential of the largest and expanded opportunities for government missions and non-governmental organisations to universities and colleges outside the country, which shares in the country to provide scientific expertise in the various branches of modern knowledge.

The spread scientific research centres, especially in agriculture and livestock in various parts of the country to reach areas of production and animal communities and expanded the work of general survey of the potential of the country and its natural resources. A closer cooperation between Sudan and the friendly countries and bodies and international organisations are very important.

STRUCTURE MANAGEMENT AND COORDINATION OF SCIENCE AND TECHNOLOGY AND SCIENTIFIC RESEARCH

The country continued her scientific during the period that followed independence until the 1970 year of transition the great scientific where a National Research Council as an independent sponsor scientific research in the country under the care directly to the president and the president of the National Council for Research in the rank of minister and participate in meetings of the Council of Ministers and led the National Council Research march to scientific research by universities. Sudan announced in early 1982 that the era of the eighties would be the start-up phase in building a modern science. In 1991 the centre was established the National Centre for Research (NCR) as a substitute for independent, multidisciplinary research and development concern in the field of applied developmental and under the auspices of the Ministry of Higher Education and Scientific Research

1. Sector of higher education and scientific research

This sector is supervised by the terms of the development of policies, strategies and plans, National Council for Higher Education and Scientific Research under the auspices of head of state and is chaired by the Minister of Higher Education and Scientific Research, representing the universities and the National Centre for Research heads of their boards and Directives members in addition to the membership of institutions of higher education colleges and private

Ahli. Established the National Council for Higher Education and Scientific Research of the Research Committee as one of its standing committees and entrusted with the task of coordination between universities, higher institutes and the National Centre for Research.

2. Research and development sector ministries.

This sector consists of institutions for research and development to follow the federal ministries. The largest of these institutions, the Agricultural Research Organisation, which consists of agricultural research centres and the Food Research and affiliated with the Ministry of Agriculture and Natural Resources, in the same form belongs to the Livestock Research of the Ministry of Livestock, and Medical Laboratory of the Ministry of Health, the Centre for Research and Industrial Consultancy to the Ministry of Industry, Research Institute of Hydraulic to the Ministry of Irrigation, and the Institute of Geological research of the Ministry of Energy and Mining.

3. The supreme council for environment and natural resources.

Established under the chairmanship of the president of the Republic and the membership of the Minister of Agriculture and Livestock Minister and the Ministers of Higher Education and Scientific Research, health, industry, irrigation and finance. The Board shall leave policies that are interested in the environment, natural resources and the coordination between governmental and private institutions in their respective fields. Based on the above are policy development and coordination and evaluation in the field of science and technology at the moment on several levels in different sectors. The National Council for Higher Education and Scientific Research, policy development and coordination between universities and the National Centre for Research on science and technology through the Standing Committee on Research. The policy development and coordination between national research institutions are at the level of the Supreme Council for Environment and Natural Resources and the Federal Cabinet.

4. Qualified personnel in the field of science and technology and scientific research

Classified as developing nations when compared to the rest of the world it is lagging behind scientifically percentage of scientists is very low, and also spending in science and technology does not affect the rate of 1% of GNP set by UNESCO as a minimum for the development of science and technology. There are many indications and are known to help assess the degree of development of science and technology, including:

- Number of qualified cadres in the field of research and development in every million people.
- Percentage of expenditure on research and development of the gross national product.
- Number of scientific personnel and technical ability in the thousands in every million people, it is the duty of developing countries to develop research and development in the structures of local scientific even expanding the scientific base and are used and increase their effectiveness and strive for the developed countries and benefit from the model of scientific as most of the scientific personnel and technical assistance to these developed countries working in industry in the area of quality control and production development. In the field of research and development, the labour force and high-trained staff are a great wealth for the success of the application of science and technology in moving the wheel of development. According to UNESCO standards require developing countries with a per capita GNP between U.S \$500-1000 to 6000 specialised scientific and engineer in every million people that 10% of whom specialise in the field of scientific research and

development. Also need this number of qualified personnel to a large number of intermediate cadres of technicians and skilled workers.

5. Sudan trends in science and technology and scientific research

Sudan are evaluating the effectiveness of teachers and researchers in universities and research institutions in the light of the results of their research and their experience in addition to their participation and contribution in the productive sectors, including industrial, agricultural and services sector. Also, as the correlation of universities and research institutions of these sectors is one of the important indicators in determining the level of scientific, technical and can be measured by the number of contracts related to research and development in the public or private sector and also offers advice and other technical services for the benefit of society.

SCOPE OF PROCEDURE

Sudan has taken in recent years a number of positive steps towards supporting science and technology and its applications in the field of formal commitment and policies are the following steps:

- A comprehensive national strategy included an approved plan for development of science and technology and its applications. This is the first formal commitment in the modern history of Sudan.
- To create the National Centre for Research in 1991 as an independent, multidisciplinary research and development concerned and aimed to strengthen the scientific capacity in the field of applied and developmental.
- Formation of the Supreme Council for Environment and Natural Resources in order to support, coordination and balance environmental and sustainable development.
- Horizontal and vertical expansion in the training of scientific personnel and professional establishment of regional universities and specialised institutes and increase the proportion of the number of students of higher education. As the expansion of education above college and branched specialties.
- Restructuring of the agricultural research for independence and support staff and financial resources and linking them to the application farm in the major agricultural enterprises. And take advantage of technological packages for the establishment of crops and increasing the vegetable production, and were separated body dealing with livestock research and development in livestock enormous.
- And encourage scientific publishing and media support scientific publications and programmes at different levels of information in audio-visual media tools and governmental interest in public awareness in science and technology.
- Establishment of the council to develop the manufacture of Sudan under the auspices of Centre for Research and Industrial Consultancy, Ministry of Industry.

Outside

Sudan has been a great interest in regional and international cooperation in science and technology and to provide what is available has the potential of scientific and material assistance to the brotherly and friendly countries as Sudan committed themselves to the agreements and protocols, regional and global within this framework:

- Sudan signed in 1992 the Vienna Convention and Montreal Protocol on Substances that Deplete the Ozone Layer.
- Sudan signed in 1992 the Convention on International Centre for Biotechnology and Genetic Engineering and established a national focal point of the National Centre for Research.
- Sudan has signed conventions on biodiversity and global climate during the International Conference of the United Nations Environment and Development in Rio de Janeiro in 1992.
- Sudan adopts many of the activities of the Federation of Arab Scientific Research Councils.
- Sudan participated actively in the programmes of regional and international organisations.

There is still a need for greater effort in different sectors to create an enabling environment adapted to the increased production of science and technology and its applications to bring about growth and development through:

- An interest in developing the capacities of institutes and research units in universities and scientific centres to provide the funding and training opportunities within and outside Sudan and supplement laboratory equipment, libraries and documentation centres and information.
- Care for the environment and the provision of scientific supplies necessary for researchers and technicians, professionals and motivate them to stability in Sudan and to increase their production and technological research and to encourage and honour of or excelled in them.
- Involvement of scientists and modern technology (Altqanyen) priorities in the formulation and application of science and technology on scientific grounds.
- Working to upgrade the basic science curriculum in higher education with interest in teaching mathematics and modern science such as genetic engineering and computer science.
- Work on doubling the number of researchers, engineers and technicians with stimulate outstanding students to join the institutes of education and training and in the training of the intermediate.
- To find the appropriate formulas for linking scientific research areas of consulting, production and so on:

A/ insurance needs of the citizens in the basic food, clothing, medicine and energy through productive projects attractive to investors so as to ensure self-sufficiency.

B/ self-production complexes typical for rural development and balanced regional cities and to alleviate the bottlenecks. These complexes will provide opportunities for the transfer of research results to the fields and factories.

C/ vertical development is done through modernisation of management and means of production and services in various sectors and the use of computer data and takes advantage of genetic engineering and the introduction of sprinkler and drip irrigation and other inputs from modern technology.

D/ double centres and computer networks and arrived in the commercial and political centres in Sudan, computer information networks that are created National Council of the computer.

E/ establishment of laboratories and high technology and advanced to the development and consolidation of technological rules to advancing development, such as microelectronics laboratories and laboratories of biotechnology and genetic engineering laboratories and information and solar power, atomic energy and science of the desert and remote sensing and medical science.

F/ and/or attract scientists and professional staff, technical and technological requirements and provide better service and equipment specific to the progressive work and a better working environment.

G/ qualification and training and improving production in order to focus on human development.

It is clear that universities set up distributed to various states of Sudan and the following must be considered:

- (1) Confirm the identity of the nation and establish it through the curriculum which are approved by the university and applied.
- (2) Conduct scientific and applied research related to the different needs of society and renewable energy in order to service and upgrade.
- (3) Interest in desert ecology, medicine, land and industry in the context of interest in the development of Sudan in general.
- (4) Attention to issues of human development, thought and religious values.
- (5) Concern for the environment of Sudan in general and the state concerned, especially the environment and the rehabilitation staff is able to upgrade and resolve jurisdictional issues relating to the environment.
- (6) Technical innovation and employment to serve the Sudanese community, in collaboration with universities and institutions of higher education and scientific research, and the other country.
- (7) Interaction with the citizen understanding of rural problems and recognition of his knowledge and experience, and work with him to develop according to his needs and values.
- (8) To prepare students and give them the vacation of science.

Institutions of Higher Education

- (1) Institute of Music and Theatre in Khartoum.
- (2) Higher Institute of Physical Education in Khartoum.
- (3) Institute of Higher X-ray diagnostic and therapeutic Khartoum.
- (4) Abu Ostrich College of Agriculture and Natural Resources.
- (5) Institute Wad El Magpool acceptable for Earth Science Technician.

Bodies and National Research Centres

- (1) Food Processing Research Centre Shambat.
- (2) Research in pasture and forage in Khartoum.
- (3) Research in wild animals and land in Khartoum.
- (4) National Health Laboratory.

Interests, Units and Research Centres Follow the Ministries

- (1) Department of Animal Production.
- (2) Research Institute of Leather.
- (3) Department of Meteorological Research interests.

- (4) Research Division of labour.
- (5) Khartoum International Institute for Arabic Language.
- (6) Sudan Academy for Administrative Sciences.
- (7) Centre for Management Development and production efficiency.
- (8) General Organisation of Cotton (Research Department).
- (9) The interest of research Bank of Sudan.
- (10) Research Division Correctional Service.
- (11) Department of the hydrological research.
- (12) Research in poultry and animal production.
- (13) Department of Eye Research.
- (14) Department of Research Movement (Sudan Railways).
- (15) Department of Health and vital statistics.
- (16) Research Department of Finance.
- (17) Educational Statistics Section.
- (18) Criminal Laboratory.
- (19) Geological.

From here it is clear that scientific research theory and practice-oriented and is the mainstay of development plans in the country, the first stage of each development project, or a step forward in the world today based mainly on new technologies. However, the concept of scientific research and unfortunately may like a large mixing in Sudan since the prevailing concept of scientific research is the work leading to the new discoveries and inventions of the things that were not known before. And this became the prevailing sense of politicians, planners and executives, as well as ordinary citizens, resulting in the full dimension of scientific research on the movement planning in the country, and do all the development projects both big and small, without that preceded or followed by scientific research. As in the side of development projects across all the previous era, we have witnessed the collapse of a large number of agricultural projects, especially those established by the private-sector, for simple reasons for the disqualification of soil or poverty, or lack of validity of the climate, or after the area of marketing, or certain types of insects in the region concerned and others. In the industry it is even worse and more bitter, and the whole Sudanese society is still bemoans the textile project Kadow, and a project for manufacturing fertilisers, and the project of producing yeast and others. Even the existing plants, it works because the specifications of low cards do not match temperature in Sudan

The Goals of Scientific Research in Higher Education Institutions

Derived from Sudanese old universities reputation and fame and reputation locally, regionally and globally from academic and research excellence. Prestigious universities have sought to regulate scientific research to devote our specialised departments dealing with the affairs of scientific research under the direct supervision of the Departments of University. It is the most important functions of the Department of Scientific Research is the supervision, coordination, and funding for outstanding scientific research.

Of the goals of scientific research institutions of higher education is the development of existing technologies, and creating the concepts of new frameworks include the economic and social aspects also addresses the problems of imported technologies, and adapted to local conditions and development projects and local industries, according to the needs and capabilities, where there are no finance houses that research institutions and have to rely mostly on the human elements and technical and scientific universities and research centres, which is fully dependent on state support.

To hide the that the cross-fertilisation between scientific research centres, which is the main tributaries of research activity in universities has become an absolute necessity in the pursuit of excellence and integrated work for scientific research, basic and applied universities, as both are complementary to one another because of the organic unity that exists between higher education and scientific research, education includes research activities in all its aspects and specialisations, and comes through the provision of scientific research results in basic and applied. But is not limited scientific research on science and technology, but knocking all areas of social sciences and human and economic, etc. Since the homes are prestigious universities has particular expertise harnessed their potential and efficiency of research faculty members to conduct applied research of the character, which contribute to achieving development goals, by linking research and the urgent need for the development of society and help solve problems that impede development

Areas of Scientific Research Institutions of Higher Education

The link between higher education institutions are preoccupied with the country necessitated the commitment engagement in all areas of research available, which greatly helped in securing the rise reflected an integrated development and prosperity and the prosperity and development of comprehensive and the most important areas of research:

1. Medical research and health.
2. Research and industrial engineering.
3. Research livestock and wildlife.
4. Agricultural researches.
5. Research forestry and natural resources.
6. Research geological and earth sciences and mining.
7. Water research.
8. Energy research and renewable energy.
9. Economic research and development.
10. Research for strategic studies.
11. Research sovereign, political and judicial.
12. Research, educational, social and intellectual.
13. Security research.

Tasks of scientific research centres specialised in:

- (1) That are centres of radiation of modern technologies such as remote sensing, biotechnology and space science, renewable energies and others.
- (2) That are centers of training for staff in all institutions in order to settle these technologies in the country.
- (3) To be advisers to the state of the scientific studies necessary preceded any development project in order to avoid confusion and loss, and planning random.
- (4) To ensure that resettlement technologies in the global agriculture, industry and animal husbandry, and others.
- (5) That the necessary studies in order to achieve international standards in all national products and national wealth in order to be competitive globally.
- (6) That works to detect the exploitation of natural resources existing in the country, such as plants medical and natural fertilisers and pesticides, plant, solar and others.
- (7) To spread the spirit of innovation and invention and disclosure, and encourages and seeks to achieve scientific leadership.

(8) To establish research projects of integrated human development and fighting poverty.

Problems of Evaluating Scientific Research

Scientific research in Sudan is concentrated in three or four ministries which are the Ministry of Higher Education and Scientific Research and led by the National Centre for Research and Universities, Ministry of Agriculture and Natural Resources Development and the Agricultural Research Corporation, and the Ministry of Livestock and the Body Livestock Research, Ministry of Industry and the Centre for Research and Industrial Consultancy. In addition to the small units in some other ministries such as the geological research, and the National Department of Energy, and General Management of Forests

- An escalating costs of research materials necessary laboratory and field and logistical.
- Migration researchers outside the country and sometimes internal, non-research sites to get an income guarantee.
- Lack of funding for general research, a very small proportion of national income.
- Imbalance ratios between scientific research and technical assistant in all disciplines.
- Social and economic conditions that adversely affect the researcher and the lack of appropriate financial incentives and lack of access to opportunities to participate in conferences and meetings of global and regional.
- Quality of research and its incompatibility with the application directly.
- Coordination between producers of research and its users.
- Failure to provide supplies to apply the results of scientific research in terms of management and human resources, and financing frameworks.
- Busy bodies in the productivity boost production, and incentives and lucrative bonuses.
- Weak contribution of 10 research organisations in solving the actual bottlenecks in production lines, including punishment of confidence between the parties. 11 non-priority-setting research properly respond to urgent cases and with tangible economic returns.
- Poor management of scientific research.

SOLUTIONS

- Develop a strategy for Sudan to encourage scientific research in the country to help achieve comprehensive development in various states and enable them to confrontations and challenges of the twenty-first century.
- The expansion of graduate studies in universities of Sudan and provide the conditions and requirements for success.
- Ensure the academic freedom of faculty members in Sudanese universities in the areas of research and teaching.
- Activating the role of network information so that helps to document the links and linked to international information networks (internet).

Sudan was for a long time in line with the global movement for scientific research in terms of:

First: Find the same equipment.

Second: The links researchers with their counterparts in all parts of the world distinctive character. There were a large number of bilateral agreements between colleges or universities and

research centres with their counterparts in many parts of the world, resulting in projects of joint research led to impressive results contributed aid and research grants provided by the bodies and organisations of different world, and has helped researchers Sudanese to attend conferences and scientific gatherings. The presence of the researchers, evident in the social and economic life, health and environment in Sudan are important. It was a familiar sight scientific research teams in different regions of Sudan studying soil and water, and studying archaeology and history, and treat the problems of endemic diseases in remote villages and through the woods, and even studying the natures of animals and insects, and others. Mingling with people studying the economic and social problems, but that, for quite some time ago began some of the factors affecting a profound impact on the movement of scientific research institutions of higher education in particular:

- (1) Qualified scientific personnel (scientific ammunition for the country) emigrated, mostly because of economic pressures, and migration after reflow because of their scientific reasons of scientific research is not available in contracts, which migrated out.
- (2) Research potential of laboratory equipment has been disrupted all of which did not break down outdated and has become outdated and has become the science performed by not considering the expense of evaluating research.
- (3) To move and work the field is the basis of scientific research and with transportation difficulties and lack of ways to move the disappearance of field research, especially in remote regions of Sudan, which is the basis of thesis research projects.

Third: keep up with developments in terms of research, since a significant number of scientific journals and was a regular libraries, various colleges, the library next to the National Laboratory ((Lab Welcome)) is a scientifically advanced only library outside the scope of higher education institutions. Most of these magazines completely stopped or stalled in the regularity.

Fourth: The affected cope with researchers to scientific research, regional and global severely affected since stopped most of the international scientific periodicals for libraries of Sudan and not in many cases, as well as attending conferences and scientific meetings, thus reflow blending of scientists Sudanese with their counterparts around the world, and I said, but there is a lack of joint research projects between Sudanese and their colleagues outside the country.

Fifth: almost stopped the movement of scientific publishing in Sudan has been disrupted as all scientific journals, which was issued regularly because of the costs of preparation and printing excessive.

And do not forget that the establishment of several universities in a time when one has had such a profound impact on the movement of scientific research, since all of these new universities is qualified to perform scientific research, and this is a natural need to go through these institutions and should note the state of research in universities:

- Lack of a dedicated budget for scientific research.
- Times, and the poverty of laboratory equipment and chemicals.
- Accumulation of a large number of students in one supervisor.
- Apology for the registration of some colleges' students due to the lack of possibilities.
- Over a long time to register students without disabilities because of the results of the search.
- Adoption of the phenomenon of students themselves in providing the materials they need for a crisis to search.

- Non-existence of continuous college professors.
- The phenomenon of the high cost that has become imperative for the student pay for registration.
- Transformation function of graduate schools in the universities of care scientific research and exchange it to institutional investors concerned with achieving a cash entry to universities.
- Lack of direct linkage between development plans or strategy and ongoing research projects in universities and even the lack of correlation between each other and the issues of the Sudanese community are in terms of quantity and quality.

4. Difficulties that hinder the course of the development of research and development system

The following difficulties are discussed:

1. Coordination in the development of research and development programmes

Lack of coordination in the development of research and development policies and development between the national plan and research programmes in universities, research centres and lack of familiarity with the problems and needs of the industrial sector and agriculture and due to the lack of authority, which sponsors scientific research and then entrusted with the accounting research directions.

2. Coordination between universities and research centres

Not to encourage researchers in universities on the use of laboratories, research centres and the results of previous research affiliate, no facilities and special benefits for the exchange of information and experience between them but no interaction is limited to each and everyone in his own world.

3. Coordination between the productive sector and the service, and scientific research

Solve the problems of the factories away from the centres of scientific research, whether in universities or research institutions and often the solution will cut the import of new or foreign assistance. The results of the research not concern the productive sector to lack of confidence and accommodating the extent of its success and realistic cost.

4. Internal difficulties in research institutions

There are several internal constraints impeding research institutions to interact with the productive and service sectors, such as not qualified for the Latest Altqanyen in sufficient numbers to carry out maintenance and operations research under the supervision of senior staff. These intermediate cadres need to be a comprehensive training and there is a lack of familiarity with the needs of these sectors and how to market services to them. There is no sense of the role of media failure and the absence of a mechanism to activate the association and coordination and integration between research institutions and sectors of the recipient.

5. Financing of research and development

The agreement in the research and development is one of the direct indicators to assess the scientific status of any country; there is a high correlation between investment in research and development and economic growth. Developed countries maintain the progress and prosperity through the availability of credits in the field of research and development, while

developing countries in contrast to the belief that the interest in investment in science and technology does not come benefits urgent. In the time that developed countries spend high percentages (between 2 to 3 %) of their gross national product in research and development, we find that the majority of developing countries does not exceed more than 2%-3% and 0.2%-0.5% of their gross national product in research and development.

6. Where we are!

A comprehensive national strategy in 1992 (1992-2002) on a strategy for higher education and scientific research and technological and the introduction of science and technology in various fields on the stages:

Phase 1 development rationing.

Phase 1 development of services.

Phase 3 evolution Pilot.

Phase 4 developments and updating of the vertical input of technical packages in the areas of production and services.

Phase 5 expansions of computer and information services.

Phase 6 technology transfer and employment in the fields of energy and industry.

Phase 7 to improve seeds and soil technology.

Phase 8 expansion techniques in the fields of microelectronics and artificial intelligence.

Phase 9 the introduction of biotechnology and genetic engineering to use it in production.

The plan means that the strategy is the means of research, legislative, human and material resources.

7. Human resource

The human element is a powerful tool in bringing about economic and social development through the use of other factors of production, and the human at the same time the target development. Dealing with human development as the development of population characteristics, abilities and organically linked with the overall development of a society where rights and the means or purpose. The population of Sudan, about thirty million people (Statistics 1996) and estimated population growth rate of about 8.2% per year and notes that the increase of population in urban areas of 5.7% per year, while increasing the rural population rate of 5.1% per annum and is due mainly to migration from the countryside to cities. It is also noted that a high proportion of the population under the age of 15 years (it follows that the existence of the proportion of approved high) and the population density is about 10 inhabitants per square kilometre and up in agricultural areas populated to 390 and there is variation in the distribution of population between different states.

The number of economically active population by about 48% of the total population and contribute to kidney for males by about 60% and women by about 4.6%, which is very low and worthy of review and processing and the contribution of women in rural areas is higher than in urban areas and areas rich in the top of the poor. By the urbanisation process and continuous improvement of health services, the youngest age bracket increases for the composition of the population. The estimated labour force (15-64 years) at about 54% of the total economically active population who are estimated to be about 5.8 million of whom 1.2 million urban and 4.6 million rural. One of the problems that must be addressed, increase-mounting losses in the various stages of education, has the unemployment rate in 1993 about 17% while it was 5.10% in 1983.

And to promote population characteristics and development of human resources and development skills of the workforce to raise the efficiency of production to achieve the development goals desired, while maintaining the stability, entitled to the problems of population

and workforce awareness and mobilisation and organisation, guidance and information to improve the characteristics of population while maintaining the highest rates of population growth commensurate with the geographical expanse and objectives strategic addition to the employment potential of the population and higher rates of growth while preserving natural resources and ensure the continuation of its bid for ways to raise awareness and promote the means of production and legislation

The workforce may be seeking to address issues of illiteracy and reduction of waste education and technical training and vocational skills development and linked to appropriate technologies and the local environment and the needs of the labour market.

Agricultural systems

The climatic conditions, soil, water and natural resources and systems investment and agricultural development strategies pursued by successive governments and social conditions and technology used in production led to the different agricultural systems, including irrigated agriculture, rainfed agriculture traditional, rain-fed agriculture machinery and livestock systems that depend on pasture and natural forests and wild animals as well as of fish.

Vary the contribution of each of these systems in GDP and in the importance of economic and living conditions depend Sudanese economy heavily on irrigated agriculture and rain-fed agriculture mechanism and the two together contribute about 80% of food production (maize) and estimated its contribution of about 50% of the value of agricultural exports has recently contributions to the growing livestock and gum Arabic in the Outbox

1. A system of irrigated agriculture

The history of irrigated agriculture in Sudan to talk sense to the beginning of the twentieth century, where they began the use of irrigation pump replaced animal driven systems, and has required the expansion of irrigated agriculture, the establishment of Sennar dam on the Blue Nile (1925) and tank mount parents on the White Nile (1937) and debit drawing closer to the Atbara River (1964) and Rosaries on the Blue Nile (1966) and goes now endeavour to ramp tank Rosaries expansion in irrigated agriculture in Kenana and Rahad.

The area of area irrigated by about 5.4 million acres, including 2.2 million acres represents an area of the Gezira Scheme and protractors and the rest of the irrigated area is limited in areas that draw water from the Blue Nile and White Nile in the Central Region and the Main Nile and the Atbara River in addition to agriculture, flood in Tokar and Gash and have been used by Sudan until now 6.15 million cubic meters from its share of \$5.18 million cubic meters when the Aswan by the Nile Waters Agreement between Egypt and Sudan (1959), with the exception of projects of the island protractors and New Halfa, Rahad, irrigated agriculture using pumps or flooding rivers and valleys, seasonal.

Major crops in the irrigated agriculture is a long-staple cotton, peanuts, corn, legumes, vegetables, fruit, fodder, sugar cane and crop productivity in the irrigated sector high in comparison to the traditional rain fed, but is considered low when compared to other country-irrigated agriculture, such as Egypt. Contribute to irrigated agriculture in providing livelihoods stable for about 5.1 million people, and has contributed significantly to improved social services and the provision of clean drinking water and health services, education and literacy and women's affairs in the areas of irrigation projects. Successive governments have continued to exercise parental role in this sector in terms of providing the requirements of foreign exchange for inputs and operational requirements and the obstacles that have emerged have accompanied the influential sector in its overall performance. The following can highlight these constraints accumulated in the components of irrigated agriculture:

2. Agricultural ills

Low productivity compared to agricultural systems like the country's other stability in a low level and still the gap between reality and can be large despite the use of a reasonable amount of inputs and technology packages and require problem analysis of its causes and develop solutions to break the productivity and the reasons for low productivity include:

(A) Non-integrated application packages for affordable and proven technology.

(B) Poor control of agricultural operations, including the spraying of pesticides and land preparation, irrigation, etc.

(C) Twice the efficiency of irrigation for many reasons, including siltation of canals and drainage and the accumulation of grass scarcity of possibilities.

(D) The weakness of the settlement of land within the project, which reduces the area under irrigated Gezira Scheme. In the example of land estimated at low and high water, which can not be detected by about 10% or about 200 thousand acres, as well as in the case Rahad and other projects.

(E) Limited crop structure and the limited alternatives and limited water in major irrigation projects.

3. Planning ills

The planning a major irrigation projects in the vision and the absence of seasonal careless programming, which will reflect negatively on the provision of inputs to the extent required and timely irrigation water or programming or application of agricultural operations.

4. Economic ills

Return the material is the one who motivates the product more of an effort, and return the result of many factors the most important cost of production and its impact, and it is not necessary to determine the effectiveness of each of these factors on the revenue farms scientific analysis to be able to apply what is optimal and has escalated recently, the operational cost of production and the cost of inputs and finance and employment.

5. Administrative ills

It did not develop management style in the great institutions at the field level in periods different undergone major projects and has been the participation of farmers in decision-making and implementation of programmes through the boards of the production is weak not kept pace with the training of administrative changes that have occurred across the stages of the project, have been projects suffer of excessive bureaucracy in the financial and administrative procedures affecting the flow of agricultural work. Remained most of the laws and regulations official purely financial and accounting systems, and not characterised by analysis of the components of cost and staff lacked training in the craft of technical systems analysis, financial management and has been recently an active participation of farmers involvement in the boards of directors.

6. Structural and organisational ills

Organisational structures have remained constant with the change of project objectives and farming systems and policy changes are being reviewed in the structures and I think

that there is a need for closer monitoring of the implementation of the new agricultural policy which requires re-formulation of structures.

- (1) High cost of funding and limitations on the financing requirements of production and post-harvest operations, including marketing.
- (2) Rising tax burden on the irrigated sector, particularly on cotton with the ease of what happened remains an urgent need for further easing the tax burden on agriculture.
- (3) The escalation of production costs due to inflation.
- (4) The escalation of the cost of administrative expenses.

Perhaps the modifications and alternatives available to support the development of irrigated agriculture lies first in the development of solutions to break the barrier of low productivity and this is the following direction:

- (1) Focus on the optimal use of land irrigated with the expansion of the current horizontal minimalistic. Reform of banking would increase the irrigated area in the existing projects and increase productivity.
- (2) To continue to focus on crops of cotton, peanuts, vegetables, spices, sugar and sunflower to happen right balance between production for local consumption and export.
- (3) Improve the level of the department from the best selection, led by boards of directors and membership of councils in order to be competent and effective and accountable for all the factors of production.
- (4) Support the improvement of means and methods of water use in irrigation and management at the field level.
- (5) Introduce the concept of modern farmer by the method of the leading group.
- (6) To give more flexibility in the composition of the crop and the opening of the introduction of alternatives and expand the scope of diversification and adaptation, and this requires the support and development research.
- (7) Continue to reduce the state's role in production and reduce its direct role with the extension of the bulk of the contribution of farmers.
- (8) Follow-up and monitoring the implementation of liberalisation and privatisation in the irrigated sector and to provide the climate necessary for the success of these procedures and care until it reaches the desired objectives.
- (9) The interest in addressing environmental concerns in the agricultural sector.

7. Rain-fed agriculture mechanism

This system is limited to agricultural land in the heavy clay in different areas, including south Gedaref and Akaddampelia and southern Blue Nile and Upper Nile and south Habila in South Kordofan. It depends on the rates of annual rainfall varies from 450 to 900 mm. It is characterised by agricultural system using the mechanisation of partial (tractors and agricultural equipment and harvesters) in the operations of land preparation, agriculture and in the harvest of some varieties of maize, sesame, using employment leased in all phases of agriculture in the holdings of large (1000 1500 acres of farms) and agriculture is rainfed mechanised production's main commercial crops maize and sesame. The rain-fed agriculture machinery began in 1945 in the belt of open savannah) area Akaddampelia in the growing areas of the fire where there is no tree cover has been made and later spread to the area of Daly and Almsmom and after the expansion began in the plantations, which necessitated cutting trees without a measure of good and with time. This resulted in land erosion, which contributed to the destruction of the environment, soil degradation and emerged to the surface intense competition between agriculture and the needs of the mechanism of animal grazing. The main obstacles faced by the mechanism of rain-fed agriculture, which limit the productivity are summarised in the following:

- (1) Fluctuation of rainfall and distribution during the season.
- (2) Partial mechanisation, which requires workers rentals large and expensive, requiring the completion of other aspects of mechanisation.
- (3) Poor efficiency performance slides arts and crafts in the use of mechanisation and the scarcity of spare parts, which requires intensive training.
- (4) The scarcity of sources of standing water in production areas.
- (5) The poor roads and poor communication.
- (6) Or refraining from inefficient use of affordable technologies, including varieties with high productivity and the scarcity of use of agricultural inputs and non-observance of the application of the agricultural cycle with improved varieties that are highly productive.
- (7) High cost of labour.
- (8) Weak research and testing and evaluation of technical equipment.

Measures required reducing the obstacles and routing mechanism of rain-fed agriculture to sustained growth:

- (1) Reducing the horizontal expansion of land with heavy tree cover means that review the overall strategy in terms of modernisation and doubling the size of mechanised farming without conflict with the needs of the animal and its tracks and uses of forests and other traditional uses and that the absence of land-use maps.
- (2) The inevitability of the use of appropriate technology affordable and complete the complementary aspects of the technical packages with the use of agricultural inputs, particularly fertiliser in areas of rain safe to address the low fertility of the soil and the choice items with cheaper production and early maturity and the appropriate height. It has been developed for the vacation of high productivity of product arranged and made the bathroom and one hybrid corn.
- (3) Reduction of conflicts with the requirements of the animal from pasture to achieve a degree of balance between agriculture machinery and to meet the needs of the animal from pastures and forests.
- (4) To support and develop research in the fields of agricultural mechanisation and relations of water and soil and the development of high-yielding varieties and early support and development of agricultural extension.

8. Rain-fed agriculture of traditional living

Traditional farming households are agricultural system practiced by small farmers in western and southern Sudan and ease of central and eastern province in the clay soil and sand for the production of crops food such as maize, millet, mainly in addition to the crops cash sesame and peanuts in the holdings of small scattered and that system also includes raising cattle and cut the Acacia Senegal in the positions exercise the population and additional work to earn more. Due low productivity for the use of methods primitive in agriculture and varieties with low productivity and a dearth of pest control and land use for years in a row in monoculture sequential and without crop rotation, which weakens the soil fertility in addition to the adverse effects of systems of tenure, poor infrastructure and scarcity of drinking water. Perhaps the most important impediments to sector reform, the traditional lies in creating an enabling environment for the organised private-sector to provide economic services and in-kind to small farmers through contract farming with the provision of storage, transport and marketing facilities, accompanied at the same time improve the roads and provide water sources and mitigate natural climate harsh. With the inevitability of illness and treatment to reduce impediments to agricultural growth, there are some data must be provided in order to increase agricultural growth and persistence, including:

- (1) To support the agricultural sector and provide solutions to problems.
- (2) A reconciliation between the good economic growth rates and margins for the safe use of resources.
- (3) The allocation of a share of development investments for the maintenance and protection of resources and the development of the rule collections.
- (4) The use of affordable technology matchmaking, which reconciles the objectives of most of the output and productivity and those that ensure the optimal use of resources and the preservation of its resources innovative.
- (5) The use of accounting system suppliers (environmental accounting) given the resources real value and was able to calculate the value of environmental degradation of the economics of projects.
- (6) The establishment of land use planning, water and agriculture on the environment, the integrated approach to agricultural development of maps, which requires investment.
- (7) Taking into account the reduction of environmental pollution and risks to human and animal health when the application of modern technology.

9. Date of agricultural engineering research

The Agricultural Engineering Research Corporation of Agricultural Research began since the early fifties of the twentieth century. Research station mudflats and central stations Kenana Abun'amh, Rahad, Al Gezira, New Halfa and then white and tubercle, Gedaref, Algenid and farm Tambul leader in the field of agricultural engineering. In the sixties the interest of Agricultural Engineering, Ministry of Agriculture, the establishment of a pioneer farmer in the area of Gedaref and Al Gayoob, Gereida in south Darfur and in the New Halfa and Suki and Alknav. Research has been conducted in several University of Khartoum since the sixties and the University of El Gezira since the mid-eighties.

10. Cadres working in the agricultural engineering research

The proportion of researchers working in the field of agricultural engineering:

Agricultural Research 9.26%
 University of Khartoum 6.34%
 University of Gezira 5.15%
 Sudan University 5.11%
 Sesame Centres 5.11%

10. Research objectives

1. Determine the needs of the land by blowing the desired goal.
2. Design, development and adaptation of different agricultural operations.
3. Improve the use of agricultural equipment.
4. Move technologies.

11. Research projects

(A) The preparation of the draft Land:

- (1) Land preparation for the cotton crop in the irrigation projects in the soils of one mark.
- (2) Preparation of land for the territory of the alkaline salt of low productivity of the Gezira scheme.
- (3) Improve the preparation of land technically and economically of the corn, peanuts and wheat projects New Halfa and Rahad.

- (4) A comparison of different methods for the preparation of land for sugar cane crop.
- (5) Preparation of land for crop and irrigated sesame raincoat.

(B) Harvesting of crops:

- (1) Development of harvest technologies:
 - Harvest of sesame.
 - Harvesting the winter crop legumes.
 - Harvesting palm.
 - Constant development of the study of the peanut harvest.
- (2) Improve the use of harvesting techniques:
 - Reduce the loss harvesting wheat.
 - Improve the use of technologies harvest sugar cane.
 - The use of animated harvester to harvest maize areas of rain.

(C) The development of agricultural machinery:

- (1) The development of cultivation manual for the cultivation of corn.
- (2) The development of circular allowance for peanuts.
- (3) The development machine to the work of ridges and agriculture in the rows.
- (4) The development of family agriculture and the diversion of wheat.
- (5) The development of the use of the plow disc harrow for weed control.

12. The role of agriculture in national economy

Agriculture in Sudan as large destruction (crop, animal, forestry and fish) is the main production sector and will remain so for too long. Agriculture and food is the source of the meaning of earnings as a source of industrial raw materials, energy, representing 70-90% of export proceeds and 90% of the food and provide employment for about 75% of the population. Above all other sectors, including manufacturing, trade; transport and services are dependent on agriculture in one way or another. The average contribution of crop sector in GDP is about 53% of the contribution of the agricultural sector. The contribution of agricultural production to GDP was about 33% up to 42%, while the contribution of animal production on average 2.38%, forests and fish 2.9%.

Usually divided into crop production systems in Sudan to the three major systems including the irrigated and rain-fed mechanised farming system and traditional rain-fed farming system. Producing sectors, irrigated and automatic raincoat 80% of food crops and 50% of exports. The traditional rain fed sector and production sector to provide ways to gain about 90% of the agricultural population. There are many problems that hinder agricultural growth continued in the agricultural systems, including poor infrastructure (transport, storage, etc.) and limited financial resources required for investment in agriculture and weak capabilities planning for sustainable agricultural development, lack of foreign currency required to import inputs and macro-economic environment is favourable for agricultural growth.

13. The objectives of agriculture in overall national strategy

The main objectives of agriculture as set out in comprehensive national strategy on:

- (1) Food security.
- (2) Sustainable agricultural development.
- (3) Of the increase and diversity in crop and animal production.
- (4) Raising the efficiency of resource use.

- (5) Increasing productivity by using modern technologies to focus on small farmers and investment by the private-sector and the interest in the role of women in development.
- (6) Integrated rural development and balanced.

The key elements is to enable agriculture to meet the challenges of globalisation and the information revolution and the ability to produce agricultural commodities with a high level of quality so that they can compete in the global market. Include the rational use of information and advanced agricultural education and training they gain skilled and influential agricultural research and dissemination of improved technologies and adapt. And move all of these elements require the use of the human mind, skills and information in addition to other factors of production to economic growth. This is because the free market economy requires the presence of statisticians and students trained and equipped with comprehensive skills and information. While gained agricultural research and production a reasonable amount of attention in Sudan, we find that the statistical and information systems is still very weak and capabilities on the collection, sorting and testing, analysis and exchange of information have been limited and much less than required to meet the challenges of globalisation and information revolution. They have started and the Ministry of Agriculture and Forestry recently in taking preliminary measures to create an information system include the following:

- (1) Providing statistics, the cultivated areas and crop productivity and cost as well as statistics and prices and incomes.
- (2) Sub-databases in the institutions dealing with the major irrigated production techniques and management of agricultural inputs, finance and other institutions.
- (3) An information base for investment shows the country's resources and opportunities for investment and the key information required for investment and trade.
- (4) A database of crop inputs and contributions to agriculture in the balance of payments.
- (5) Dissemination of agricultural census results and analysis.
- (6) Agricultural legislation, including land tenure, land distribution and relations of production, legislation and regulations prevailing.
- (7) Agricultural services include the provision of seeds and seedlings, soil conservation, and land preparation, crop protection and veterinary services and cardoons (Ahadjrasahy), and nutritional requirements of the animal for the production of dairy, poultry and fish.
- (8) Institutional issues such as research, finance and management of irrigation facilities.
- (9) Rule of collections management of natural and environmental issues in all areas of agricultural and environmental elements of the local environment and biodiversity.

Agriculture to be able to provide adequate food and the production of agricultural commodities competitive in the global market must be taken several measures including:

- (1) Should be the agricultural sector to produce what can be a maximum production of food resources available.
- (2) Efficient use of resources and cost relatively less able to compete in global markets and increase the opportunities for the wider market.
- (3) Focus on water security water reckoning is set for the future of agriculture.
- (4) To proceed with the policies of economic reform and structural adjustments programmes and remove all the ills that limit efficiency.
- (5) To encourage intra-regional trade in agricultural commodities. It should be the strategy and action plans that are consistent with those needs and the following are some of the institutional liabilities:

1. Adequate climate policies that encourage investment in agriculture.

2. To encourage adoption of technologies capable of increasing production.
3. An effective coordination between the organs of agricultural development.
4. Development of human resources trained and highly skilled.
5. Focus on sustainable agricultural growth.
6. Promoting and improving the performance of agricultural exports.

Raise the efficiency of the distribution of materials and services in the agricultural sector and the reduction of agricultural pests and animal disease resistance, and approval and registration of seeds and cooperation with international organisations. Strengthening the capabilities of information management through the establishment of an information network that will provide information to relevant departments. The main components of this network are the computer and trained manpower and the rules of information-gathering systems.

14. Higher education in agriculture

1. An expansion of a higher agricultural education system to include all food production from farm to market.
2. Preparation of higher agricultural education programmes on the basis of teaching, research and extension.
3. Re-structure of the curriculum so as to provide knowledge, skills and information technology including the use of computer and sustainable resources.
4. Creating and strengthening links between universities (Colleges of Agriculture and Veterinary, etc.), and national research centres.
5. Provision of training opportunities to raise the capabilities and efficiency of the faculty members through seminars, meetings and programmes.
6. Support cooperation and distribution of information among educational institutions and other devices.
7. Attention to sustainability of institutions of higher education because they suffer from a continued decline in funding and the erosion and degradation of the environment research and the inability to keep the faculty members in their positions.
8. Consideration of the establishment of centres of excellence for postgraduate studies in some Arab countries.

15. Agricultural research and extension

1. A national agricultural research systems to address issues of productivity and sustainability, and national research systems should be documented contacts with advisory groups of the global agricultural research, as well as with farmers and livestock breeders.
2. To encourage adoption of technologies that can increase productivity.
3. Increased investment in research resources and increasing operational funding for research.
4. Provide a climate that encourages researchers to stay in the search sites.
5. Coordinate research networks among Arab countries.
6. Move the Union of National Agricultural Research Institutions of the territory of the Middle East and North Africa to be a forum for effective research, and to be effective link with the Consultative Group for International Agricultural Research.

THE LIVESTOCK SECTOR

We can distinguish two main ranges represent the animal production in the traditional pastoral production and modern production and characteristics of each, which is characterised by the other. And can also identify sub-systems within each of these bands.

Pastoral production of traditional system of diffusible (Transhumant) live 90% of the total volume of livestock and the system includes mobile and semi-mobile, stable and depends mainly on animal feeding on natural grassland and in need of labour intensive typically include entire families, is estimated to use any input or modern technology only to the extent necessary narrow to live animals and breeding such as water pumps and veterinary pharmaceuticals, and thus the productivity of animal low. The pastoral sector and provides the traditional base for the supply of breeding stock (Kenana cows, Buttana-the lining of milk and other types of livestock for meat for the modern sector). The modern production system is characterised by stable high-density and productivity of vertical as of much greater use of modern inputs and technologies available and the animals are chosen carefully so requires a more economical management skills and highly technical.

Perhaps the growth strategy of animal production is based on the grounds that the traditional production is the basic rule that must be developed to raise the productivity of animals, especially cows milk and meat by their size and spread, and a value of animal units than among cattle society. And be in the traditional sector to do the following:

(1) To ease the pressure on natural grassland is the disposal of livestock producers and improve herd composition and vertical lift productivity and improve the infrastructure to facilitate transport and marketing development in the storage yards and fattening cattle around cities such as yard Omdurman.

(2) Preserve the resources of pasture and drinking water sources to prevent environmental hazards.

(3) Improve the nutritional value of pasture rest of the natural rain-fed agricultural residues and mineral salts.

(4) To continue to support policies and taking into account the cost of imported inputs. Integrated rural development in Sudan, it must be singled out space for the animal in the framework of strategies and national plans for economic and social development and for the livestock sector broadband pays and implications of the Sudanese economy was necessary to study the problems and obstacles to the development of this sector, which is represented in the problems and solutions, which include:

(1) Breeders rights and his economic.

(2) The pattern and methods of education, the most important migratory animal life.

(3) Pasture and forage, a core concern of present and future.

(4) And lack of distribution of water resources and the impact on the load of pastoral.

(5) Absence of policies and development plans balancing.

(6) In the control of epidemic diseases.

(7) Of the problems and export.

Livestock contribute to food security through sustainable and increase animal production and increase national income. Represent natural grassland, about 60% of the total area of the country located mostly in the semi-desert environments and low-rainfall savannah tree. Who practices a craft grazing 14% of the population and own 90% of the total national herd of livestock; according to statistics in 1996 some 103 million head of sheep and goats represent the highest percentage, followed by cattle and camels and finally Equidae family. Featuring livestock that survived the weather conditions surrounding the prevailing mode of production. Based on rainfall and soil type there were several plant environments including the desert and semi-desert and savannah woodland (low rainfall and heavy rainfall), swamps and mountainous areas.

Each environment holds certain properties and plant environments are semi-desert and low rainfall savannah tree backbone of the traditional livestock production. Consists of vegetation in semi-desert environment in the dominant grasses and herbs with varying temperature

and density of trees, shrubs, and includes unique areas such as the lining and the Beja Congress and most of the grass round about, with some perennials which represents the pastoral environment of the camels and sheep. There is widespread economic development to increase country's exports of animal origin and import substitution and to achieve balanced development of sectoral and environmental and represent the most important strategic pillars of the sector in improving the environment for animals and expand the production base and provide institutional frameworks for the exploitation of available resources efficiently and work to make a quantum leap in human resources, working in the sector and in spite of all these data. Economic still reluctant for many reasons, which include environmental degradation and its impact on low numbers and high mortality rate and low birth rate, births and increased withdrawals, involuntary and non-programmed and the disruption of the composition of herds and turning herds to areas of inadequate mixing between species to increase the resistance of the environment at the expense of economic value and the loss of components of genetic good production. As well as diseases include animal deadly and that cause major economic loss is the loss of animal and is in the diseases that cause low production and loss of economic and diseases, food shortages, malnutrition and diseases that cause abortion and diseases include non-lethal, but prevent the export of the animal in addition to diseases of the skin and cause of the loss an economic large.

Biosphere reserves are areas of systems for environmental land or coastal been recognised internationally within the UNESCO. Man and the Biosphere (Map) and to develop their relations balanced between man and nature have been designed to interact with more issues facing the world challenge which goes to the twenty-first century in order to preserve diversity plants, animals and micro-organisms which are vital surroundings while maintaining the natural ecosystems in good condition at the same time can bring our physical needs and aspirations of the growing numbers of the population. Working biosphere reserves to combine three functions: conservation, development and support services in connection with activities on research and monitoring, training and education on issues relating to the conservation and sustainable development at local, regional, national and global, as stipulated in the agreement Seville in 1995 for the Biosphere Reserves.

Sudan protectorates of the biosphere joined the fold Dinder National List of Biosphere Reserves in 1979 and the National Alrdom barn in 1982. Dinder compound facing several challenges hinder their development as demonstrated by studies and research, and sustainability of animal production. Sudan has a huge animal wealth of cows, sheep, goats and camels are still the poultry industry and dairy in the early stages is relatively small. Latest census of the livestock was in 1996 and estimated numbers of livestock now an estimated 103 million head (30 million head of cattle, 70 million head of sheep and goats, almost evenly and 3 million head of camels). The major constraints facing livestock production include the lack of actual materials in spite of the abundant crop residues, and overgrazing, which results in him to land degradation, as well as weakness in the genetic capacity of local breeds to produce meat and milk with the exception of Kenana cattle and Buttana-the lining of milk. This is in addition to the institution and the technical constraints and diseases. The health of the animal is at the heart of sustainable animal production and the fight against animal diseases veterinarians in the U.S.A in coordination with the Federal Department for Animal Health. Using vaccination, the most important infectious diseases under control, especially in northern and central Sudan.

The export of animals and their products to the outside is subject to the supervision of accurate health and the body of research. Livestock research in animal health and animal production and the production of vaccines. The most important obstacles to the health of the animal is in the weakness of research budget and weak veterinary services, especially in rural and low capabilities of diagnostic services and the deterioration of research infrastructure. The area is

to increase production of livestock sector in Sudan because the large livestock production is very low, much lower than can be produced in the fields of testing. The research agenda must be to accommodate the problems facing the production and waste and the problems of handling, marketing and resource degradation. That increase the capabilities of research institutes of national applied research directed to resolve issues producers pressing require the integration and interaction of many elements related to planning research and develop technologies, adaptation and investigation of navigator techniques and distribution, and research centres of national influencers also requires firm resolve and sustained political commitment and last but not least, adequate and sustainable funding.

It has escalated in recent years, interest in finding solutions to problems that affect the production and sustainable livestock sector (land, soil, biodiversity, etc.). In Sudan, drought and desertification, soil degradation and the effects from the harmful effects of animal shows the urgent need to protect the environment and environmental awareness. And the need for the rise in production levels to better and sustainable while maintaining the integrity of the rule of collections and ecological balance has become of paramount importance. And liabilities for the sustainability of development of animal include: a comprehensive information base: animal research in order to increase productivity with sustainability and efficient use of natural resources and inputs, capacity building institutional capacity, optimal use of soil, water and climate, human capacity building in education, training and guidance for all levels which includes the shepherds of men and women, research participatory multi-disciplinary and dissemination of technologies, improving the systems of finance, marketing and transportation, development institution to participate from the bottom to the top according to model the development of selected areas, which have been his experience in Sudan, in cooperation with the United Nations programmes, a system of monitoring and evaluation and feedback from producers in livestock production systems different.

The role of scientific research in solving the problems of the private-sector and industry: The private-sector grew Sudan since 1908 under the state control of all walks of economic life, traditionally without seeking the importance of scientific research centres in the development of performance and changes in production, commerce and industry arose transport industries are small and craft of this pattern. The General Union of Sudanese Employers is the backbone of the private sector since its inception in 1976 to exercise functions, which came out in its statute. This works Sudanese Employers Union of Federations of five rooms, namely:

1. Union of Chambers of Commerce.
2. Confederation of Industrial Chambers.
3. Federation of Chambers of Transport.
4. Federation of Chambers of Small Industries and Crafts.
5. Union of Chambers of Agriculture.

The Union of Chambers of Industry was created in 1972 to collect the owners of small industries in Sudan in the organisation of one means the interests common to create a good relationship between partners in the production and employers themselves or between them and the competent authorities of the state and contribute to studies and programmes of the state in addition to the advancement of studies and research of economic and scientific and applied to collect information and research for the development of national industry.

The Confederation of Industrial Chambers includes the following:

1. Room leather.
2. Bedroom oils and soap.
3. Room spinning and weaving.
4. Room food industries.
5. Bedroom-engineering industries.

6. Chambers of printing and publishing.
7. Room chemical industries.

The following conclusions are drawn:

1. Funding: This issue is related to the banking sector where the needs of industry funding oeuvre.
2. An excise of tax, customs, and obstacles facing the industry in raising the production costs could not able to compete externally.
3. Lack of energy infrastructure, roads, waterways, which form the basis of contact for the industry.
4. Conflict and bias government policies in favour of some other industries without causing frustration on the industry.
5. The establishment of centres of scientific research requires funding for the room are unable to provide.
6. The existing industries do not need to do a research centre, (7.85%) of the rooms there is no scientific research centres, but there are plants belonging to some big factories.

1. Strategic and applied research

Identify strategic objectives depends on the formulation of strategic plans and provide the basic capabilities of these components operate at three different levels:

1. Level strategic.
2. Level administrative and download.
3. Level operability.

2. Strategic objectives based on three axes

1. Fonts petition policy.
2. Goals key.

Three procedures required accessing the completeness of the goals of the observed and the strategy includes three main components:

1. Formulation of objectives.
2. Planning work programmes to reach the objectives.
3. Ensure that the capabilities required.

Management strategy must be seen as an ongoing process and it does relate to the goals and plans, and monitor the risks and restraints, and support aids, and the decline of priorities, and believe in possibilities, and the sequence of implementation, and the results. Even a strategy of scientific research does must believe:

1. Maturity of the strategy and the plans.
2. Safety priorities.
3. Integrated management process (technically, administratively and financially).
4. The stability of scientific research institutions structurally and functionally.

Types of research can be summed up as follows:

1. Research strategy.
2. Applied research.
3. Technical research (field technology) research.
4. Research methods (methodology matters).

Success factors of research plans:

1. Availability.
2. Financial resources and appropriate technical.
3. Powerful infrastructure.
4. Qualified workforce.

However, it cannot be the success factors certainly without linking it with other elements such as:

1. The formulation of a policy, e.g., solid with specific goals.
2. Agreement on the priorities and goals.
3. Involvement of professionals and decision makers in all stages of policy development and strategy formulation.
4. Coordination between different sectors and units of the research and create a mechanism to strengthen.
5. Provided the required information and secure employment.
6. Insurance capacities to identify research issues and methods of solution and make sure to understand the researchers have.
7. Structural organisations of the administrative and functional.
8. Scientific trade-off between available and please, please can.
9. And existence of institutions for training and rehabilitation and upgrading skill in the field of rehabilitation research integrated with the outside.
10. To provide references and periodicals that are interested in research.

3. Stages of development of the capacity of research institutions

Studies agree that there are three key stages to reach this goal and every stage of which needs to periodic review in order to achieve its goal. And these stages can be summarised as follows:

1. At the consensus of opinion.
2. Building capacities.
3. Reinforcement of structural and functional (consolidation).

4 Scientific researches and the challenge of civilisation

Believes much of the so-called third world (including Sudan) that the transfer of technology in its final form represents an ideal solution to the problems of poverty and underdevelopment are experiencing, and an indispensable tool in narrowing the differences of civilisation between them and the developed countries, the owner of this technology and then adopt to monitor huge amounts of their income low in order to achieve this goal at a time are neglected these countries. Scientific research, both basic and applied largely ignored and clearly foreshadows his meagre allocations upon the absence of a plan and conscious of actual research priorities, methods, and operates intellectual capacity through both scientific researches mentioned it affects each in other in a constant cycle of movement and interaction, leading to community-building and face the problems of scientific solutions which take into account the specificity of the community and the uniqueness of its components. One manifestation of lack of attention to scientific research as well as the weakness of the preparation of national human resources trained and capable of understanding the techniques of the times and working with them for its development or at least bear in mind in order to achieve optimal use of them, reduces mistakes, and vanished with its negative effects on social and cultural life.

Technicians, technology, information revolution, the Internet are all echoes of the scientific research and development has reached the world for hundreds of years in research and experience. And for the world technology, we find that pre-empt access to knowledge that ensure comfort and superiority to others, especially to maintain national security. We find that some developed countries have given the efforts of the scientific and intellectual interest in each of their children and ridiculed their all kinds of support. And others learned the importance of the human mind to migrate minds and marshalled for the service of science and technology even possessed the world. It has become clear that the intellectual capital, which came by the information revolution, is a source of wealth, a new capital.

Scientific research is the examination and investigation of the fact that the orderly and systematic follow scientific methods. Since we are in the era of globalisation and privatisation has received the importance of scientific research in the definition of globalisation as the entry because of the evolution of the information revolution and technology in the process of the development of civilisation. Development is the activation of natural resources and the human-centered human mind in its search for how to use and activated. And development stage does not come only by the accumulation of quantitative and qualitative research and ongoing efforts. Relationship is still scientific research institutional development the subject of controversy, this despite that the relationship between them cannot be separated. Developmental planning is putting the priorities and needs of the scientific research programme while feeding the proper research institutions planning information and the correct data, which would work to increase production and reduce costs and make the upcoming changes. It is sad to know that the development of research is an investment in itself, where studies showed that the average rate of return of scientific research than 1000% of expenditure on it. Although this ratio is differ according to different states in Sudan, but just the opposite.

CONCEPTUAL FRAMEWORK

1. First, the cultural fabric of social consideration

Begin to say that the experiences of forty years of development efforts that shows growing modern industry is not subject to the elements of traditional production, which also says the comprehensive national strategy for only a tenuous link does not carry an abundance of raw materials and energy resources or human density flows or foreign aid. Growing modern industry depends on cultural fabric of social, a product of more than a political, social, cultural spiritual and the fruits of social mobilisation. Court, unity and national vision inclusive and effective, is the result of the victory on the crises of national and confusion, and waste and conflict, which is the result of finding programmes that cruel to national priorities and resource allocation and the provisions of the settings and promotion of manpower.

2. Second, macro-economic policies

The growing modern industry requires the provision of appropriate macro-economic environment, which manufactured and rooted macro-economic policies effects directly and indirectly. That macroeconomic policy is appropriate to require Shell industrial development programmes and obstruction of public and industrial performance, and industrial investment.

3 Third, national constitutional changes

It is necessary to fit the industrial development policies and regulations of the Department of Industrial Development with the political and constitutional changes and major social changes that are organised home. Hijacking on the meanings and values of autonomy (the

terms of reference state and the competence of local government) is exceeded on the principles of democratic governance and the principles of decentralisation and basic services. Needs to be a better means of economic management and capacity-building performance in the climate market economies, and then fit with the dramatic changes in the global economic climate.

4 Fourth, changes in economic life and the global wave of globalisation

Characterised by a climate of international economic life depletion constraints of official international aid organisations and to link international inferior pressures and constraints. And the national industry will face new challenges in the post-General Agreement on Tariffs and Trade (GATT), not only the challenges of competition in foreign markets but in the challenges against competitors in the market within the national itself. There is no way an expression of that cruel to reach high levels of economic efficiency and quality, support and development. The advantages are of natural systems, the relative economic efficiency and high quality industrial dynamic, and that the keys to the future are a science and technology, information technology and knowledge-based industry. Otherwise the industry will not get from agricultural products and edenic but rates of subsistence and go value-added and employment opportunities and employment and gain skills to employers industries. The industry is oil refining and electricity production and transfer of mineral ores and agricultural products to high-value multi-purpose. At this stage of our economic development, it is necessary to link the agricultural development to industrial development and a tight linkage to the full coordination between the arbitrator agricultural programmes and industrial programmes. The world is at the stage of knowledge-based economy and information technology in the pattern and type of industrial products and a stunning development in the patterns of industrial goods, the traditional and the transition to industrial products, new goods and products to the intellectual capacity (Brain Power Products) this economy is based on the miracle of conversion brainpower to material products.

Economy of the future requires a workforce with high skills and superior capabilities of mind and fullness of the spirit of innovation and initiative. Economy of the future requires a new culture and new modes of behaviour and affiliation unwavering to the values of harmony and unity and team spirit and requires a firm relationship between membership, production and the forces of science and knowledge and powers of the soul and technology. We have to deal with the changes of contemporary systems, the division of labour (Division of Labour) in the international economy and the resettlement of large groups of industries to train industrial industries like truck, automotive, industrial equipment, steel mills, fertiliser and cement and traditional textiles and leather tanning, etc.

5. Fifth, schools (Mzhabiyat) industrial development

We should beware of liquid industrial development strategy in any Mzhabiyat or schools of thought or any rules M_khash theory (Cook Book Rule) and be careful of the transfer and application of the theoretical basis and ignore the real situation in the country and the actual conditions. And the development of the necessary tools to address the actual situations of national industry and solve problems based or expected in the national industry.

6. Sixth, congenital natural economic

On the natural moral economic technical homeland outline of a strategy of industrial development in the country, the strategy for the development of real resources of the country and to protect and enrich the education advantages enjoyed by the country's crops and wealth dynamic industrial technology and the highest levels of economic value added and economic efficiency and innovation.

And a summary of the matter is that the foundation stone of the industrial strategy is the treatment of industrial processes or manufacturing of materials and primary resources of the country (such as availability of cotton, oil seeds, leather, corn, vegetables and fruit) that requires the full coordination and harmonisation of agricultural and industrial policies. Should adopt a strategy of industrial development to address the real ills and build on the diagnosis and deep analysis, realistic and critical ills following:

- (1) Small industrial processes (shallow), and low added value.
- (2) Greater reliance on wills inputs.
- (3) Imbalance and the weakness of the front and rear linkages with other sectors of the economy.
- (4) Imbalance and the weakness of the interdependence of the industrial sector still rolling.
- (5) Lack of productive diversification, and low use of industrial by-products.
- (6) The inability to integrate in the global market.

7. Seventh: Require industrial strategy focusing on two types of patterns of industrial projects will not be a substitute for one another

Type I: A type of projects the locomotive, strategic projects the standards of high value added and economic interdependence, the front and back with the rest of the economic and technical development and comparative advantages dynamics and competition in the global market and employment petition and to meet consumption needs of national projects such as the sugar sector and engineering industries of defence. It is enough to look at the features of urbanisation, urban planning, social and economic dynamics who was born in the sugar belt. These constructive industries locomotive are able to provide all their needs of infrastructure, overtaking conditions of underdevelopment and structural deficiency and vertical components of the core development in peripheral regions of the country.

Study II: development of the broad base of small and medium industries and providing planning and technical backstopping and administrative, financial, and developed from the bondage of traditional development with environmental and cultural characteristics. The small industries, a social tool costs to combat poverty and create jobs, production and the mobilisation of social groups is the organisation and improving their skills .

Human development is the foundation of development in all spheres of life. And that sustainable development requires integrated strategies long-term focus on improving the productivity of land and rehabilitation and maintenance of resources (water, forests, grasslands, maintenance of soil production, animal, wild animals, and energy) and manage the sustainable management lead to improved living conditions, particularly at the community level, with the cooperation of all levels (government, NGOs, local communities, and land owners). And the empowerment of women and young people to participate with the necessity of the involvement of parents in addressing the problems that beset their lives while recognising the importance of the role of the private sector. Our knowledge of how response to wildlife to climate changes resulting from human activities is still in its infancy, due to the novelty of this phenomenon. The new information suggests that climate change will affect wildlife because the environmental factors that determine the climate affect the physiology of living organisms. Where that reduces releases of greenhouse gases and becomes an urgent need to protect human civilisation. In this contribution analysis of the linkages critical linking the human environment and development, including gender and population growth, food security and the environment, including health effects and acidification, climate change, soil degradation and the economy in terms of investment and foreign exchange and the trade and security concerns.

THE SAFETY OF THE ENVIRONMENT

Surah Al-Baqarah (verse 29) behold thy Lord said to the angels, I would create a vicegerent in the earth where they mischief therein and shed blood, we praise and glorify you cherish said: "I know that you do not know. Al-Baqarah (verse 203) if the effort on the ground, to spoil and destroy crops and cattle, and Allah does not like corruption. Surah Al-Baqarah (verse 100) it is he who has sent down water from the sky to the plant everything got us out of it green, we love him and sieving of spathes and gardens of grapes and olives and pomegranates suspects and is similar in look to the fruit if fruit and that in ye are signs for those who believe. (And in the land after its reform and to invite him in fear and hope that the Mercy of God is close to the good) of Surah Al Araf (Verse 55). (As drowsiness security of it and you come down from the sky water to purify it and you go Satan and connects to your hearts and steady your feet) (Al-Anfal verse 11). (And to Thamud their brother Salih, said you worship Allah, the God of your money is the other faculties of the earth and the ask forgiveness then replied to him that the Lord close respondent) (Hood verse 60). (And cattle, where you create the warmth and benefits of them you eat) (Al-Nahl verse 5). (And the earth we have spread out, we placed therein-firm hills, and produced therein from everything weighted) (Al-Hijr verse 19). (Which made the earth an expanse and the corps of roads for you therein, and sent down water from the sky, we produced diverse pairs of plants) (Verse 52 Surah Taha). (Not those who disbelieve known that the heavens and the earth were sewn together and made from water every living thing do you not believe in) (Verse 30 Al-Anbiya). (He it is who sends the winds as published in the hands of his mercy and send down from the sky pure water) (Al-Furqan verse 48). (And do good, seek God in daily market statistics hereafter and do not forget your share of the world and better and best to you and God, corruption in the earth that God loves spoilers) (Surah 77 verse stories). (Corruption has appeared on land and sea because of what the hands of people to taste some of what they did, they might turn) (Ar-Rum verse 40). (Which made the earth an expanse and made for you the ways that you may guide yourselves;) (Verse 9 Surah decorations). (Which came down from the sky water as well as a dead) (Verse 10 Al-decoration). (And tell them that the water is divided among them all dying to drink) (Al-Qamar verse 28).

The meaning of the environment is (as the term is meant all things, forces and conditions that affect the individual through the reception of the stimuli that). It came in the definition of UNESCO in 1968 (as everything outside for the same rights and surrounded by directly or indirectly, and all the activities and influences that obey UNESCO, which responds to, which perceives by means of different communication available to UNESCO). The conference of the United Nations Environment Programme city of Stockholm, the capital of Sweden was in 1972 understanding of scope for the term of the environment (water, air, soil, minerals, and sources of energy, plants and animals), but is the balance of material resources and social opportunities in time to satisfy human needs and aspirations. Environment includes also the heritage of the past: customs, traditions, customs, history, law, scientific discoveries and their applications, and advance the work of the physical and intellectual. The environmental heritage and the moral component of the environment come in the first place of importance. Keep the environment can be summarised as follows:

1. The natural environment

- (A) Land and soil and the form of surface and geological composition of all special circumstances of earthquakes, floods and depressions and water bodies, etc.
- (B) Change its various components.
- (C) Vegetation and wild animals and organisms.

2. The civilisational environment

(A) Quantity of material civilisation and human use it or tangible and significant material of housing and industry, clothing, transport, services and sources of energy, machinery and the level of pollution, etc.

(B) The quantity of civilisation is material and includes the same rights, ideas and beliefs, customs, traditions and cultures and the degree of education and the development of ambition, etc.

3. The social environment

Include the framework of relations that regulate and determine the survival of any group (social systems), and social services include health, education, culture and education, and social characteristics of the population.

4. The economic environment

Include the economic nature of any group and income level, employment, unemployment, etc. The ocean or frameworks, which lives and interact with the different organisms, balanced system consists of the interaction of different covers of the globe (atmosphere, hydrosphere, lithosphere and soils). Atmosphere consists of several layers there are on each other. The layer consists of the most important of all turbo Ambassador of life, and there are 80% of the masses of the air component of the casing and the gas clouds are formed and occur where the weather changes. Exist between the turbo and Alastrano Ambassador layer of ozone gas, which are protected by a belt of living organisms on earth from ultraviolet radiation.

Sudan is seeking to achieve, among other objectives in the field of environment and natural resources from building the capacity of individuals and institutions. Important element in capacity building is knowledge. It becomes environmental awareness and environmental knowledge is an indispensable input for capacity building and human development. It has become scientific research in the era of globalisation is the substrate for development. There is no development without the scientific research and the scientific research to development without withholds development and search in the case of the adoption of a joint. Sudan is in dire need in the field of the environment to re-look at the map of new information, which adopted the political structure and rules of Sudan, which has by which many states and counties exceeded the per cent is no longer environmental work through the media centrally and spread clubs seen in villages across the receiving stations of the satellites and there have solar energy operator of the dish receiver and TV and in any case that the link between environment and intimate contact.

The Earth's atmosphere has the characteristics of physical, chemical in terms of structure and motion, which have a great impact in keeping the natural balance, thus providing the climatic conditions suitable for the continuation of the evolution of life, but that since the Industrial Revolution led human activities different to the emission of huge quantities of pollutants in the atmosphere caused an imbalance in the rate of temperature led to a change in climate resulting in an imbalance in some of the phenomena of others like a normal phenomenon Kept known phenomenon of greenhouses, which is the gas carbon dioxide from the most important influences upon because of its release in large quantities when you burn fossil fuels which contributes a percentage of 53%. So attention turned world attention to the energies, clean and relatively, including solar, wind, hydropower, biomass and the preservation of the environment of the escalation of 3.5 billion cubic meters of gas carbon dioxide, 20 thousand cubic meters of other pollutants (nitrogen oxide, sulphur and Almithat, etc.). Moreover, this quantum of energy generated needing covered nearly one million inhabitants in one year.

5. Water

Humans began late turn to water after the discovery that water one degree or another threatens their future. That most of the problems of the world floating on the water, and the next century will witness the aggravation of the crisis and the impact on agriculture, industry and public health. More importantly, it will turn into clashes, conflicts and wars. Drought, desertification and land failures and blowing and planting and the loss of animal and human phenomena known to many regions in the world over recent years. The low rate of rainfall and climatic changes are taking place in many areas. Problem has three dimensions. Water resources must be more than dams and irrigation systems and modern technology, and uses of water from the rationalisation and then a fair share of its available water. Percentage of overlap between the close of water resources and ecology, environment and social and economic activities and growing, which produced some of the threats such as desertification and soil degradation and low agricultural production and water pollution from sewage and agricultural and industrial. It requires managing and coordinating work and continuous assessment and water resources conservation and development.

The rain is the main sources of surface water resources of rivers, valleys, seasonal and permanent runoff, a major source of renewable ground water. It is also the main source for the production of forest and pasture and crop raincoats. Table (1) shows the annual rates of rainfall in Sudan, in billion cubic meters.

Table 1. Annual Rainfall Pattern ($10^9 \text{ m}^3 \text{ year}^{-1}$)

Average range (mm)	Annual rainfall	Percent (%)
< 100	41.7	3.8
100-300	76.5	6.9
300-600	199.5	18.2
600-1000	515.5	47.2
> 1000	261.0	23.9
Total	1094.2	100.0

NATURAL AND ENVIRONMENTAL CONSTRAINTS

1. Fluctuations

Earnings quality and quantity of water, especially groundwater resources in general and non-renewable groundwater to some extent in addition to overgrazing have led to water erosion and the formation of mobile sand dunes that threaten urban areas, agricultural land and irrigated alike. Add this to extremes leading to a scarcity of resources and a scarcity of sources of groundwater recharge and surface demonstrated by the importance and seriousness necessary in dealing with water and protection from pollution and depletion and waste. Investment rationalisation of water resources and reduce waste (waste) in water use and interest in advanced technology uses water, so wastes can be reduced to the minimum possible in order to preserve the environment and achieve the objectives of environmental development of water resources .

2. Forestry

Forest is of paramount importance in the development of urban and rural areas and to achieve environmental and economic stability and food security. As is well known that the forest is considered a safe haven for humans and animals and plants including the great services provided cannot be confined systems and evaluation of mathematical beauty. Statistics indicate the steady increase in population numbers and the spread of the new cities and this means the removal of large tracts of forest to provide fuel and food to meet their requirements of life . As a result of urban expansion impact on the light of the implementation plans of housing in the capital and the U.S.A, the demand for wood fuel for use in the manufacture of bricks will reach 970,000 cubic meters during the next ten years has adopted this industry to use wood acacia forests covered by the plans of action, which depends on the base of sustainable production, but due to increased population and change their consumption pattern has become the bulk of the firewood used for bricks sourced from natural forest savannah, which is any scientific plans and are subject to constant by de-population and agricultural expansion. This increased demand for fuelwood for the industry means the removal of 27,000 thousand acres annually from the forests of acacia, implying cultivated areas of these forests more than 700,000 thousand acres a year using only extend the industry note that the area planted each year throughout Sudan within forests reserved for not more than 80,000 acres used for the production of sawn timber and the rest is mainly for the production of firewood.

Expanded agriculture in the rainfed mechanised sector, traditionally irrigated and cleared vast tracts of tree cover for the establishment of agricultural projects without any considerations for the maintenance of soil, causing an imbalance and the destruction of the environment and infrastructure areas of these projects. Overgrazing and fires have led to the weakening of the ability of trees to natural regeneration and the disappearance of many of the trees and shrubs in different regions of Sudan and instead replaced by other trees. One of the main threats to the forest in Sudan covenants contemporary political volatility. Salad is managed between the centre and the region continued to retreat and site management in the administrative structure of the Ministry of Agriculture. This has led to more than decoding the reserved forests and the unjust encroachment on forest resources to meet the bill for services. It is threatened by civil wars in Sudan and in neighbouring countries and the drought, etc. To address these risks must involve the population in the management of forest resource protection, development and afforestation of cities and villages (public squares, schools, streets, public parks, places of worship, residential and industrial areas, places of pleasure and entertainment):

- (1) Urban forestry urban forestry.
- (2) Tree plantings farm forestry.

(3) Forest folk community forestry.

Local variables, regional and global in the management of forest resources to accommodate testing, interaction, and it must change the philosophy of resource management of forests to absorb the new concepts (Environment and Globalisation). Strengthen it and enhance cooperation with voluntary organisations and basal and localities to attract popular participation in the reconstruction, agriculture, resource protection and management of forests. There have been major discoveries in the field of converting fossil fuels and natural gas to petrochemical products, with the discovery of thousands of products and manufacture of chemicals produced from fossil fuels such as fertilisers, synthetic fibres, plastics and the majority of organic chemicals. Despite all the advantages and benefits brought about by fossil fuels for a human, it was a source of contamination of the environment, whether water or air or soil, as well as purified, transportation, refining and product distribution and consumption, and manufacture of petrochemicals, as well as facilities that use fuel such as power plants and factories, as well as the case in the news transportation by land, sea and air. Characterised by fossil fuels from other sources, other energy derivatives, which exist in solid, liquid or gaseous, which increases the possibility of contamination of land, water and air during production, transportation, refining, distribution and consumption. But not limited manifestations and effects of pollution on human health and the threat of life at sea but transcended it to the plant and forestry. It has exacerbated the problems of environmental pollution in the twentieth century, especially when using fossil fuel and its derivatives, as a result of the evolution of industrial growth, social and economic, in particular and the world receives the outskirts of the twenty-first century, which requires the need to assess the environmental and health impacts and the establishment of methods and approaches appropriate to manage the environment so as to control and reduce the risk of these effects. It can be summarised sources of pollution from fossil fuels and its products in the following:

- (1) When fossil fuel production processes are accompanied by liquids and gases out of the production equipment, land and air pollution.
- (2) Upon the transfer of raw fuel and emptying occurs in severe contamination of seawater and beaches, this is threatening marine life and populated areas along the coast. As well as for the leak (Leakage), which occurs from hoses during loading and unloading.
- (3) When refining petroleum refineries, heated crude to high temperatures result in cracking sulphur compounds occurs cracking in the hydrocarbon chains, and out of sulphur compounds and hydrocarbon gases and liquids through leakage and smuggling (Venting) to the atmosphere, land and water causing pollution of all.
- (4) When the use of different petroleum products from gasoline and kerosene and jet fuel and gasoline and diesel, which is used in internal combustion engines used in transportation on land, sea and air pollution, the outputs of the risk to humans themselves. And the proportion of the expected increase in the activities of the petroleum industry in Sudan, such as production, refining, export and consumption, if we take into account the full cycle of fuel exploration, extraction, preparation, conversion, transportation, storage, distribution, end-use and finally disposal of waste, the environmental pollution will be noting near future. This surge must be prepared to meet the requirements of the petroleum industry especially in the field of environmental pollution:

- (1) To support efforts in the fight against pollution and that the processing of institutional frameworks.
- (2) Intensification of training and qualification of personnel working in the field of the

environment within and outside the country and benefit from the experiences of countries that have preceded us in this area.

(3) Development of legislation and appropriate laws and to combat environmental pollution from the oil industry.

(4) Support the efforts of scientific research and development in the field of oil and the environment.

3. Desertification

Scarcity of rainfall and soil type and the integration of erosion, logging, overgrazing, and increased agricultural area raincoats tendency to increase production without interest promoted the direct causes of desertification, the effects of that is the absence of vegetation and soil creep from place to place and the hills and sand dunes, climate change, which comes about adverse effects and other economic and social. Include the demographic transition in the distribution of population and the increasing demand for land, pasture and water and thus restoring the demographics, animal and plant. Resulted in negative economic effects of desertification abstract, including:

(1) Eco-composition changes to the absence of some plant groups reduce the production of so-called macro-ecological in terms of the total of the full potential of productive eco-system.

(2) Loss of vegetation makes the soil lose physical and chemical components and thus deteriorating soil fertility and biological carrying capacity of production and a soil science in the maturation stage of ecological vegetable blend the so-called eco-summit.

(3) The degradation of blend ecofloristic applies to every ecosystem especially in the peak is affected by the economic output of a total of ecosystems in terms of its structures and degrees of animal, plant, and even microbiology.

In Sudan deserts are wide; it also has more areas threatened by desertification. Table (2) shows the desertified areas and threatened by desertification in Sudan and is located mostly in northern Sudan. Perhaps the main reason for the phenomenon of desertification is a succession of drought years in the region since the eighties, which resulted in the increasing scarcity of water resources in addition to increasing population pressure on natural resources, whether on water or vegetation. Desertification is a native of the problems threatening the first of resources if the insect pests is one of the threats to agricultural production, both plant and animal, the Sahara is the cemetery of the lesions. Of the most important ingredients to combat desertification collect scientific information and develop a plan for research and training. Desertification is of the threats to the security of the modern state and its economy in a vicious circle. Sudan is a oil production, its uses and its associated service equipment, the product of oil is a fire fires extended in the midst of forests and woodlands greater threats to human and waste energy plant to become the soil in the wind and the course of water and moving aimlessly and are deposited and formed in a random. In 1995, Sudan signed as one hundred and five states of the convention to combat desertification and mitigate the effects of drought than forty articles and four annexes to give priority to Africa, the convention has focused on ensuring participation of local people and local communities and then pledged to countries affected by five commitments:

1. To give priority to combating desertification mode.

2. Strategies.

3. Report of the development of the local population, especially women and young people.

4. Analysis of the underlying causes of desertification.

5. Report the relevant existing legislation.

Table 2: Land-Resource Zones

Zone	Area as % to total area of Sudan	Persons per km ²	Mean average rainfall range (mm)
Desert	44	2	0-200
QOS sands (sand dunes)	10	11	200-800
Central clay plains	14	19	200-800
Southern clay plains	12	8	800-900
Ironstone plateau	12	7	800-1400
Hill area and others	8	16	Variable

Stressed the convention on the economic environment, developed countries committed themselves to support activity of parties in developing countries and to provide resources and to mobilise private-sector funding has also focused the agreement to extend scientific and technological efforts and capacity building. The fight against desertification is a message you must bear for future generations to preserve resources and protect the ecosystem of the production forces of society as a whole are fully responsible for joint action and resource conservation. If people are partners in the water, pasture and fire, they represent the true dimension of resources and then the forces gathering political, economic and social should be activated and thrown in the midst of movement harmonious symmetric to combat desertification and researchers can regulate these forces in order to activate their performance

WOMEN'S EXPERIENCES IN COMBATING DESERTIFICATION

The negative effects of the social aspect and the horrible deterioration in the composition of ecological impact on the configurations rural communities as a result of desertification and a percentage of the disparate impact on urban communities, which receive the abandonment of the set-up is difficult to attract the levels of service. Women are the measurement for each indicator and the negative impact was a social or economic. It assumed a responsibility to double because of male migration in the cases of desertification and women bear the burden of production and management of resources and the family and to bear all the consequences of population mobility and environmental imbalance. In cases of desertification distances away fetching water and firewood, which is an additional burden on women. It is doing this role will become more traditional working hours and increasing physical effort, and women are becoming more and more diseases and high mortality rates and infant mortality and infant and women. In cases of desertification is located on women the burden of defence, security and control of resources for fear of looting and crimes dependent. Women in Sudan is more stable than men and need to combat desertification and stability and the stability of this position to engage in experiences that takes supply of some models such as:

- (1) Women in Sudan's western part in planting vegetation-surrounding areas desertified also contribute to the establishment of excavations at the village level.
- (2) Women contribute to agriculture and forestry popular nursery and household agricultural work schedule to fit in small spaces and homes in addition to fundamental rights.
- (3) Women in eastern Sudan, contribute to the care teams search for water and repair them special in the mountains of the Red Sea and south of Tokar.
- (4) In northern Sudan, which was to involve women in water programmes through the use of local wells and water pumps manual and training to manage and repair which facilitated the task of following up the integration of water programmes in agriculture in small spaces.

CLIMATE CHANGE

The ongoing changes in the composition of earth's atmosphere caused critical stage when the earth's surface, and there is increasing evidence that this is the result of human activities and especially activities related to energy production and transportation. The phenomenon of heating called greenhouse effect. As a result of the resurgence of other gases produced by heating the climate may be designated by some (trapping infrared) heating process of climate which is caused by human activities is different from cycle heating natural in two things first is the fastest of the session of the heating, natural, and second, are a constant non-stop unless you stop the source (the impact of trapped gases). Warm climate means that the earth warms, although local temperatures and rainfall patterns are changing to new ones. This affects the nature of the case mounted on the interactions between the atmosphere and oceans, and wildlife.

Greenhouse effect phenomenon that occurs naturally in the planet vapour water and carbon dioxide cover air above the ground and reduces the cover of the heat energy released by the earth in the form of heat rays into space. This is why the average surface °C and 6°C are not as it should be temperature 15°C. Gases resulting from human activities of industrial and agricultural land to make more because the critical stage when the atmosphere created by these gases will absorb more infrared sent by the earth's surface to the atmosphere, before it can escape into space. The temperature of these gases by the same radiation absorbed. The launch of this turn away from excess energy in all directions, and thus some of them back to the earth's surface and rates more than ever, therefore, the exact balance of cosmic change accompanied by serious consequences.

It is known that the climate is always changing, but climate change is human-induced, which is faster than you are used to wild life in the past. This change is expected to have a greater impact on wildlife due to habitat destruction because of the spread of civil and urbanisation, urban and agricultural expansion. It is possible that some extinct species as a result of climate change. It may be considered small compared to the loss of the effects of drought, floods and rising sea level expected from climate change. An ecosystem in the planet provides the rights and benefits of huge material values priceless. Some species can lead to an imbalance in the work function of ecosystems in the long term as wasted aesthetic value and economic, in addition to the loss of biological diversity and distribution of wildlife. Climate change is likely to have a great impact on the rights and civilization.

STRATEGIC OBJECTIVES FOR THE ENVIRONMENT IN SUDAN

1. Preservation of the environment and development and prevent disasters.
2. Stop environmental degradation and reconstruction.
3. To maintain the balance and stability of environmental components (systems ecology).
4. Development agencies working in the environmental field.
5. To develop relations with other countries and international institutions and organisations in the environmental field.
6. Development of the balance of wildlife and exploitation in accordance with sustainable development.

POLICY

1. To follow a sound approach in the rational exploitation of natural resources.
2. Achieve sustainable development in pace with global efforts to protect the environment and natural resources.
3. Status of a comprehensive plan for scientific research in the fields of the environment.
4. Issuance of environmental legislation for each collector and the fundamental principles of public policy for the protection of the environment.

5. Reconstruction of the southern Sudan environment affected by the war and reconstruction of areas affected by drought and environmental degradation in coordination with the relevant authorities.
6. Sudan to fulfil commitments to international conventions and organisations in the area.
7. Attention to cadres and the creation of specialised training at home and abroad.
8. To encourage the voluntary associations and organisations in the environmental field.
9. Allocation of new natural reserves and the promotion of new projects zoos states.
10. Include the environment in the curriculum.
11. Rational exploitation of resources, the environment and promotion of environmental awareness to all levels of coordination.
12. To provide potential accommodation and complementary services of transport and communication.

SUDANESE PARTIES INVOLVED IN THE AREA OF THE ENVIRONMENT

- (1) State native forest.
- (2) The Ministry of Education.
- (3) Institute for Environmental Studies.
- (4) National Council for Population.
- (5) Babiker Badri Association of feminist studies.
- (6) The Society for Environmental.
- (7) Sudanese Association of Small Industries.
- (8) Assembly of hope.
- (9) Organisation for the Protection of Environment Bahr el Ghazal state.
- (10) Wildlife management.

ACTORS IN THE FIELD OF ENVIRONMENT

- (1) The Supreme Council for Environment and Natural Resources is the technical arm of the Ministry of Environment and Tourism and established in 1992.
- (2) The Sudanese Society for the Protection of the Environment, a civil voluntary association founded in 1975 and registered with the Humanitarian Aid Commission under Registration Certificate No. 198 issued on 16/02/1987.
- (3) German Friedrich Ebert Foundation and the global organisation working to support and help in the efforts to development, especially human development and labour culture. The office of Sudan carried several activities since its inception in 1976.
- (4) United Nations Development Programme (UNDP).
- (5) United Nations Environment Programme (UNEP).
- (6) World Federation for the Conservation of Nature (WFCN).
- (7) Ford of America.
- (8) Oxfam (British, American, and Australian).
- (9) The Dutch embassy.
- (10) Plan Sudan.
- (11) Save the Children.
- (12) Al-Hajjar charity.
- (13) UNICEF (UNICEF).
- (14) Global Environment Facility (GEF).
- (15) National Centre for Research.

INTERNATIONAL AGREEMENTS

- (1) United Nations Convention to combat desertification, particularly in Africa, signed in 1995 one hundred and five countries and thus become legally binding. Whale Convention forty articles and four annexes and the aim is to combat desertification and mitigate the effects of drought.
- (2) World Federation for the Conservation of Nature and the headquarters of the Union in Gland, Switzerland and the Union's regional and continental offices and national site in 35 in various parts of the world, the number of member states 133 and the number of government institutions and NGOs. Must be accompanied by training local management based on the use of this technology, and this must be a programmer to choose the local people sperm delivery of the project they must participate in the process of technology selection, design, construction and delivery and to participate in a simple run under the supervision of experts.
- (3) The need to comply with base balance between the sources of energy, environment and promote cooperation in the field of renewable energy and focus on the applications of biomass energy for rural development and the expansion of interest in them. And dissemination and promotion of solar technologies for the introduction of new technologies is not harmful to the environment.
- (4) The rationalisation of consumption of firewood and coal, and thus to preserve the wealth of forest and environmental impacts, and optimum utilisation of agricultural residues and animal heat and raise the value.
- (5) Awareness of the importance of native landscaping, and encourage farming planted forests and shelter belts and the introduction of fast-growing tree species and improve care of trees and forest management and the fight against destructive factors unjust random, and the rationalisation of consumption and improved household stoves next to improve manufacturing techniques.
- (6) The need for organisational units and lead the process of preserving the environment and achieve the objectives of development of natural resources in the cooperation and coordination.
- (7) There is a need for fundamental change in energy systems to bring them into line with sustainable development. And the need to change dictated by social and economic issues, environmental and security situation in the account with the following:
 - (A) To promote universal access to modern energy.
 - (B) Building local capacity.
 - (C) Establishment and maintenance of fair rules of the game (by removing the permanent subsidies and make energy prices reflect the external costs (such as social and environmental costs)).
 - (D) To single out the roles of stakeholders (environmentalists, consumers, current and potential, etc.) not belonging to the private-sector.
 - (E) The entry of the regular formation of the new generation of technologies that are used to cleaner fossil fuels, and renewable sources and efficiency improvements.

SCIENTIFIC RESEARCH IN UNIVERSITIES

Status: expansion of higher education and scientific research (Table 3). Table 3. Universities established before 1989

1. University of Khartoum, in Khartoum.
2. Sudan University for Science and Technology, Khartoum.
3. University of Niles, Khartoum.
4. University of Juba (currently in Khartoum).
5. University of Omdurman Islamic, Omdurman.

CONCLUSION AND RECOMMENDATIONS

The attention to scientific research has become the duty of the state-public and private-sector and it is difficult to enter the twenty-first century, the century of globalisation and planetary who became illiteracy is computer illiterate without proficiency in scientific research and technology development resources and technology. And developing countries face many problems in the transfer of technology or in the tradition of industry after the World Trade Organisation and to ensure intellectual property rights related to Trade Related Issue of Intellectual Property Right (TRIPR) and the Court of tendencies and not but to rely on themselves or the establishment of centres for joint research with the developing to be produced from an original effort, the thought of her children and technology adapted to the level of development. Of the richest on the discretion of the state of the importance of research and serious political commitment towards the creation of a climate and create a mechanism to develop, update and adopt a policy, e.g., a sound and priorities are on a scientific basis and adequate funding. Because the research is the ways to provide scientific information systematically to develop programmes and activities effects on sectors where it is applied research results and therefore on society and the state. After it is vital that we come to be vital for the development of technological and scientific research can be its recommendation as follows:

1. Development of strategic planning for the scientific research according to the desired available and can be leading, and setting priorities. Favourites including development issues and serve the community, and detailed analysis of the research carried out and the periodic review.
2. Coordination between the centres of scientific research in the education sector and government and private agencies in the country.
3. Research unit and the private-sector through the Sudanese Employers Union and coordination with the relevant authorities.
4. Coordination and integration, communication, and cooperation between scientific research bodies, universities, consulting, production locally, regionally and globally.
5. Financing of scientific research (laboratories, and field logistic), input of scientific research, scientific instruments, certain, references, magazines, specialised libraries, scientific publishing, and attending conferences.
6. To identify a percentage of national income for scientific research and the involvement of the private sector and the Federation of employers in financing scientific research, and the imposition of fees on all productive sectors for the benefit of scientific research.
7. Support the translation and localisation to keep abreast of developments in scientific research.
8. Benefit from the results of scientific research in the development and promotion of production and services, industry and trade, according to development plans.
9. Focus on scientific research on rural development and regional balanced and sustainable.
10. Commitment of government and private agencies to provide information and data to researchers and establish a database in all science disciplines and double centres and computer networks.
11. Public awareness of the importance of scientific research in the dissemination of knowledge and the evolution of reality through the media of audio-visual and print media.
12. Improve the situation and living conditions of researchers and stop the migration of research centres, universities and others.

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DEVELOPMENTAL PERSPECTIVE OF ORGANIC AGRICULTURE AND IPM: A REVIEW OF BANGLADESH

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Abstract

Organic agriculture and Integrated Pest Management (IPM) are widely perceived as being more environmentally friendly than conventional agriculture and plant protection practices. Insect Management using organic methods are a lot like IPM, with an emphasis on cultural practices and without the option of using synthetic insecticides. Newer botanicals such as azadiractin (neem extract), biologicals such as Bt(a bacterial toxin) and other materials including insecticidal soap, kaolin (clay) and a variety of plant-based repellents such as garlic and hot pepper sprays are available. In Bangladesh, organic agriculture research is at the very premitive stage. Infrastructure and marketing behaviour of these inputs are not so well organized. On the other hand, research on IPM is widely practicing and also some new avenues especially biological control has developed aginst vegetable pests. Recently, peoples are getting aware about the advantages of organic food and few shopping malls especially in capital city Dhaka are

introducing vegetables produced through using organic insecticides. Urban customers are gradually inclining to buy organic products with paying comparatively higher prices than the same produced by using synthetic fertilizers. Most organic farms use fewer pesticides than conventional farms. The five main pesticides used in organic farming are Bt, pyrethrum, rotenone, copper and sulphur. Fewer than 10% of organic vegetable farmers acknowledge using these pesticides regularly; 5.3% of vegetable growers in admit rotenone while 1.7% admits pyrethrum. Reduction and elimination of the use of chemical pesticides is technically unavoidable for practical reasons. Organic pesticides often act as a complement of other pest control methods. Less toxic but still effective organic insecticides include neem, spinosad, soaps, garlic, citrus oil, capsaicin (repellent), Bacillus popilliae, myco-insecticides such as Beauveria bassiana, and boric acid. Biological pest control uses natural predators or Parasitoid wasp/parasitoids such as praying mantis, Trichogramma sp, Trathala flavo-orbitalis, Bracon habetor, minute pirate bugs, big-eyed bugs, and to a lesser extent ladybugs (which tend to fly away), all of which eat a wide range of pests.

INTRODUCTION

Organic and IPM practices where different from of conventional practices is heavily dependent on the use of synthetic fertilizers and pesticides and integrated all plant protection approaches in an umbrella with the minimum use of pesticides. The reduction or non-use of synthetic chemicals with organic farming system can decrease the environmental hazards and possible adverse effects on wildlife. Organic materials improve the physical, chemical and biological properties of SOIL in contrast to synthetic fertilizers. Use of organic materials is, therefore, necessary to sustain the productivity of soils as well as soil health. The most common organic materials which are currently used throughout the world are BIOFERTILISERS, humate fertilizers, manure spreaders, crop residues, green manure, guano, bone meals, compost, farmyard manure, fish meal, fish wastes, liquid manure, sewage sludge, slurry, etc.

The agricultural sector is contributes around 21 percent of the country's GDP and provides for 52 percent of its employment (Bangladesh Economic Survey Report 2007) and approximately 13% of the total cropped area is triple cropped, 50% double cropped and the remaining 37% areas are single cropped, settlement and water bodies. But agricultural practices without chemical fertilizers seem to be impractical because the country demands more production to keep pace with increasing population rather than quality products. The 'Hortex Foundation' of Bangladesh has also developed a scheme to promote high value crops, particularly high-value non-traditional crops; and their sale to high-price, non-conventional international markets. Their aim is to improve the income of farmers and thereby contribute towards eliminating rural poverty (Hortex Foundation 2006). Yussefi and Willer (2003) have argued organic agriculture is not just a solution for rich countries, but can also be beneficial for poor countries, where it can contribute to purposeful and sustainable socio-economic and ecological development. Up until now, however, Bangladeshi farmers have not been able to benefit from the growing global organic market, and they have even failed to create a good domestic market of organic foods. So, considering the benefit of organic farming including IMP based plant protection-a review was undertaken to explore the environment friendly agricultural production in Bangladesh found in an umbrella.

MATERIALS AND METHODS

This piece of paper is absolutely a review paper. So that all of the information's have been collected from the secondary sources. With a view to writing this paper various relevant books, journal, proceedings, periodicals, annual reports, internets and publications that were available in different libraries, website and personal contact were reviewed. Valuable information form resource personnel were also collected. Those collected information's were compiled and this paper was prepared.

DISCUSSION

Organic farming including IPM based plant protection of Bangladesh is very complex. Developmental perspective of organic agriculture and IPM in Bangladesh are discussed below under the following sub heading-

Organic Farming and IPM in Bangladesh

In Bangladesh, organic farming still occurs largely on an experimental basis with few exceptions with organic cultivation has been estimated at 0.177 million hectares land (IFOAM, 2006), representing only 2% of the country's total cultivable land. By 2005, only 100 of its traditional farms and 47 NGOs are engaged in practicing organic agriculture, among them Kazi and Kazi Ltd. is a leader. Kazi and Kazi Ltd. are marketed as "Meena Tea" (Tea International 2005) and also produce fresh organic vegetables and herbs in "Meena Bazar," of Dhaka city. Moreover, PROSHIKA's EAP (Ecological Agriculture Program) has involved around 0.8 million farmers in organic cultivation across 0.22 million acres of land. Out of these, 0.22 million farmers started to practice ecological agriculture on 0.08 million acres of land in the last five years.

Trained farmers spent US\$ 9(1 US\$=Tk.70) per hectare less on pesticides compared to their untrained neighbouring farmers, which is a reduction of 87.0 per cent in T. Aman season . At the same time, they produced a 371 kilo higher yield per hectare, which is a yield increase of 10.6 per cent. Moreover, IPM trained farmers had reduced their pesticide use by 86 per cent. Since 1989, a number of IPM projects, executed by Government departments, international agencies and NGOs have come into existence in Bangladesh. Bangladesh has already produced some core IPM trainers and it is expected that, by the end of 2011, there will be about 2100 IPM trainers from Department of Agricultural Extension (DAE) alone and more than 400 from NGOs, particularly CARE. Also, about 1100 farmer trainers will be produced. So far, close to a 100,000 farmers have already received season-long practical in depth training in IPM but this represents only 0.27 per cent of the estimated 37 million farmers employed in agriculture in the country. As in all other Asian countries with similar IPM programmes, the IPM trained Bangladeshi farmers were able to reduce their pesticide use by as much as 80 per cent and yet produced about 10 per cent more yields.

Global Organic Market Scenario

The worldwide organic market sales were US\$ 32.3 billion in 2009 and forecasts that by the year 2012, the global organic market is expected to reach US\$133.7 billion (Bharat Book Bureau 2006). Increasing consumer awareness of health and environmental issues has been an important driving force for the recent growth in sales of organic food: 17 to 22% annually, compared with 2 to 3% for conventional foods. Throughout the world, over 100 countries are producing certified organic products on a commercial basis, including 30 countries in Africa, 30 in Asia, 20 in Central America and the Caribbean, 10 in South America, 5 in Australasia and the Pacific, most countries in Europe, as well as the United States and Canada (IFOAM 2006).

Socio-Economic Profile of Consumers

It is crucial to know about the Socio-economic profile of consumers of organic foods in Bangladesh e.g. 51% of the consumers were highly conscious regarding their personal health, around 40% were moderately conscious, 10% had low consciousness and 63% had medium awareness regarding the environmental hazards caused by agro-chemicals, around 30% were highly aware, and less than 8% had low awareness. Based on annual income in thousands of taka (taka is the Bangladeshi currency; 1000 BDT= US\$14.61), most of the consumers who usually buy organic foods (93%) belong to either middle or rich class, whereas less than 8% were poor. Perhaps surprisingly, most of the consumers (90%) were willing to pay more than the present market price for certified organic foods.

Perception of Consumers about Organic and IPM

The most respondents (91%) want organic foods that are certified, since more than half (63%) were not confident that the available organic foods were really organic. Nearly two thirds of the consumers (63%) 'partially agreed' that "available organic food items are really organic" and that "quality is satisfactory". However, only a third of respondents (31%) firmly believed that the available organic food items were really organic; and less than a third (29%) were completely satisfied with the quality of available organic food products. Moreover, only a quarter of our respondents (25%) 'agreed' that organic foods are highly priced, with two thirds (67%) 'partially agreeing' and only 9% 'disagreeing'.

Drawbacks Associated with the Expansion of Organic Farming and IPM Practices

Organic farming in Bangladesh has four core problems such as poor farmers, poor farmer knowledge of organic farming and its benefits, insufficiency of organic inputs and poor marketing of organic foods. It is very difficult for poor smallholder organic farmers to resolve these problems alone, and to develop their organic farms. Organic agriculture practices expansion has remained limited but the organic agricultural movement has been active in Bangladesh since the 1980s. A mechanism for the establishment of national IPM for Bangladesh is suggested. At present, the plant protection wing of the Department of Agricultural Extension is directly involved in the implementation of IPM activities. No national IPM programme exists. An organizational setup would be needed to ensure the proper implementation of national IPM and green farming programmes.

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DEREGULATION OF THE NIGERIAN ECONOMY :THE THEORETICAL MILIEU

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Abstract

The deregulation of Nigerian economy was the main thrust of the Structural Adjustment Programme (SAP) introduced in the country in 1986 under the leadership of General Ibrahim Babandiga (1958-1993). Prior to that period the Nigerian economy was almost a command one with wide range of government control. Indeed, the introduction of SAP was said to be a final solution to the economic crisis faced by the Country. Unfortunately, SAP was introduced yet, the economy became more crunched. During the General Abach's regime (1993-1998), SAP was suspended out rightly. When General Abdulsalami Abubakar (1998-1999) took over, he continued pursuing the privatization programme which is a synonym of deregulation of the economy with the promulgation of another privatization decree. The civilian government led by President Obasanjo which took over from 1999 made deregulation the core with vigour. It is basked on this development that this paper intends to unravel the theoretical paradigm under which the deregulation of Nigerian economy could be explained. This includes capitalism, imperialism, colonialism particularly the incorporation of Nigerian into international capitalist system.

OVERVIEW OF THE NIGERIAN ECONOMY

The Nigerian economy has been undergoing fundamental structural changes over the years. There is evidence, however that the structural shifts in the economy have not resulted in any appreciable and sustain economic growth and development. The economy which was largely at a rudimentary stage of development has been experiencing some structural transformation immediately after the country's independence since 1960. Unequivocally up to the early 70s, agriculture was the core of the economic activities in Nigeria. During that period, manufacturing and mining activities were at a very low level of development. The country's participation in the external trade was based on the level of economic activities in agriculture. Thus, agricultural commodities dominated the country's export trade while manufactured items dominated imports (CBN, 1993).

However, the oil boom of 1973/74 brought a new dimension into the economic activities of the country. The sharp increases in oil revenue from N735 million in 1972 (Ibid.) had a pervasive effect on the Nigerian economy. This was because the increase in revenue led to large increases in public spending designed to expand infrastructure, non-oil productive capacity, human capital and to heal the wounds of the civil war that ravaged the country between 1967 and 1970. In other words, the performance of Nigerian economic growth during 1975-1985 period has its antecedent in the quadrupling of crude oil prices in 1973-1974. The resulting large windfall gain enabled the country not only to expand the public investment almost three folds over the subsequent years but also to build up its foreign reserves. But many of those investments were carried out without sufficient attention to their economic viability (Oyejude, 1991)

These rising wages and an appreciating domestic currency squeezed the profitability exports of non-oil exports, while cheap imports competed with domestic food production. As a result, the country's resources shifted from the production of non-oil traded goods mostly agricultural to that of non-traded goods mostly public services. Thus, the emergence of the oil boom, relegated agriculture to the background and within a short period, Nigeria became a major food importer which cost the country N116.40 billion (1998), N119.87 billion (1999), N134.81 billion (2000) and N174.76 billion (2001). In addition, production of export crops declined substantially, making the country dependent on a volatile international oil market for almost all her export earnings and most of the Federal, State and Local government revenues (Shariff, 2004).

Consequently, with the sharp fall in the international oil price in the early 1980s, early 1985 and late 1986, Nigeria's economy was almost at the verge of collapse. This led to the country's built up of large fiscal and external deficits and other macroeconomic imbalances which ensued. To address this problem, government introduced several policy measures which started with the Stabilization Act of 1982, budget-tightening measure of 1984 and finally the 'Structural Adjustment Programme (SAP) of late 1986. SAP was aimed at laying the foundation for a self-reliant and dynamic economy. The corner stone of the SAP is the deregulation of the economy in other words called privatization of the economy.

Indeed, SAP was aimed through the combination of exchange rate and trade policy reforms, at revitalizing the non-oil sector of the economy with stabilization policies in order to restore the Balance of Payment equilibrium and price stability. SAP emphasized the downsizing of public sector and improving the efficiency of public asset management. Import license and agricultural marketing board were eliminated, price controls were lifted and liberalization of the financial system was almost important instrument of stabilization (CBN, 1993). However, the problems of internal and external imbalances and the undue dependence on oil which brought about the adjustment problems still persist. This implies that there is a relative insensitivity of the economy to the corrective policies.

It should be noted that, the genesis of deregulation of the Nigerian economy could be hinged substantially on the economic crisis faced by the country. This economic crisis could be traced to the lopsided character of the post-colonial developmental path followed by the country. The foundation of this lopsidedness was laid from 1945 when the country was under colonialism. During the period, the country in alliance with foreign capital promoted import-substitution industrialization. This was carried out through the use of peasant surpluses to finance the importation of the inputs necessary for the growth and expansion of manufacturing activities (Olukoshi, 1993).

In explaining the causes of this economic crisis in Nigeria many reasons have been adduced. Some of these reasons emanated from the neo-capitalist Economist the nationalists and the neo-Marxist. The neo-capitalists, toeing the Nigerian official line, submitted that it was the international oil market glut and the recession in the world market rather than domestic reason that the economic crisis. And that the solution is for the world market to return to the path of economic expansion before Nigerian economy could improve. The Nationalist, it was the prevalent of fraud and mismanagement of Nigeria resources that caused the economic crisis. And that as far as such attitude continues definitely the economy would never be back on track. To the neo-Marxist, the economic crisis could be anchored on specific role of contractors, consultants and middlemen and their various ruinous activities. That, the way in which the patron client network operates contributed to the country's economic decline. It suffices to say here that; the Nigerian economy is characterized by lack of organic linkages between agriculture and industry, production and consumption an autochthonous capital base, development of indigenous manufacturing sector, balance of payment problem, heavy debt burden, low gross domestic product (GDP), labour inflexibility, high unemployment rate, inadequate provision of social services and poor maintenance of infrastructural facilities, the near collapse of the manufacturing sector etc. (Ibid:57).

CONCEPTUALIZATION

Deregulation of a Country's economy could be conceptualized as privatization, divestiture, and marketization of the economy. In essence no government but private participation in the Country's economic activities. This is in order to ensure competitive economic system devoid of monopoly and allow price mechanism of demand and supply's principle of economy to prevail. According to Ahmed (1993:iii). Deregulation of an economy entails according greater weight to the private sector as the prime mover of the economy's opposed to the emphasis on the dominance of public sector. To achieve this objective, greater role are assigned to market factors as against the use of pervasive administrative controls. This is aimed at stabilizing and fundamentally restructuring the economy and places it on a durable and suitable growth path.

As a major solution to the economic crisis experienced in Nigeria, in 1986 Structural Adjustment Programme (SAP) was introduced with the central aim of deregulating the economy. To Ayodele (1994), Privatization in other words deregulation is one essential aspect of price and market reforms which entails both unshackling private sector development through removal of government restrictions on private economic activity and divestiture of the state assets particularly State Owned Enterprises (SOEs) into private hands.

The main objectives of deregulation include: introducing a market economy; increasing economic efficiency; establishing democracy and guaranteeing political freedom and increasing government revenue (Dhaji and Milanovic, 1991). It is also assumed that economics based on private prosperity are better institutions for preserving individual freedoms than economies where the productive apparatus is socially owned (Ijhaiya, 1999). Moreover, for government to be effective, it has to restrict itself surely to the areas of governance and within that

duty provide guidelines for the operation of economic activities which can be performed better by private individuals. This is needed the situation under which deregulation of the economy is introduced in Nigeria.

THE THEORETICAL MILIEU

The theoretical foundation of deregulation draws largely from the general equilibrium theory which among other things indicates the relevance of efficient pricing in ensuring optimal allocation of society's limited resources for efficient production of the various needs of society and efficient distribution of the commodities and services among various consumers. Thus, the concept of perfect competition and free market imply that the general equilibrium analysis will tend to yield an optimal allocation of resources since competitive equilibrium prices ensures that supply and demand are equal and in the long-run, all firms which can produce profitably will enter the industry to ensure long-run stable and sustainable growth (CBN, 1993)

It is obvious that such optimality results cannot be achieved under centralized planning or command economies which depend on elaborate control. This is because such system is hardly able to arrive at a set of efficient prices which will ensure that all firms maximize their profits by covering their costs and earning reasonable margins, while consumers maximize their utility. And even in recent times, there has been some ferment in economics about the role of the state in economic life (Killick, 1989).

Traditionally, the state's economic role has been defined in terms of a reasonability to correct or eliminate various market failures which place serious limitations on the allocative efficiency of the free market and justify the need for government intervention. Foremost among these are failures of competition, existence of externalities, incomplete markets, information failures, public/merit goods, macro economic instability, creative failures and poverty/inequality. Although development economists no longer assume that the existence of market failures constitutes adequate cause for state interventions. This is because, experience, especially in the peculiar circumstances of developing countries, has taught that government has a duty to rectify these failures through the use of taxation and subsidies to moderate if not remove the observed distortions arising from the market failures. Even among the Socialist Economist (Social Democrat), the case of market globalization is widely accepted (Ibid).

Importantly, there is indeed a symbiosis among capitalism, colonialism and imperialism as theoretical milieu underlying deregulation. Colonialism which implies the policy and practice of a strong power extending its control territorially over a weaker nation or people has a long history but commonly regarded as an attribute of the late 19th century imperialists who conquered large tracts of the globe to find themselves ruling areas. Indeed, colonialism of that latter period had been usually used pejoratively to denote an unwarranted sense of racial superiority and the set of attitudes, beliefs and practices that sprang from it (Walter Rodney, 1985).

That is, the contradiction in capitalism in terms of the transplanted reduced the rate of profit and arrested the capitalization of surplus value in the western world in the 19th century. In addition to this development was the sole aim of profit maximization by capitalism both of which culminated in the need for a new environment in which the process of accumulation could continue. Therefore, the capitalists turned to foreign lands, attacked and subjugated them and integrated their economies to those of Western Europe through colonial imperialism. To date that experience of western imperialism, particularly colonialism cum capitalism remain the most decisive phenomena in the history of Nigeria like any other colonized countries of the world (Ibid).

Unequivocally, colonialism severally decapitalised the third World Countries, distorted and dislocated their economic and social systems. Their economics were disarticulated and specialized unconsciously in the production of raw materials to the metropolis in an international market with unequal exchange. Thus, the colonized periphery countries were made to depend on the metropolis (the developed countries) for almost everything. Based on this premise, it could be concluded that the deregulation of Nigerian economy is an idea packaged and sold by the metropolis through their agencies such as World Bank and International Monetary Fund (IMF) (Thonvbere, 1989).

Moreover, the classical political economy which is capitalist was more concerned with the best way to engage in the production distribution, exchange and consumption of goods and services with no role for government but the market in such growth and development. The aim was to remove encumbrances placed by ambitious governments and bureaucrats on the free operation of a market economy and therefore in favour of the market economy with its vaunted claim to efficiency (Mishan, 1983). In the bid of classical political economy to preach and promote capitalism and liberalism, it argued essentially, that a nation's true economic wealth is derived from the industry and the economic right of the people to choice. That the state should therefore only engage in the provision of internal and external security. It further argued against the various restrictions in international trade. Based on this premise, the current deregulation of the Nigerian economy could be said to have its root in the contest of the classical political economy and should be situated therein (Momoh and Hundeyin, 1999).

Furthermore, the world economic system that is essentially capitalist promotes an international division of labour in which the industrialized Capitalist Countries (IOCs) produced the manufactured goods while the third World Countries were forcefully made to produce raw materials needs of the IOCs whose price are determined by the latter. This unjust and unbalanced international division of labour began through the process and logic of colonialism driven by imperialism and currently propelled through the political legislation of the Bretton Woods system as represented by the World Bank and IMF which hegemonized the Euro-dollar as an international currency of convertibility and a gold reserve (Onimode, 1988).

In order to sustain this world economic system an international capitalist financial system was established made up of multilateral institutions comprising General Agreement on Tariffs and trade (GATT), the International Monetary Fund (IMF), the World Bank Group; International Reconstruction and Development (IBRD), International Development Agency (IDA) and the International Financial Corporation (IFC). The World Bank and IMF were established to help give aid to European countries to enable them come out from ruins of the First and Second World Wars in order to reconstruct their economies. Unfortunately, their orientation and policy objectives changed with time. AS ARGUED BY Onimode (1988:278);

Since 1979, IMF has been offering more assistance to third world countries under its stands-by arrangements of Extended and Facility, with preconditions. Similarly, the IMF gives "letter of intent" (clean bill of health) to member states that are in need of World Bank loans with harsh conditionalities among which is the deregulation of the economy among others. And even a look at those conditionalities reveals their pernicious effect on the countries such as Nigeria which are caught in a "debt trap" have to take the bitter pills. Unequivocally, the adoption of the policy measures and initiatives couched in economic liberalism or deregulation of the economy has further pauperized the third World Countries and made their economic crisis assume a tragic proportion. In a nutshell, the activities of the World Bank and the IMF have in recent times further contributed to the underdevelopment of the Third World Countries such as Nigeria and have made them to be more dependent on and subservient to the West (Momoh and Hundeyin,

1999)P. Unequivocally, the basis of the World Bank and IMF conditionality is the deregulation of the economy which has also been added to the democratization of the polity.

Thus, this IMF conditionalities such as trade liberalization, monetary anti-inflationary measures, fiscal anti-inflationary programmes, anti-inflation control, wage increase, anti-inflationary dismantling of price controls and minimum wages door policy on foreign investment and Multinational Corporation: reduction of spending on social services and privatization of public enterprises`1 are part of the deregulation of economic process.

CONCLUSION

The deregulation of the Nigerian economy as discussed in this paper is no doubt has a capitalist undertone with the notion that capitalism produced colonialism and imperialism. Unfortunately, right from the time the Nigerian economy began to be deregularized as part of SAP in 1986 it had only succeeded in pauperizing a larger population of the country. And even with the emphasis on the deregulation of the economy of the economy of the present civilian government in the country the material condition of the citizens is yet to improve.

RECOMMENDATIONS

Based on the development, that deregulation of the Nigerian Economy implies privatizations and privatization is based on maximization of profit. Consequently, majority of Nigerians 70% of whom are below poverty line might not be able to afford those deregulated goods and services. Therefore, the current government in Nigeria should review its deregulation policy. This is because an economic system that could not improve the material condition of the majority of the citizens of a country is not a good economic system. Though, the deregulation of economy policy might have been successful in developed countries, it has been a failure in developing countries due mainly to differences in socio-political environment. Therefore, the deregulation programme should either be discarded or refined in Nigeria.

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FARMERS' PERCEPTION OF LEOPARD (*PANTHERA PARDUS*) CONSERVATION IN A HUMAN DOMINATED LANDSCAPE IN NORTHERN ETHIOPIAN HIGHLANDS

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Abstract

*Attitudes toward large carnivores were surveyed in two sub districts May Anbesa (relatively high leopard density area) and Egrinwonber (area with no leopard) in the northern Ethiopian highlands. This district is a completely human dominated landscape, where conflict has manifested in terms of livestock depredation. Spotted hyena (*Crocuta crocuta*), leopard (*Panthera pardus*) and common jackal (*Canis aureus aureus*) are common in this landscape but all other large carnivores are virtually absent. A structured survey instruction was prepared in the form of an interview-based questionnaire containing 23 items arranged in three sections: attitudes and perceptions; management issues; and economic impact. We interviewed 519 randomly selected households (core area, n=317 and control area, n=202). Majority of the respondents (64.6%) had positive feelings and only 10.2% had negative feelings in the core area, whereas majority of the respondents (52.3%) had neutral feelings and only 9.1% negative feelings towards leopard in the control area. The mean attitude score in both areas was 3.53: neutral to positive. The majority of respondents (72.3%), including 88.6% in the core area and 46.5% in the control area, thought that compensation should be paid to farmers whose livestock had been killed by leopards. Only 34.7% of all participants, including 25.9% in the core area and 48.5% in the control area, agreed that killing of leopards should be strictly regulated. Farmers of the core area reported losses of 85 domestic animals due to leopard depredation causing an estimated financial loss of about US\$ 51,673 over the last five years, or an annual mean of 0.4% of stock worth US\$ 10,334. Of all the respondents in core area only 12% of the people had suffered from leopard depredation. Goats were the most depredated livestock species (49.4%). The findings indicate that tolerance for depredation is high for that further efforts could improve support for carnivore conservation.*

Keywords: Leopard, Conservation, Financial Impacts, Ethiopian Highlands

INTRODUCTION

The common leopard (*Panthera pardus*) is the most widespread large carnivore (Myers, 1986), occurring throughout sub-Saharan Africa, India and southern Asia (Nowell and Jackson, 1996) due to its highly adaptable hunting and feeding behavior (Bertram, 1999). It can live wherever there is sufficient cover and adequately sized prey animals (Bertram, 1999). Leopards are known to inhabit croplands in human dominated landscapes (Athreya et al., 2004). This close proximity to humans often results in conflict and can be particularly controversial when the resources concerned have economic value such as livestock depredation and the predators involved have a high conservation profile (Graham et al., 2005). In general carnivores have disappeared from areas of high human density (Woodroffe, 2001), and the species most exposed to conflicts with people are the most prone to extinction. They have been perceived as a threat to human survival because of danger to human life and to livestock. People retaliate to livestock depredation by poisoning carnivores, habitat destruction and direct killing which have led to extinction of many species and significant reductions in carnivore populations. Local people often hold negative attitudes, when carnivores prey upon livestock as reported for snow leopards (*Panthera uncia*) by Oli et al. (1994) and wolves (*Canis lupus*) by Lenihan (1996). In most landscapes large carnivores will need to coexist with humans. This coexistence requires knowledge about people and their attitudes towards large carnivore conservation. Hence, study of public opinion and knowledge becomes an important element of large carnivore conservation.

Leopard is one of the vulnerable species owing to predation large number of domesticated animals in Ethiopia; however least concern in terms of its conservation is given in the country. In the country, the public is poorly informed about issues of wildlife conservation. No research on public attitudes to carnivores has been published yet. Attitudes of farmers towards the predation problem are poorly understood in Tigray, regional states of Ethiopia. Hence, the present study aimed to understand farmers' perceptions and attitudes towards leopard occurring in the area.

STUDY AREA

The study was conducted in Endrta district (northern Ethiopian highlands) that lies between 12° 13' and 14° 54' North and 56° 27' and 40° 18' East with an area of approximately 10,000 km² at an altitude of 2,300 m.a.s.l. The rainfall of the area is bimodal with a short rainy season occurring between January and April, and a long rainy season from June to August. Average annual rainfall is about 550 mm. The mean maximum temperature ranges between 12° C (November and December) and 27° C (January and March). The rural population is extremely poor and chronically dependent on food aid. The total rural human and livestock population is about 115,000 and 56,000, respectively (Bureau of agricultural and natural resources development (BOANR) 2009). Two sub districts were selected with the assistance of local administrators. The first is May Anbesa (Core area) with a total human and livestock population of about 6,387 and 7,579, respectively with annual rainfall of 400-600mm. It is about 12km from Mekelle located at 1500-2300m.a.s.l and hosts hyena (*Crocuta crocuta*), leopard (*Panthera pardus*), common jackal (*Canis aureus aureus*) and low density of small prey species, example Red-fronted gazelle (*Eudorcas rufifrons*). Secondly, Egri Wonber (Control area), is situated at about 2,303 m.a.s.l at 8km from Mekele, with total human and livestock population of about 7,994 and 1,424, respectively. This area hosts hyenas, common jackal etc but no leopard.

METHODS

Interviews are a widely used technique for surveying mammals, especially carnivores, and for understanding people's perceptions (Dietrich, 1995; Rabinowitz, 1997; Brooks et al., 1999; Conforti and de Azevedo, 2003; Marino, 2003). A structured survey instruction was prepared in the form of an interview-based questionnaire containing 23 items arranged in three sections: attitudes and perceptions; management issues; and economic impact. Most questions were measured on a 5-point scale ranging from "strongly disagree" to "strongly agree". Two sub districts May Anbesa (core area with relatively high leopard density) and Egriwonber (control area, with no leopard) were selected with the help of local administrators of the district. According to Storck et al., (1991), the size of the sample depends on the available fund, time and other reasons and not necessarily on the total population. Accordingly, we interviewed 519 randomly selected households from two sub-districts (core area, n=317 and control area, n=202). Respondents (the head of the household or their spouse) were also asked questions relating to number of livestock owned, livestock management, number of livestock lost to predation from 2006-2010 and human attack by leopard. To quantify the economic cost of livestock depredation in core area, the species, age, number and sex of livestock losses were recorded. Estimates of current average market values of different classes of livestock species by age and sex were obtained from traders. Values were translated to US\$ at the exchange rate of the time of the study.

STATISTICAL EVALUATION

For the statistical analyses, data were entered into JMP 5 Software. Analyses were conducted using Pearson's chi-square test. A chi-square test of association was used to test the null hypothesis that row and column variables were independent. A high χ^2 value and $P < 0.05$ indicated significant differences.

RESULTS

Socio-Demographic Characteristics

Overall, slightly more males (57.8%) than females (42.2%) participated in this household survey. Approximately 46.6% of the respondents were between the ages of 21 and 35 years, 26.4% were 36-50 year-olds, 16.2% were 51-60 years old and 10.8% were above 60 years old (Table 1). The proportion of farmers over 50 years old was 27%. More than half of the respondents (61.5%) were illiterate and only 5% were college graduates.

Our expectation that attitudes would be most negative in core areas was not confirmed. A majority of the respondents (64.6%) had positive feelings and only 10.2% had negative feelings in the cores area, whereas majority of the respondents (52.3%) had neutral feelings and only 9.1% negative feelings towards leopard in the control area (Table 3). Overall six times more respondents had positive feelings (54.5%) than had negative feelings (9.8%). The mean attitude score in both areas was 3.53: neutral to positive. The majority of respondents (72.3%), including 88.6% in the core area and 46.5% in the control area, thought that compensation should be paid to farmers whose livestock had been killed by leopards. A lack of education was identified as the most important current issue that should be considered in large carnivores conservation work. Only 34.7% of all participants, including 25.9% in the core area and 48.5% in the control area, agreed that killing of leopards should be strictly regulated.

Mean attitude scores were 3.7 and 3.36 in core and control areas, respectively. Similarly, mean management scores were respectively 3.36 and 3.32 in core and control areas. An attitude and opinion about leopard management score was calculated using 7 and 8 items, respectively (Tables 3 and 4). A mean attitude score of 1 indicates strongly negative feelings, a score of 3 neutral and of 5 strongly positive feelings toward leopards. In general none of them had really negative feelings toward leopards. Participants of the survey generally held neutral to

positive attitudes toward carnivores (mean score 3.44). Farmers in both areas had neutral to positive attitudes toward leopard management.

Farmers of the core area reported losses of 85 domestic animals due to leopard depredation causing an estimated financial loss of about US\$ 51,673 over the last five years, or an annual mean of 0.4% of stock worth US\$ 10,334 (Table. 2). We don't have any report of attacks on humans. Only 12% of the respondents in core area indicated the incidence of livestock depredation.

DISCUSSION

Farmers' attitude is an important consideration in conservation of large carnivores. Overall six times more respondents had positive feelings (54.5%) than had negative feelings (9.8%). Previous studies have found that people in a carnivore-free area tended to be more positive than people in a carnivore area (Szinovatz, 1997). In the present study the presence of carnivores doesn't seem to affect peoples' attitude toward them negatively. A more detailed study using anthropological insights and methodologies is required to better understand the feelings of farmers to large carnivores. Participants of the survey generally held neutral to positive attitudes toward leopard (mean score 3.44). Factors such as culture, education, economy, status, exposure to an event have been found to influence attitudes (Røskaft et al., 2003). Human attitudes towards carnivores tend to be shaped by understanding and knowledge of a particular species, as well as by past and present interactions with that species (Kellert et al., 1996). Human acceptance is very important for conservation of large carnivores.

We don't have any report of attacks on humans. Only 12% of the respondents indicated the incidence of livestock depredation. Owing to the relatively low livestock depredation and absence of human attack farmers might have neutral attitudes about leopard in the study area. Variation in people's attitudes towards large carnivores seems to be based partly on the extent to which different species conflict with human interests and partly on inherent human prejudices (Kellert, 1985). However, attitudes can change considerably over time (Fritts et al., 2003). Assessing the attitudes of people is a complex issue (Dickman, 2005) owing to cultural, social, ecological and economic factors. The presence of large carnivores in human landscapes can have different consequences such as fear evoked by its very presence (Quammen, 2003) to fatal attacks on humans (Loe, 2004). The most reported consequence of the presence of carnivores in human dominated landscape is livestock depredation (Patterson et al., 2004) which often results in undermining the conservation effort. However, depredation is often preventable by employing efficient livestock management practices (Ogada et al., 2003). In our case, mitigation is for social, not conservation motives.

The majority of respondents (72.3%), including 88.6% in the core area and 46.5% in the control area, thought that compensation should be paid to farmers whose livestock had been killed by leopards. Compensating for livestock depredation has been used as mitigation measures. This might help in reducing the impact of conflict and increasing the tolerance of livestock depredation (Swenson and Andren, 2005). To mitigate the results of conflict between humans and carnivores, reactive and proactive measures need to be taken (Madhusudan and Mishra, 2003). If we want to conserve carnivores in human dominated landscapes we have to look for options that might benefit communities of this area. For the large carnivore like leopards to survive in a human dominated landscape there is a need of efficient management practices to be employed, both on the part of wildlife managers as well as the local people (Linnell et al., 2001). Carnivore conservation in such landscape is as much a policy issue as a scientific and ecological one (Treves and Karanth, 2003) and science can help us in formulating better and efficient management policy that will help in reducing the impact of conflict on people (Primm and Clark, 1996).

Goats appeared to be most vulnerable to leopards' depredation, assuming the reported depredation rate of 49.4% is valid. A similar pattern was noted by Kiran (2008) from India; dogs, goats and sheep primarily form the prey base of leopards in which depredation by leopards accounted for 80% of deaths in goats. Selection of prey by leopards depends on prey body size, with smaller and medium sized prey being preferred (Hayward, 2006). According to the informants, lax guarding practices, favorable cover and habitat conditions were the primary reasons for the livestock depredation in the area. Some amount of conflict is unavoidable when large carnivores inhabit human dominated landscapes (Namgial et al., 2007). In Tigray the wild prey base is small and often carnivores prey on livestock species (Yirga et al., *subm.*). In the present study, for example, farmers of the core area reported losses of 85 domestic animals due to leopard depredation causing an estimated financial loss of about US\$ 51,673 over the last five years. Areas with good numbers of wild prey could face some degree of livestock depredation but where natural prey has been depleted, livestock depredation is likely to be inevitable (IUCN –CSG 1992). The impact of this predation might be serious as most of the cattle farmers in the region have very small herd size.

The findings indicated that tolerance for depredation is high for that further efforts could improve support for carnivore conservation. Large carnivores' conservation efforts should address the problem of livestock depredation in order to obtain the wider support of the local communities. Farmers indicated a lack of education as the most important problem in current management of leopard. Around 52.6 % (51.6% in core area and 53.5% in control area) thought that people need to be given more information about large carnivores' conservation. Hence, awareness creations on the need for carnivores at the grass hoot level would be so important for carnivores' conservation.

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Table 1 : Socio-Demographic Characteristics of Sample Respondents

Socio-demographic	Core area	Control area
Age structure		
21-35	150	92
36-50	90	47
51-60	47	37
>60	30	26
Sex ratio		
Female	135	84
Male	182	118
Education		
Illiterate	196	123
Primary	40	14
Junior	44	22
Secondary	31	23
College	6	20

Table 2: Stock Number, Depredation, Predated Biomass and Economic Impact of Leopard from 2006-2010 in May Anbesa (Core Area) in Endrta District

Species	Stock	Depredation (%)	Predated Biomass(kg)	Economic loss(US\$)
Donkeys	327	0(0)	0	0
Sheep	172	9(10.6)	585	466.6

Goats	742	42(49.4)	2940	14,838.6
Cows	500	5(5.9)	1250	9,500
Poultry	868	9(10.6)	12.6	495
Dogs	313	7(8.2)	245	140
Bulls	248	5(5.9)	1250	12,500
Oxen	556	5(5.9)	1750	10,833
Calves	123	3(3.5)	180	2,899.8
Mules	9	0(0)	0	0
Camels	11	0(0)	0	0
Cats	228	0(0)	0	0
Total	4097	85(100)	8212.6	51,673

Table 3: Results for the Items Concerning Attitude toward Leopard by Study Area

Leopard is bad animal	1	2	3	4	5		
Core area n=317		4.7%	11%	31.6%	41.6%	11%	P=0.0001
Control area n=202		1.5%	32.7%	47%	17.3%	1.5%	X ² =114
The Presence of Leopard is a Sign of a Healthy Environment							
Core area		0%	1.6%	34.4%	52.7%	11.4%	P=0.0001
Control area		0%	0%	22.8%	67.8%	9.4%	X ² =430
Leopard Kills Livestock							
Core area		0%	0.6%	8.5%	58.7%	32.2%	P=0.0001
Control area		0%	1%	27.2%	65.8%	5.9%	X ² =467
Leopard have been known to Attack and Injure People							
Core area		1.3%	12.9%	35.6%	37.9%	12.3%	P=0.0001
Control area		0.5%	17.8%	77.2%	3.9%	0.5%	X ² =362
I would be Afraid to go into the Forest/Field if there are Leopard							
Core area		0.3%	5.7%	15.1%	43.5%	35.3%	P=0.0001
Control area		0%	1%	55.9%	24.8%	18.3%	X ² =363
Leopard is Dangerous to Humans							
Core area		0%	0.9%	13.6%	74.1%	11.4%	P=0.0001
Control area		0%	1%	87.1%	11.4%	0.5%	X ² =496
Leopard should be Protected							
Core area		6%	26.5%	37.2%	19.9%	10.4%	P=0.0001
Control area		0%	7.9%	49%	33.2%	9.9%	X ² =178

1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree

Table 4: Results for the Items concerning Opinion about Leopard Management

There should be Leopard in Tigray	1	2	3	4	5		
Core area		5.7%	17.7%	19.9%	45.7%	11%	P=0.0001
Control area		0%	4.9%	14.4%	69.3%	11.4%	X ² =42
Leopard should present in my Village							
Core area		23%	24.9%	32.8%	15.1%	4.1%	P=0.0001
Control area		3.5%	7.9%	49%	39%	0.5%	X ² =93

Leopard should only Live in Restricted Places in Tigray						
Core area	3.5%	31.2%	30.6%	31.2%	3.5%	P=0.0001
Control area	2%	39.6%	52.5%	4.9%	1%	X ² =62
Farmers are Responsible to Protect their Livestock from Leopard Depredation						
Core area	0.3%	0.6%	10.7%	71.9%	16.4%	P=0.2279
Control area	0%	0.5%	14.9%	74.3%	10.4%	X ² =6
Money should be Paid to Farmers whose Livestock is Killed by Leopard						
Core area	0%	1.6%	9.8%	41.3%	47.3%	P=0.0001
Control area	0.5%	22.8%	30.2%	34.2%	12.4%	X ² =133
Killing of Leopard should be Strictly Regulated						
Core area	1.9%	24.6%	47.6%	22.1%	3.8%	P=0.0001
Control area	0%	2%	49.5%	47%	1.5%	X ² =70
Killing of Leopard should be Allowed						
Core area	3.2%	17.4%	47.3%	29.7%	2.5%	P=0.0001
Control area	5.5%	47.5%	43.7%	3.5%	0%	X ² =89
It is Necessary to give more people Information about Leopard						
Core area	2.2%	12%	34.4%	38.8%	12.6%	P=0.0001
Control area	0%	1%	45.6%	44.6%	8.9%	X ² =30

1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree

9

DECEPTIVE AND SUBLIMINAL FOOD ADVERTISING

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Abstract

The purpose of advertising is to make sure that people know about the range of products and services that are available on the market. It is the interest of the manufacturers and retailers to make as many consumers as possible aware of their products or services. But, it is important to ensure that ads meet certain standards, particularly relating legal and ethical requirements, because consumers do not always have sufficient knowledge to decipher the messages in advertising, to detect the exaggerations or the possible frauds. They, therefore, need to be protected from the incorrect or misleading ads. Advertising can encourage the people to over - consume, which is bad for the consumers' wallet, for the environment and for the sustainable development. But, if the deceptive and subliminal advertising may harm the security of the children, it means that urgent measures must be taken to protect this special social class.

Keywords: Food Industry, Communication Policy, Advertising, Deceptive Advertising, Subliminal Advertising, Misleading Ads, Consumer Protection

INTRODUCTION

All over the world, food industry is a huge market force. Nowadays, this industry produces a major number of different food products. As the market has grown, so has the amount of choices that consumers have. This is just one of the reasons why advertising and promotion are important to the marketing of food supply. The good thing about ads is that they inform people about new products. But, why so much advertising? There are several reasons for it. First, the food market is huge, capturing - for example - in the USA, around 15% of the consumers income, and in Romania around 50%. Because of that, there is a vigorous competition among food firms to compete for this market. Second, food is the most important repeat - purchase item.

Marketers are interested in the spending and purchasing power of the consumers. That's why, multiple ways are used to influence the consumers' behavior. It's estimated that the average European consumer receives 30,000 advertising messages a year. The TV, the radio, the posters, newspapers and magazines are the traditional media, but companies now have new smart ways of reaching potential clients too. Food product choice is overwhelming, as well as TV commercials and printed advertisement that want to sell their food products to us. The concrete ways - the communication channels - used for this reason, includes: television advertising, direct marketing, sales promotion, merchandising, the power of the sales forces and so on. Television is the most widely used medium because it can reach large audiences. Food manufacturers spend also massive amounts promoting their goods to the retailers, through discounts and allowances or incentives.

CHILDREN - A SOCIAL GROUP VULNERABLE TO ADVERTISING

The above mentioned communication instruments are used not only to influence the purchasing behavior of the adult population. In the last years, children became a major an

important target group to marketers, because they have their own purchasing power. They have also the power to influence their parents buying decisions. Parents today are willing to buy more for their kids because of the contemporary market trends. But guilt can also play a major role in the spending decisions of the parents, trying to substitute the time needed to be spent with their kids - time which is always too short - with material goods. Marketers always use to exploit these familiar trends.

Marketing to children is a powerful force. Because of that, kids are considered the young consumers of the present and the adult consumers of the future. Industry spending on advertising to children in the USA has exploded in the past decade, increasing from a mere \$100 million in 1990, to more than \$2 billion in 2000.

We will analyze some of the *strategies* marketers nowadays use *in targeting kids*.

- Kids today possess product knowledge and buying influence far beyond their years, and marketers must adapt their strategies to this new reality, if they want to overcome their competitors. Today's kids have more autonomy and decision-making power within the family, than the previous generations. That means, kids are vocal about what they want their parents to buy. The term "pester power" refers to the children's ability to nag their parents into purchasing items they may not otherwise buy.⁷

According to the 2001 marketing industry book "*Kidfluence*" (*exploiting the nag factor*), pestering or nagging can be divided in two categories: "persistence" and "importance". Persistence nagging (a plea that is repeated over and over again) is not as effective as the more sophisticated "importance nagging." This method appeals to parents' desire to provide the best for their children, and plays on any guilt they may have about not having enough time for their kids. The strategy isn't new, and it is used in all the domains, also in purchasing food. For example, advertisers have been encouraging kids to pressure their parents to buy sugared cereals for decades. But now they're adding cars, electronics and banking services to the "kidfluence" shopping card. What's more shocking is that they're targeting not just teenagers, but also "tinies" - a market demographic category that includes kids who are still in diapers.

To effectively market to children, advertisers need to know what makes kids tick. With the help of well-paid researchers and psychologists, advertisers now have access to in-depth knowledge about children's emotional and social needs at different ages. Using research that analyzes children's behavior, fantasy lives, even their dreams, companies are able to craft sophisticated marketing strategies to reach young people. What can the parents do? Media education is one solution: given the right tools and frequent timely reminders, kids can be taught to embrace a buyer-beware mode. Knowing that the supermodel's perfect looks have been graphically enhanced, can change how they relate to ads. But it takes a lot of time and effort to counter the hundreds of thousands of promotional messages they're exposed to, every day.

Further understanding of the mechanism that produce these priming effects is also needed to enable educators and parents to more effectively protect children (and themselves) against unhealthy food advertising influence. As most of the adults did not recognize the potential influence of food advertising on their eating behaviors, increased awareness will be an important first step. These findings also highlight the need for media literacy programs that go beyond teaching children how to analyze and evaluate advertising messages, and increase the public's understanding of how advertising may affect them outside of their awareness.

- Marketers use to build up brand name loyalty. Companies want their products to be "must-haves", creating loyalty for the brand so that consumers buy them again and again. And they do that by getting consumers to try them, and by ensuring, once tried, they like them. It creates a buzz and a peer pressure around the brand, so that everyone wants to own them. That means, they plant the seeds of brand recognition in very young children, in the hope that the seeds will grow into a lifetime relationship.

Fast food, toy and clothing companies have been cultivating brand recognition in children for years.

- Many companies are using "buzz marketing". The idea is to find the coolest kids in a community and have them use or wear their products in order to create a buzz around it. Buzz or "street marketing" as it's also called, can help a company to successfully connect with an exclusive teenager market by using trendsetters to give their products the "cool" status. Buzz marketing is successfully and particularly well-suited to the Internet, where young "Net promoters" use newsgroups, chat rooms and blogs to spread the word about music, clothes and other products among unsuspecting users. That way, the blogs - online journals written by people/children around the world - are also being used by advertisers to promote their products, but with a new blog created every second, it can be hard to tell which of the 9 million postings a day are written in the name of the companies.

- School used to be a place where children were protected from the advertising and consumer messages that permeated their world. But nowadays, corporations realize the power of the school environment for promoting their name and products. Marketers are exploiting this medium in a number of ways, including:

- sponsored educational materials;
- supplying schools with technology in exchange for high company visibility;
- exclusive deals with fast food or soft drink companies, to offer their products in a school or district;
- advertising posted in classrooms, school buses, on computers and so on, in exchange for funds;
- contests and incentive programs: for example, the Pizza Hut reading incentives program in which children receive certificates for free pizza if they achieve a monthly reading goal;
- sponsoring school events.

- The Internet is an extremely desirable medium for marketers wanting to target children. That happens because it's part of the youth culture (this generation of young people is growing up with the Internet as a daily and routine part of their lives). Kids are often online alone, without parental supervision. In that way, companies can build brand loyalties from an early age.

- Humor is one of the most powerful communication devices and many ad agencies believe that a funny campaign helps consumers remember a product longer. Humor is often at the centre of viral advertising. Virals are funny video clips or games that are emailed to a few consumers who, if they like them, send them onto their friends who send them again, so that the campaign spreads like an epidemic. Such viral videos are the most popular among kids.

- Children wants often to see entertainment meant for older audiences, because it is actively marketed to them (marketing adult entertainment to kids). In a report released in 2000, the U.S. Federal Trade Commission (FTC) revealed how the movie, music and video games industries routinely market violent entertainment to young children.

The kids are talking evidence of the educational effectiveness of commercial culture. They've learned that cool clothes are the keys to popularity and fast food is the answer to pretty

much everything else. To many of us a commercial on TV is time for a break. But not for kids who are unable to separate the ads from the program. The kids are too vulnerable to ads.

Buzz-marketing, in-school marketing, product placements, kids clubs, the Internet, toys and products with brand logos, are wonderful ways to influence the buying preferences of the kids, and then, later, of the adults. Children are more vulnerable to advertising because, before a certain age, they do not fully understand the persuasive intentions of advertising. For this reason, advertising that is aimed at children must respect certain conditions:

- ▶ It should not encourage the child to buy the product directly, nor should it encourage them to pester their parents or any other adult to buy it for them;
- ▶ It should not compromise the child's confidence in their parents, teachers, etc;
- ▶ It should not encourage the child to do anything that can be detrimental to their health or wellbeing;
- ▶ It should not suggest that they should do anything that would put them in a dangerous situation;
- ▶ Advertising should be appropriate to the age bracket it is aimed at.

Even if the above mentioned instruments are legal, we shouldn't forget that advertising is the only way able to assure really high incomes to the entities. Because of that, advertisers have a lot of methods to try and get the consumers - kids and adults - to buy their products.

ETHICS IN FOOD ADVERTISING CAMPAIGNS

Lots of times, what a company are selling is a lifestyle or an image, rather than a product. Obviously, it's up to each of us to decide what we eat, but if we're constantly bombarded with images of food every time we pick up a magazine, or every time we watch TV, then we're going to be swayed in what we choose. These foods look perfectly delicious, thanks to the work of a food stylist. Food stylists are like make-up artists. It's their job to make the food we see in advertisements, look great. But when we find out how they do it, we just might lose our appetite. We're all understandably concerned about food additives, which have become a necessary evil now, because of mass production, and many food additives are permitted. Normally, every food additive has to be tested before it's allowed to be used commercially. Preservatives are different from additives, inasmuch as they're generally safe because they're closely related to natural substances. The ones used in the foods we buy have all been rigorously scrutinized for safety before being allowed - but if the consumers are still worried, it's the best to avoid these products. Perhaps the most worrying are GM foods, which have been genetically altered.

At the same time, the greatest part of the foods marketed are predominantly high in sugar, fat and salt; that means, the hugest part of the food marketed all over the world is unhealthy or dangerous. Even if the Departments of Consumer Protection all over the world regulates all persons and businesses that manufacture or sell food products, approximately 2 percent of adults and about 5 percent of infants and young children suffer from food allergies, while each year, roughly 30,000 individuals require emergency room treatment and 150 individuals die because of allergic reactions to food. Allergy symptoms can vary widely: from mild irritation to death. Given that allergies are difficult to cure, sufferers must avoid foods which contain allergens at all costs. Nine major foods or food groups - cereals (containing gluten), milk, eggs, fish, Crustacean shellfish, tree nuts, peanuts, wheat and soybeans - account for 90 percent of the food allergies. At present, there is no cure for food allergies. Comprehensive food labelling is therefore crucial. EU legislation requires all ingredients to be indicated on the label of the food products, in particular the potentially allergenic ingredients too.

Each food must meet the following three conditions: to be safe, nutritious and to have a high quality. Good nutrition and health depend in large part on the consumption of adequate amounts of good quality, safe food. The consumers all over the world must have access to reliable

nutrition information through education, information and labelling regulations. Consumers should be able to choose foods that are appropriate for their individual health needs and to prevent insufficient and unbalanced diets that can lead to undernutrition, obesity or chronic diseases. At the same time, each state must solve the issue of food advertising aimed to children.

But, which marketed foods meet this conditions simultaneously? What's behind the advertisements? Who to believe? How to choose? Do you trust what is shown to you? Do you trust what you hear everyday at the TV?

Because of the strong competition, products and services marketed needs to be credible. More than that, all the advertisement types need to have credibility. This are just a few of the reasons why The International Code of Advertising Practice adopted by the International Chamber of Commerce promotes high standards of ethics in marketing, more exactly, in advertising. The Code applies to all advertisements for the promotion of any form of goods and services. The Code applies to the entire content of an advertisement, including all words and numbers (spoken and written), visual presentations, music and sound effect.⁸

The Code sets standards of ethical conduct to be followed by all the companies concerned with advertising, whether as marketers or advertisers, advertising practitioners or agencies, and is to be applied against the background of the applicable law. Because of the different characteristics of the various media (press, television, radio and other broadcast media, outdoor advertising, films, direct mail, fax, e-mail, Internet and online services) an advertisement which is acceptable for one medium may not necessarily be acceptable for another. Advertisements, therefore, should be judged by their likely impact on the consumer, bearing in mind the medium used.

The basic principles regarding advertising - formulated in this Code - are the following:

1. Advertising should be legal, decent, honest and truthful;
2. Advertisements should not contain statements or visual presentations which offend prevailing standards of decency;
3. Advertisements should be so framed as not to abuse the trust of consumers or exploit their lack of experience or knowledge;
4. Advertisements should not condone any form of discrimination, including that based upon race, national origin, religion, sex or age, nor should they in any way undermine human dignity;
5. Advertisements should not denigrate any firm, organization, industrial or commercial activity, profession or product by seeking to bring it or them into public contempt or ridicule, or in any similar way;
6. Advertisements should not contain any statement or visual presentation which directly or by implication, omission, ambiguity or exaggerated claim is likely to mislead the consumer;
7. Advertisements should not - without reason, justifiable on educational or social grounds - contain any visual presentation or any description of dangerous practices or of situations which show a disregard for safety or health;
8. Advertisements should not exploit the inexperience or credulity of children and young people;
9. Advertisements should not contain any statement or visual presentation that could have the effect of harming children and young people mentally, morally or physically

or of bringing them into unsafe situations or activities seriously threatening their health or security, or of encouraging them to consort with strangers or to enter in strange or hazardous places;

10. Advertisements should not suggest that possession or use of a product alone will give the child or young person physical, social or psychological advantages over other children or young people of the same age, or that non-possession of the product would have the opposite effect;
11. Advertisements should not undermine the authority, responsibility, judgment or tastes of parents, taking into account the current social values. Advertisements should not include any direct appeal to children and young people to persuade their parents or other adults to buy advertised products for them.

But, one are the principles and the theory, and other the market reality. Advertising rules vary in different EU countries, so what may be permitted in France or Spain is not necessarily allowed in the UK or in Romania. At the same time, not all the products can be advertised. Tobacco advertising is banned in the EU. In some EU countries toy advertising is prohibited and in the UK, the Government is considering banning junk food advertising before 9pm on TV. In the UK, the Advertising Standards Authority (ASA) ensures that adverts, promotions and direct marketing are legal, decent, honest and truthful.

Ads should also be socially responsible and respectful of the principles of fair competition generally accepted in business. Marketers worry about whether their offers will be perceived at all, and consumer worry that they will be affected by marketing messages through subliminal and deceptive advertising. That's why, suddenly, advertiser and consumer protection groups became interested in subliminal perceptions. Some consumers fear that they are manipulated through subliminal advertising, changing them in "consumer marionettes". Subliminal and deceptive advertising are just two examples of the illegal practices used in all the fields, especially in food advertising.

Subliminal advertising - the insertion of hidden messages - is a technique of exposing consumers to product pictures, brand names or other marketing stimuli, without the consumers having conscious awareness. The term "subliminal advertising" was coined to describe advertisements on television and in movies that include extremely short duration text messages or images that are embedded into the advertisement to provoke a subconscious response from the consumer. Subliminal advertising produces stimulus without directly targeting individuals senses. Subliminal advertising is also illegal as the deceptive advertising are. Deceptive advertising is an unfair, misleading and un-truthful advertising. Concretely, deceptive advertisement is defined as the advertisement that misleads or is capable of misleading the public and affects the public's financial capacity, or that harm or is capable to harm the competitors.

In the food "industry", misleading descriptions can occur many forms:

a) Specific rules govern certain types of food. For example, for chocolate to be called "chocolate", it must contain at least 45% cocoa solids.

Sausages can contain all kinds of strange animal products, including pigs ears. Some sausages contain only a small percentage of meat flesh, so, each consumer have to check the label, carefully. Consumers must be aware that in a restaurant they will never be sure of exactly what they are eating.

b) If expensive products have been replaced with cheaper alternatives, the label must say that. Cheap margarine cannot be blended with expensive butter, without informing the consumer.

c) Food cannot be "enlarged", for example by adding water to ham or chicken, without this being indicated.

d) Food origin must be correct. For example, Parma ham has to come from Parma in Italy. Wine claiming to be champagne has to come from the region in France of the same name.

To determine whether an advertisement is deceptive, The Spanish law no. 34/1988 (Unlawful advertising law in Spain) requires analyzing the following elements:

1) *products or services traits*. This includes origin, nature, composition, intended use, suitability, availability and novelty; quantity, quality, category, specifications, and denomination; manufacture or introduction date; expected use results; harmful or hazardous effects;

2) *price* or elements considered when pricing goods or services;

3) *how to obtain the products and services and how to deliver them*;

4) *reasons for the products or services offer*;

5) *advertisers qualifications and rights*. This includes advertiser's identity, professional qualifications and intellectual property rights.

Spanish law defines unfair advertisement as the advertisement that discredits - directly or indirectly - the products or services, including trademarks, symbols and commercial names of a business or natural person. Additionally, unfair advertisement is the one that creates confusion or is capable of creating confusion regarding the competitors products or services. This includes trademarks, symbols and commercial names. Comparison advertising that do not follow the specific rules of law 34/1988 may constitute unfair advertisement as well. Inaccurate, subliminal or misleading ads can mislead consumers into purchasing inappropriate products or services. Competition between traders is unfair if one of them is giving misleading information to consumers in their adverts. The International Code of Advertising Practice states that marketing should not be deceptive or misleading and should not exploit the credulity of the consumers or harm their health. Subliminal and deceptive advertising is banned in the European Union, but scientists doubt that it works, anyway.

More interesting in that moment is the use of the so-called "ambient media" which attempts to surround the consumers with different versions of the same message. That way, the contemporary market truth is that food ads are almost totally distorted, exaggerated and masked. That happens because food advertising does not contain information of real interest for the consumers, just information able to make the offer more attractive for the buyer.

Have you ever thought about what the following terms really mean?⁹

- "Fresh" and "natural". As there is no legal definition of what "fresh" and "natural" mean, these terms may mislead consumers when improperly used by manufacturers.

- "Light" or "lite". As these terms are not defined in law, if improperly used they can mislead consumers into believing that the food has fewer fats or calories than comparable foods. Some "light" foods may actually contain numerous calories; they may have been called light simply because they have fewer calories than the original.

- "No added sugar"/"unsweetened". This term usually signifies that the product does not have any added sugar. This does not mean, however, that the product isn't naturally sweet.

- "Organic". For foods to be organic, they must have been produced following the EU laws on organic production. Organic farming systems put a strong emphasis on

environmentally friendly and sustainable farming practices, with particular concern for animal welfare. Organic farming avoids the use of synthetic fertilizers, chemical and/or additives. Terms such as "Bio" or "Eco" may only be used in the labeling or advertising of organic food.

The consumers are always excited to buy these products, even if they are not vital for the consumption, generating false needs inoculated in the psyche of the potential consumer. There are a lot of issues concerning with communication ethics. A few of the critics concerning with food promotion, all over the world, are:

- the media communication channels promotes harmful foods;
- advertising shows food features as being far superior than they really are;
- advertising incite excessive purchasing;
- ads induce consumers to purchase products they do not need;
- advertising generates obsession of possession some goods;
- consumers are deceived by false advertisements;
- some ads have many shortcomings, offering disadvantages to the consumers;
- promotion creates false needs;
- advertising generate excessive expectations in terms of quality and price, coming from the consumers;
- the elements on the food labels are often insufficient for a good information of the consumers.

Subliminal, deceptive and unfair advertising is forbidden, because:

- it endanger the health and safety of consumers;
- it endanger the respect for human dignity and public morality;
- is a threat for the image, honor, dignity and private life of the consumers;
 - it promotes the marketing of goods or services which are produced and distributed contrary with the legal provisions;
 - shows the consumers false features of the goods, characteristics that the products do not have;
 - omits essential information regarding the identification and characterization of the goods;
 - encourages a detrimental behavior/conduct to the environment, contrary to the principles of sustainable exploitation.

Consumers are increasingly aware of the interdependence between food production, advertising, food consumption, their own health and that of the environment. For example, the promotion of disposable products could result in an increase in the quantity of waste that has to be disposed of. Every year, in the European Union alone, 1.3 billion tonnes of waste is thrown away, of which 40 million tonnes is hazardous. Most of our waste ends up in landfill sites.

Globalization of world markets has led to a significant increase in the variety of products available to consumers, which causes high competition between companies and regions. Advertising is a very effective way of making a product or a service widely known and traders often use it to their advantage. However, there are several restrictions on advertising, such as traders must not promote a product or a service in a way that may either deprive consumers of their rights or which may be detrimental to competitors. Given that most food is commercially produced, regulations and standards should protect consumers against deception and misrepresentation in the packaging, labelling, advertising and sale of food. Individuals should be protected against harm caused by unsafe or adulterated food, including food offered by street vendors. Food packaging and labelling should provide consumers with accurate information that is sufficient to enable them to make well - informed food choices.

In order to protect consumers and in the interests of fair competition, all adverts should be legal, decent, honest and truthful. Consumer trust in food is important. Western consumers are demanding more and better information about the food they eat and how it is produced. In the context of today's global food markets, public health, environmental and sustainable policies have a huge impact upon the consumers' food choice and the consume behavior. Because of that, whether a business is an established global brand or a start-up, effective advertising and marketing can be the key to its success. All businesses have a legal responsibility to ensure that their advertising is truthful and not deceptive. And no matter where an ad appears – on the Internet, on the radio or television, in newspapers and magazines, in the mail, or on billboards or buses – the same truth-in-advertising standard applies. If a marketer advertise directly to children or market kid-related products to their parents, it's important to comply with truth-in-advertising standards.

SUBLIMINAL AND DECEPTIVE ADVERTISING IN THE ROMANIAN FOOD SECTOR

At the end of last year, the food sector was forecast to be among the sectors to be hit most by the crisis. It is the very reason why the representatives of this sector, as well as the other players on the Romanian market, asked the Government to take the necessary measures. Although government officials came forward with a series of so-called "anti-crisis measures", they eventually proved to have remained only on paper, and the companies from the affected sector were forced to manage on their own. Food industry representatives warned about a collapse of the Romanian food industry. Subsequently, the forecasts followed the same trend. A wave of price increases and bankruptcies was announced for the sector of this industry. At the beginning of year 2009, it was considered that approximately 15% of the food industry employees could be fired. Many of these scenarios were confirmed over the year. According to the President of the National Federation of Food Industry Trade Unions (FNSIA), the current situation in this sector is a disastrous one. A part of the companies closed down, others limited their activity.

Even if the Romanian food sector is in a disastrous situation, starting with June 2009, the Romanian Advertising Council (RAC) is the depositary for the Ethical Code for Food Product Advertising Targeting Children. With this Code, the European Commission pledge to act firmly towards complying with certain general ethical rules regarding food ads addressed to children. These rules and regulations are adopted voluntarily, on a national level, by all the parties involved in food promotions targeting children.

The companies that sign this Code have pledged to responsibly advertise food and non-alcoholic beverages, in order to support parents' efforts of promoting a healthy life style.

The general ethical principles for food or soft drinks advertising in Romania are:

- Advertisers will always communicate in the spirit of truth, and will avoid misleading their consumers;
- Advertising practices will only be implemented in compliance with the national and EU legislation, as well as with the decisions of the national and local authorities;
- Advertising and commercial practices will be implemented in compliance with the ethical values of the society;
- Advertising and commercials will not affect human dignity in any way, by lowering or discrediting certain individuals or groups because of their social class, race, ethnical origin, religion, sex, age, physical or psychological features, personality;
- None of the advertising techniques to be used can take advantage from unfortunate events or situations that might occur in the life of any individual;

- Advertising will not resort to vulgarity, verbal violence, offensive and impolite behavior in communication;
- Advertising will support appropriate sizing of product servings, and will discourage excessive consumption, including by correctly displaying the appropriate size of the product servings;
- Advertising will attempt to promote an active life style and a well-balanced diet; it will never encourage in any way a sedentary life style or any other behavior that does not comply with a well-balanced diet;
- All statements referring to taste, composition, nutritional value or health benefits will strictly comply with reality, and their presentation will be made in compliance with the current legislation;
- Consumers have the right to confidentiality of their personal information, which requires for personal information collection and disclosing, as well as permission marketing practices, to be performed in compliance with the national laws and regulations, as well as with the internal practice regulations;
- Advertising will only use those media channels that, by their features and values, shed a positive light on the promoted brand and product. Advertising will not use any promotional services of those media channels resorting to strategies that might exploit violence or sex, or encourage an offensive attitude towards others.

Nowadays, the Romanian children's daily diet focuses on an excess of calories, saturated fat, hydrogenated fat, sugar and salt. Also, children do not have an appropriate intake of fruits, vegetables, cereals and vitamins. As a consequence, obesity has reached high rates and is further generating specific complications and health problems. Nutritional choices made by parents and children depend on a number of factors. Studies have shown that one of these factors may be the advertising targeting children. These studies have pointed out that ads may attract children, influence their options and encourage them to further influence and convince their parents to buy them certain products.

The ethical principles for food or soft drinks advertising targeting children, in Romania, are:

1. Do not target children under 12 with food ads, except for those food products that strictly comply with specific nutritional criteria, based on accepted scientific proofs and/or national and international nutritional guides. To this end, "Ads targeting children under 12" defines advertising broadcast during a program that has audience ratings of least 50% among the "under 12" age group.
2. Do not communicate any products in primary schools, except for the case when the communication is specifically requested by, or mutually agreed with the school management, for educational purposes.

The Romanian Advertising Council (RAC) use to evaluate - upon request - by means of the Ethical Committees, any notifications signaling violations of this Code. The Organization decisions are submitted to both, the requesting party and the company promoting the product, the latter having the obligation to take amending measures for any ads violating the Code.

Even if this ethical rules still exist in Romania, subliminal and deceptive advertisement of foods remain an every day reality, which has some particularities. The irregularities which still persist in the Romanian advertising sector, are:¹⁰

- ads provides false information regarding the nature of the products;
- advertisement provides unfair information regarding the prices of the products;
- foods are assigned with properties that they do not possess;
- it persist a massive promotion for harmful food (carcinogenic food);
- they are used and promoted packages which may deceive the consumers, regarding the quantity and the nature of the product;
- the product labeling is incorrect and incomplete, because it do not specify the percentage of MDM, fat, sugar, salt, that the product contains;
- ads presented as especially healthy those foods that are carcinogenic in an accelerated rhythm;
- in the production processes the are still used a series of extremely dangerous food additives (for example, E121 - citrus red 2, E123 - amaranth, E131, E210, E211, E213, E239, prohibited substances in the developed countries market);
- food addiction is generated by introducing in their content a lot of taste enhancers;
- there is still promoted as being 100% natural food, those products which contain almost entirely synthetic substances;
- deceptive advertising is addressed to children and old, ill peoples.

Social-cognitive theories suggest a subtle and potentially far-reaching effect of food advertising on eating behaviors that may occur outside of the participants' intention or awareness.

Despite apparent use of subliminal techniques in different media, there is no evidence for effective subliminal persuasion in videos, advertising, radio messages and so on. Only the declining health of the consumers in recent years has been linked to television and especially to advertisement, directed both to adults and children. Television food advertising has attracted criticism for its potential role in promoting unhealthy dietary practices among children and adults too. Children consumed 45% more when exposed to food advertising. Adults consumed more of both - healthy and unhealthy snack foods - following exposure to snack food advertising, compared to the other conditions. In both experiments, food advertising increased consumption of the products.

It is concluded that changing the food advertising environment on children's TV to one where nutritious foods are promoted and junk foods are relatively unrepresented would help to normalize and reinforce healthy eating

Unhealthy lifestyles also damage the economy. We all know that a healthy and balanced diet combined with daily physical activity is positive for the human health and well being. Too much intake and especially too much fat, sugars and salt in our daily diet, together with a lot of additives, can lead to weight gain, cancer, heart disease, diabetes and so on. In the EU, over 200 million adults and 14 million children are overweight or obese. The number for children is predicted to rise more than 400,000 a year. If the current trends continue, two out of three Europeans will be overweight or obese by 2030. Finland, Germany, Greece, Cyprus, the Czech Republic, Slovakia and Malta now have overweight rates higher than the USA. Content analyses indicate that junk food advertising is prevalent on the most TV channels, while healthy eating is rarely promoted. Because Romania joined the Codex Alimentarius, in the next year's things will get worse in the field of advertising and promoting biological food. Natural food will disappear from the market and advertising for synthetic food will be more aggressive.

In a lot of states, through legislation have been introduced very severe forms to control the ads. The National Audiovisual Council of Romania (CNA) is the guarantor of the public interest with regards to the audiovisual (TV and radio) sector. CNA ensures that the public in general and children in particular, are protected from inappropriate or abusive TV and radio programmes, and ads. The aims of the National Authority for Consumers Protection (ANPC) are to carry out market surveillance for consumer products and services, to pursue the effective integration of the Community acquis in the area of consumer protection, to educate and inform consumers about their rights, to be the national contact point for the EU rapid alert system for dangerous consumer products (RAPEX) and to be the liaison office for the EC regulation on consumer protection cooperation, to co-operate and share information with other European public authorities on EU legislation enforcement.

Even in Romania there exist such institutions concerning with the consumer protection issues, outdoor advertising is controlled by local authorities, while the print media advertising is rarely controlled. The complexity of the issues relating to consumer protection of foods will increase in the future, due to the diversity of products and services offered by the businesses. Contemporary society has become increasingly dependent on the successful implementation of the quality function for each type of food. For this reason, an increasing attention should be given to this function from both sides - the state and the businesses or consumers.

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GENETIC DIVERSITY IN *PRUNUS PERSICA* L (BATSCH) REPORTED FROM MALAKAND DIVISION, KHYBER PAKHTUNKHWA, PAKISTAN

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Abstract

A total of 20 genotypes were collected from unexplored area of Malakand division, NWFP, Pakistan and evaluated on the basis of morphological traits and SDS-PAGE. In morphological traits significant level of genetic diversity was observed in leaf size (29.46% CV), fruit weight (11.36% CV), flower color and flower shape. The data both on morphological traits and SDS-PAGE were analyzed through cluster analysis. In morphological traits (both qualitative and quantitative traits) it was evident that there was cluster analysis not sorted the collected germplasm into no consistence in the grouping of the cultivars and were inter-spread within clusters. Similarly, SDS-PAGE divide the collected cultivars into two main groups i.e. L₁ and L₂, however at linkage distance 2.4 tree was sub-divided into 2 clusters C₁ and C₂. C₁ sorted three cultivars: Ammy, Dogar, 7-No and 8-No and C₂ encircled cultivar 5-No only. On the other-hand L₂ is divided into 2 clusters (C₃ and C₄) at linkage distance 2.0; while C₃ sorted cultivar 5-No-sample and C₄ 5-No-China.

Keywords: Peaches Pakistani Cultivars, Biochemical Analysis, Cluster Analysis

INTRODUCTION

Peach (*Prunus persica*) is known as a species of *Prunus* native to China that bears an edible juicy fruit. The tree is deciduous in nature belonging to the subfamily *Prunoideae* of the family *Rosaceae*. It is classified with the almond in the subgenus *Amygdales* within the genus *Prunus*, distinguished from the other subgenera by the corrugated seed shell. The leaves are lanceolate, 7–15 cm long (3–6 in), 2–3 cm broad, pinnately veined. The flowers are produced in early spring before the leaves; they are solitary or paired, 2.5–3 cm diameter, pink, with five petals. The fruit has yellow or whitish flesh, a delicate aroma, and a skin that is either velvety (peaches) or smooth (nectarines) in different cultivars. The flesh is very delicate and easily bruised in some cultivars, but is fairly firm in some commercial varieties, especially when green. The single, large seed is red-brown, oval shaped, approximately 1.3–2 cm long, and a wood-like husk. The tree is small, and up to 15 ft tall (Huxley, 1992).

Peach (*Prunus persica*) is the most preferred species among the stone fruits and is temperate in nature. This species is a traditional crop of Northern area of Pakistan and occupies an area of 4543 hectares with the production of 48284 tones. Quetta, Kalat, Peshawar, Swat valley and certain parts of Kohistan hills are the main major growing areas of peach. It is considered to be very delicious and attractive in flavour and aroma (Annual report of ARI Tarnab, 2008). Peach plants grow very well in a fairly limited range, since they have a chilling requirement that tropical areas cannot satisfy, and they are not very cold-hardy. The trees themselves can usually tolerate temperatures ranging from –26°C to –30°C, although the following season's flower buds are usually killed at these temperatures, leading to no crop that summer. Flower bud starts rupturing between –15 °C and –25 °C depending on the cultivar (some are more cold-tolerant than others)

and the timing of the cold, with the buds becoming less cold tolerant in late winter. Certain cultivars are more tender and others can tolerate a few degrees colder. In addition, a lot of summer heat is required to mature the crop, with mean temperatures of the hottest month between 20 °C and 30 °C. The trees tend to flower fairly early in spring while the blooms often damaged or killed by freezes; typically, if temperatures drop below freezing point (−4°C), However, if the flowers are not fully open, they can tolerate a couple of degrees colder. (Szalay, *et al.*, 2000).

Genetic diversity as the germplasm of plants, animals, or other organisms containing useful characters of actual or potential values, especially when these characters provide the variation in genes and genotypes between and within species or populations (Cromwell *et al.*, 1999). According to Nisar (2008) a number of methods were applied for the estimation of genetic diversity in desirable traits for germplasms evaluation that includes morphological characterization, biochemical marker at protein (SDS PAGE) and DNA level. Among these different techniques Acrylamide gel electrophoresis in presence of sodium dodecyl sulfate has become one of the most widely used techniques, which separate and characterize proteins. Genetic diversity is our heritage its conservation and effective evaluation is the key point to deal with the scarcity of food and to develop elite genotypes/cultivars for future generation. Therefore an attempt was been made in the present study to evaluate the level of genetic diversity based morphological and biochemical marker (SDS-PAGE) in Peach germplasm from different agro-ecological zones of Pakistan. The aim of the study was to develop catalogue information for bio-technological treatment using advance level of molecular markers (RAPD, SCAR, SSR markers). The present report well is helpful for the plant breeder to develop different combination for selection of desirable traits.

Materials and Methods Plant Materials

A total of 20 genotypes of *Prunus persica* L (Batsch) were collected during 2008-2009, from different zones of Malakand division, NWFP, Pakistan. The collected germplasm was evaluated on the basis of morphological traits and SDS-PAGE analysis.

Morphological Traits

Morphological traits were further divided into qualitative and quantitative traits. Qualitative traits were scored through general visualization. A total of nine qualitative traits: flower color, flower type, selected plant size, leaf color, leaf type, leaf venation, fruit color, fruit type, fruit shape and disease status of the plant were studied at the relevant stage of development in the available germplasm. Likewise, quantitative traits were recorded for leaf size (cm), flower size (cm), weight of fruit⁻¹ and fruits⁻¹⁰.

SDS-PAGE Analysis

The collected germplasm was also evaluated using SDS-PAGE, to explore the genetic diversity based on protein profile. For SDS-PAGE analysis, seeds of each genotype were crushed into a fine powder with mortar and pestle. Protein extraction buffer (400 µl) was added to 0.01g of seed flour and mixed well with Automatic Lab-Mixer DH-10. The extraction buffer contained the following final concentrations: 0.5M Tris HCl (pH 6.8), 2.5% SDS, 10% glycerol and 5% 2-mercaptoethanol. Bromophenol blue (BPB) was added to the protein extraction buffer as tracking dye to watch the movement of protein in the gel. The molecular weight of the dissociation polypeptides was determined by using molecular weight protein marker MW-SDS-70 Kit (Sigma). The SDS-PAGE of total seed protein was carried out in the discontinuous buffer system following to the method outline of Laemmli, (1970). Acrylamid gel concentration 12.5% and 6 µl of sample were used for analyzing germplasm. After staining and de-staining, the gel was dried using (Atto, Rapidery-Mini Japan) gel drier. In order to check the reproducibility of the method two separate gels were run under similar electrophoretic conditions.

DATA ANALYSIS

Morphological data were analyzed for descriptive statistics, coefficient of variation and correlation was calculated to depict genetic diversity of indigenous germplasm for these traits. Each band in case of SDS-PAGE was treated as a unit character and were scored as preset (1) or absent (0) for each of the band-genotype combination in a binary matrix. Estimates of genetic similarity were calculated between all pairs of genotypes according to Sneath and Sokal (1973). The similarity matrix thus generated was used to assess genetic relationship among the genotypes with a cluster analysis using unweighted pair-group method with arithmetic average (UPGMA). All computation was carried using the computer program STAISTICA vir-2.0.

RESULTS

Morphological Traits Analysis

Varying degree of genetic polymorphism was observed in qualitative traits. A total of six traits were recorded in collected germplasm. Out of which, seven alleles were responsible for fruit color and four for fruit shape. Similarly, three alleles each were scored for flower color, leaf color and fruit test, while two alleles scored for flower type (Fig 1). In the collected cultivars Simple-#-6 were large fruit size; Suhani and Golden completely round shape fruit; Ever-Fruit palm shaped fruit; while all other cultivars were normal in fruit size. Out of cultivar 2nd Arhy, Disi-(Wild), Jetty and Baber all the remaining were tasteful (Fig 1).

Significant level of genetic variation was calculated in leaf size (29.46%) and fruit weight (11.36%), while flower size and fruit weight¹⁰ showed low level of CV% (Table 1). Correlation is the statistical relationship between two or more random variables or observed data. In the present study 4 quantitative traits were computed for traits correlation. It was found that fruit weight¹ highly significantly positive (p-value < 0.01) correlated with flower size only and fruit weight¹⁰ with flower color, leaf size and fruit weight (Table 2)

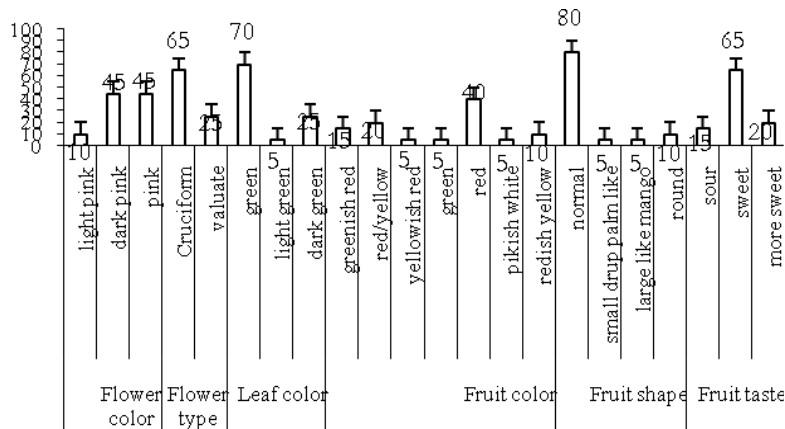


Fig 1 Qualitative traits alleles distribution among 20 different genotypes of peaches cultivars collected from Malakand Agency, NWFP, Pakistan

Table 1: Descriptive Statistics of Four Quantitative Traits in Peaches Reported from Pakistan

	Mean± St EE	St. Dev	Range	CV%

Traits			Minimum	Maximum	
Flower Size	3.26±0.05	0.24	2.80	3.73	7.38
Leaf Size	11.59±0.76	3.41	6.25	21.00	29.46**
Fruit weight	97.50±2.48	11.08	54.33	108.50	11.36**
Fruit weight/10	967.90±17.76	79.44	672.67	1034.00	8.21
Standard Error - St EE: Standard Deviation - St. Dev: CV – Coefficient of Variation					

Table 2: Correlation Coefficient in Four Quantitative Traits in 20 Different Genotypes of Peaches Collected from Different parts of Pakistan

S.No	Quantitative traits	Flower Size	Leaf Size	Fruit weight	Fruit weight/10
1	Flower Size	1			
2	Leaf Size	0.13	1		
3	Fruit weight	0.43**	0.36*	1	
4	Fruit weight/10	0.57**	0.50**	0.85**	1

** - highly significantly correlated with p-value < 0.01; * - significantly correlated with p-value < 0.05.

Cluster Analysis Based on Morphological Traits

Genetic similarity based on qualitative traits in local Peach germplasm was estimated through cluster analysis. The analysis sorted the total germplasm into two main Lineages i.e. Lineage-I and Lineage-II at linkage distance 50. Likewise, at linkage distance 20, the total population was splits into three clusters. C-1 grouped six cultivars i.e. No.6-(Golden), No.7, No.6.69, No.5-(Suhani) and Baber. While C-2 grouped five cultivars i.e. No.8, Early-Green, No.5, No.4 and No.3-(Ary). Similarly, C-3 sorted 9 cultivars and subdivided into two clusters C-3a and C-3b. Sub cluster C-3a clustered cultivar No.4 and No.2-(Ary) and C-3b were grouped No.5-(Golden), No.5-(Basary), No.5-(China), Jetty, Everfruit and Disi-(Wild) (Fig 2).

Data scored on quantitative traits were also subjected to cluster analysis and divided the collected germplasm into Lineage-I and Lineage-II at linkage distance 0.12. While at linkage distance 0.03, the total population was split into four clusters. C-1 grouped seven cultivars: No.3, No.6-(Golden), No.5-(Basary), No.5-(China), No.6.69, No.5-(Suhani) and No.8. While C-2 sorted seven cultivars: No.6, Early-Green, No.5, No.4, No.4.5, No.5-(Dogar) and No.3-(Ary). Similarly, C-3 clustered 5 cultivars which were further divided into two sub clusters C-3a and C-3b. C-3a grouped Jetty, Baber and No.2-(Ary) and C-3b sorted Jetty, Ever-Fruit and Disi-(Wild) (Fig 3).

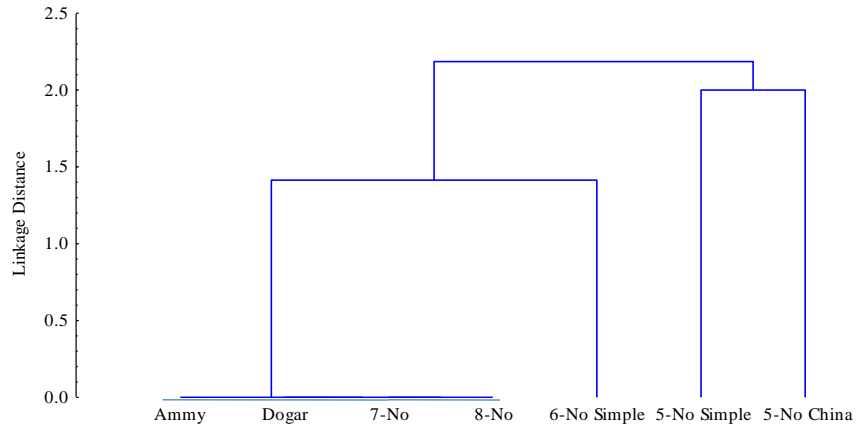


Fig 5 Cluster distributions of 7 genotypes of Peach collected from Malakand division

Table 3: Cluster Distribution of 7 Genotypes of Peach Collected from Malakand Division.

S/No	Cluster	Genotypes
1	C-1	Ammy, Dogar, 7-No, 8-No
2	C-2	6-No Simple
3	C-3	5-No Simple
4	C-4	5-No China

C- Cluster

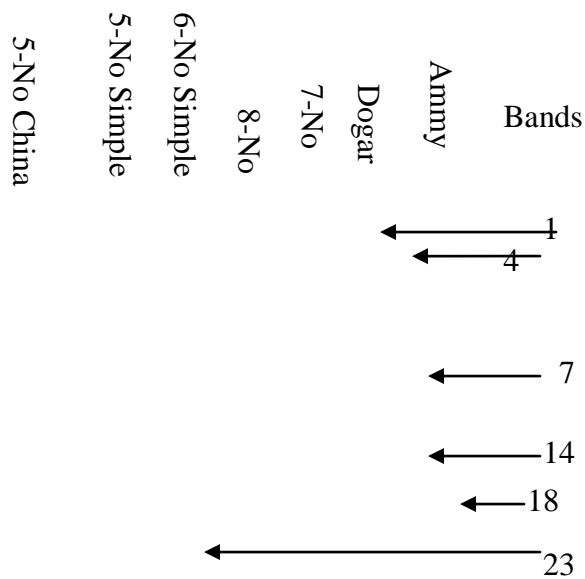


Fig: 4 Protein bands of 7 germplasm of Peach collected from Malakand division

The table 4 regarding to the allelic distribution reflected that cultivars 5-No-Simple and 5-No-China showed 83% alleles homology while No. 6-Simple, No. 8, No.7, Dogar and Ammy were 96% similarity.

Table 4: Allelic Distribution among 7 Germplasms Collected from Malakand Division

Bands #	No.50-China	No.5- (Simple)	No.6- (Simple)	No.8	No.7	Dogar	Ammy
B1	0	1	1	1	1	1	1
B2	0	1	1	1	1	1	1
B3	1	1	1	1	1	1	1
B4	0	0	1	1	1	1	1
B5	0	0	1	1	1	1	1
B6	1	1	1	1	1	1	1
B7	1	1	1	1	1	1	1
B8	1	1	1	1	1	1	1
B9	1	0	0	1	1	1	1
B10	1	1	1	1	1	1	1
B11	1	0	1	1	1	1	1
B12	1	1	1	1	1	1	1
B13	1	1	1	1	1	1	1
B14	1	1	1	0	0	0	0
B15	1	1	1	1	1	1	1
B16	1	1	1	1	1	1	1
B17	1	1	1	1	1	1	1
B18	1	1	1	1	1	1	1
B19	1	1	1	1	1	1	1
B20	1	1	1	1	1	1	1
B21	1	1	1	1	1	1	1
B22	1	1	1	1	1	1	1
B23	1	1	1	1	1	1	1
present allele	19	19	22	22	22	22	22
Absent allele	4	4	1	1	1	1	1
% similarities	83	83	96	96	96	96	96
Total variation	17	17	4	4	4	4	4

B- Band, 1- Presence, 0- Absence

DISCUSSION

Investigation on the extent of genetic diversity is vital to maintain, evaluate and utilize germplasm effectively. Germplasm is the main source used by the plant breeder to develop new cultivars, while characterization of germplasm determines the purity of cultivar (Barenger, 2004; Nisar *et al.*, 2008). Present study was planned to investigate the un-seen genetic potential of Pakistani peaches cultivars. It was investigated that flower color is found under the control of three different alleles as previously reported by Edward *et al.*, (1994), while the fruits were downy drupe and succulent with deeply furrowed. High level of diversity were found in fruit shape, among these the Cultivar-6 had large fruit like mango shape, Suhani and Golden completely round shape fruit like orange; Ever-fruit small drupe like *Prunus domestica* L., while the remaining are all large drupe. In general observation and comparative normal human taste the cultivar No-6, No-7, China-8, Arhay-3 are more tasteful; while Arhy-2, Disi (Wild), Jetty and Baber are with sour taste. The studied developed catalogue information based on morph-metric which is the first step for further study. It is suggested that physical, chemical and sensorial parameter is employed to explore the exact nature of the important germplasm (Infante *et al.*, 2008).

Highly diversity in the flowering season and shedding (Days to flowering) in different cultivars with reference to different locality was found. The duration between flowerings to shedding were found fix in all cultivars. In higher elevation zones (Meerabad-Shangla, Sakhra-Swat and Manja-Swat) the flowering season start one week later than then lower elevation zones of the selected area (higher temperature zones) like Abuha-Swat, Thana- Malakand, Chakdara and Ouch-Dir (Lower).

Cluster analysis based on qualitative traits sort the whole germplasm, with respect to allele's homology; with the exception of No.6, which grouped separately while cultivars Disi (wild), Ever-Fruit and Jetty on same clusters group. Peaches cultivars No.5 - (China), No.5-(Golden) and No.5-(Basary) were grouped in same cluster. Cultivars No. 2-(Ary), No.3 and No.4 are in same cluster, Cultivars No.3-(Ary), No.4.5, No.5-(Simple), Early-Green and No.8 were grouped in same cluster. Baber, No.5-(Suhani), No.6, No.6.69 and No.7 occur in same cluster. The clustered cultivars were similar because they have similar qualitative characteristics like flowering season, flower type, fruit size, fruit taste and fruit ripening season.

Cluster analysis based on quantitative traits sort the whole germplasm, with respect to alleles homology, with the exception of No.6.69 which grouped in separately. Cultivars No. 2 (Ary) and No. 3 were grouped in same cluster, cultivars No. 3(Ary), No. 4, No.4.5 and No.5 (Dogar), grouped in same cluster. Cultivars No.5, No.6 and No.7 occur in same cluster. Early-Green was found in separate cluster because of their unique characters that it is an early flowering and fruiting plant but have similar fruit to that of No.8. Peaches cultivars No.3, No.5 (China), No.5 (Golden), No.5 (Basary) and No.8 are found in same cluster while No.6 .69 found in separate cluster. These have same quantitative characteristics like flowering season, flower size, leaf size and fruit weight.

In correlation study, all the yield contributed traits were high significantly positively correlated which reflect the strength of the important germplasm reported from Pakistan. Disease which observed in Peach plant were shot hol, root rot, flat headed peach borer, powdery mildew, fruit fly disease and scale disease. It was found that early flowering plant was less susceptible to diseases as compare to the late flowering because of low temperature and less raining in the selected areas.

Genotypes evaluated for morphological traits were also tested through SDS-PAGE. Allelic distribution exhibit that cultivar 5-No-Simple and 5-No China were 83% alleles similar in protein profile. While cultivar No.6-Simple, No. 8, No.7, Dogar and Ammy were 96% similar in allelic distribution. Low level of genetic diversity was observed in the local peaches cultivar

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MAXIMIZATION OF PROFIT IN MANUFACTURING INDUSTRIES USING LINEAR PROGRAMMING TECHNIQUES: GEEPEE NIGERIA LIMITED

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Abstract

Any organization set up aims at maximization of profit from its investment from minimum cost of objective function. This research work applies the concept of revised simplex method; an aspect of linear programming to solving industrial problems with the aim of maximizing profit. The industry GEEPEE Nigeria Limited specialises in production of tanks of various types. Four different types of tank were sampled for study these are the Combo, Atlas, Rambo and Jumbo tanks of various sizes. Based on the analysis of the data collected it was observed that, given the amount of materials available Polyethylene (Rubber) and Oxy—acetylene (Gas) used in the production of the different sizes of the product, Combo tanks assures more objective value contribution and gives maximum profit at a given level of production capacity.

INTRODUCTION

Linear Programming is a subset of Mathematical Programming that is concerned with efficient allocation of limited resources to known activities with the objective of meeting a desired goal of maximization of profit or minimization of cost. In Statistics and Mathematics, Linear Programming (LP) is a technique for optimization of linear objective function, subject to linear equality and linear in equality constraint. Informally, linear programming determines the way to achieve the best outcome (such as maximum profit or lowest cost) in a given mathematical model and given some list of requirement as linear equation. Although there is a tendency to think that linear programming which is a subset of operations research has a recent development, but there is really nothing new about the idea of maximization of profit in any organization setting i.e. in a production company or manufacturing company. For centuries, highly skilled artisans have striven to formulate models that can assist manufacturing and production companies in maximizing their profit, that is why linear programming among other models in operations research has determine the way to achieve the best outcome (i.e. maximization of profit) in a given mathematical model and given some list of requirement represented as linear equations.

Linear programming can be applied to various fields of study. Most extensively, it is used in business and economic situation, but can also be utilized in some engineering problems. Some industries that use linear programming models include transportation, energy, telecommunications and production or manufacturing companies. To this extent, linear programming has proved useful in modelling diverse types of problems in planning, routing, scheduling assignment and design. David (1982), Nearing and Tucker (1993) noted operational research is a mathematical method developed to solve problems related to tactical and strategic operations. Its origins show its application in the decision-making process of business analysis, mainly regarding the best use for short funds. This shortage of funds is a characteristic of hyper-competitive environments. Although the practical application of a mathematical model is wide and

complex, it will provide a set of results that enable the elimination of a part of the subjectivism that exists in the decision-making process as to the choice of action alternatives (Bierman and Bonini, 1973).

Linear Programming deals with special mathematical problems by developing rules and relationships that aim at the distribution of limited funds under the restrictions imposed by either technological or practical aspects when an attribution decision has to be made (Andrade, 1990). Generally, Linear Program can be written in a canonical form for profit maximization as:

$$\text{Max (Z)} = \mathbf{C}^T \mathbf{X}$$

Subject to:

$$\mathbf{AX} \leq \mathbf{b}$$

From the model above, x represent the vector of variables (to be determined) while c and b are vectors of known matrix of coefficient. The expression to be maximized is called the objective function (\mathbf{C}^T in this case). The equation $\mathbf{AX} \leq \mathbf{b}$ is the constraint which specifies a convex polytope over which the objective function is to be optimised.

Linear Programming is a considerable field of optimization for several reasons. Many practical problems in operations problems in operations research can be expressed as linear programming problems. Certain special cases of linear programming such as network flow problems and multi commodity flow problems are considered important enough to have generated much research on specialised algorithm for their solution. Historically, ideas from linear programming have inspired many of the central concepts of optimization theory such as Duality, Decomposition and the importance of convexity and its generalizations. Standard form is the usual and most intuitive form of describing a linear programming problem. When the problem involves “ n ” decision-making variables and “ m ” restrictions, the model can be represented mathematically in the form of either maximization or minimization of the object function (Corrar and Teophilo, 2003), (Salau, 1998). For instance, for a maximization problem: it consists of the following three namely: A linear function to be maximized:

$$\text{Max(Z)} = \mathbf{C}_1\mathbf{X}_1 + \mathbf{C}_2\mathbf{X}_2 + \mathbf{C}_3\mathbf{X}_3 + \dots + \mathbf{C}_n\mathbf{X}_n$$

Problem constraints of the form:

$$\mathbf{A}_{11}\mathbf{x}_1 + \mathbf{A}_{12}\mathbf{x}_2 + \mathbf{A}_{13}\mathbf{x}_3 + \dots + \mathbf{A}_{1n}\mathbf{x}_n (\leq \text{ or } \geq) \mathbf{b}_1$$

$$\mathbf{A}_{21}\mathbf{x}_1 + \mathbf{A}_{22}\mathbf{x}_2 + \mathbf{A}_{23}\mathbf{x}_3 + \dots + \mathbf{A}_{2n}\mathbf{x}_n (\leq \text{ or } \geq) \mathbf{b}_2$$

$$\mathbf{A}_{m1}\mathbf{x}_1 + \mathbf{A}_{m2}\mathbf{x}_2 + \mathbf{A}_{m3}\mathbf{x}_3 + \dots + \mathbf{A}_{mn}\mathbf{x}_n (\leq \text{ or } \geq) \mathbf{b}_m$$

Non negativity variables:

$$\mathbf{x}_1, \mathbf{x}_2, \mathbf{x}_3, \mathbf{x}_4 \geq 0$$

PURPOSE OF THE STUDY

The main purpose of this study is to critically examine at least four of the products produced in GeePee Nigeria Limited. To effectively estimate which of these products must be given more attention or produced more in other to maximize profit. In the course of this study, linear programming technique will be used to make the best possible use of the total available productive resources of GeePee Nigeria Limited (such as time, material, labours) etc. In the same vein, in a production industry like GeePee Nigeria Limited bottlenecks may occur. For example in the factory, a product may be in great demand while others may lie idle. As such, this research work is aimed at highlighting such bottlenecks i.e. identifying the product that must be produced more in other to maximize profit in GeePee Nigeria Limited.

Moreso, this research work will assist the management of GeePee Nigeria Limited to make valid decision with the technique of linear programming used in this research work so as to make an objective decision for reduction in wastage of resources like time, money, materials etc. may be avoided.

LITERATURE REVIEW

Linear Programming was developed as a discipline in the 1940's, motivated initially by the need to solve complex planning problems in war time operations. Its development accelerated rapidly in the post war periods as many industries found its valuable uses for linear programming. The founders of the subject are generally regarded as George B. Dantzig, who devised the simplex method in 1947, and John Von Neumann, who establish the theory of duality that same year. The noble price in economics was awarded in 1975 to the mathematician Leonid Kantorovich (USSR) and the economist Tjalling Koopmas (USA) for their contribution to the theory of optimal allocation of resources, in which linear programming played a key role. Many industries use linear programming as a standard tool, e.g. to allocate a finite set of resources in an optimal way. Example of important application areas include Airline crew scheduling, shipping or telecommunication networks, oil refining and blending, stock and bond portfolio selection.

The problem of solving a system of linear inequality also dates back as far as Fourier Joseph (1768 – 1830) who was a Mathematician, Physicist and Historian, after which the method of Fourier – Motzkin elimination is named. Linear programming arose a mathematical model developed during the Second World War to plan expenditure and returns in other to reduce cost to the army and increase losses to the enemy. It was kept secret for years until 1947 whn many industries found its use in their daily planning. The linear programming problem was first shown to be solvable in polynomial time by Leonid Khachiyan in 1979 but a large theo vertical and practical breakthrough in the field came in 1984 when Narendra Karmarkar (1957 – 2006) introduced a new interior point method for solving linear programming problems. A lot of applications was developed in Linear programming these includes: Lagrange in 1762 solves tractable optimization problems with simple equality constraint. In 1820, Gauss solved linear system of equations by what is now called Gaussian elimination method and in 1866, Whelhelm Jordan refined the method to finding least squared error as a measure of goodness-of-fit. Now it is referred to as Gauss-Jordan method. Linear programming has proven to be an extremely powerful tool, both in modelling real-world problems and as a widely applicable mathematical theory. However, many interesting optimization problems are non linear. The studies of such problems involve a diverse blend of linear Algebra, multivariate calculus, numerical analysis and computing techniques.

The simplex method which is used to solve linear programming was developed by George B. Dantzig in 1947 as a product of his research work during World War II when he was working in the Pentagon with the Mil. Most linear programming problems are solved with this method. He extended his research work to solving problems of planning or scheduling dynamically overtime, particularly planning dynamically under uncertainty. Concentrating on the development and application of specific operations research techniques to determine the optimal choice among several courses of action, including the evaluation of specific numerical values (if required), we need to construct (or formulate) mathematical model (Hiller et al, 1995) (ADAMS,1969), (DANTZIG,1963) .

Conclusively, the development of linear programming has been ranked among the most important scientific advances of the mid-20th century, and its assessment is generally accepted. Its impact since 1950 has been extra ordinary. Today it is the standard tool that has saved thousand or million of dollars of many production companies.

METHODOLOGY AND DATA ANALYSIS

The method to be adopted is the Revised Simplex Method for standard maximization problem. In order to use the method the following procedure is necessary:

- Introduction of slack or surplus variable if need be and bring the problem into standard form after converting the problem into maximization or minimization.
- Find an initial basic feasible solution with initial basic $B = I_m$ (identity matrix) and form auxiliary matrix B such that:

$$B = \begin{bmatrix} B & \mathbf{0} \\ -C_B & I \end{bmatrix} \text{ and } B^{-1} = \begin{bmatrix} B^{-1} & \mathbf{0} \\ C_{BB}^{-1} & I \end{bmatrix}$$

- Considering the objective function as an additional constraint, form A and b such that:

$$A = \begin{bmatrix} A \\ -C \end{bmatrix} \text{ and } b = \begin{bmatrix} b \\ \mathbf{0} \end{bmatrix}$$

- Compute the net evaluation:

$$Z_j - C_j = (C_{BB}^{-1} I) \cdot A$$

It should be noted that:

- If all $Z_j - C_j \geq 0$, the current basic solution is an optimum solution.
- If at least one $Z_j - C_j < 0$, determine the most negative, say $Z_k - C_k$ corresponding to variables X_k enters the basis.
- Compute $X_k = C_{curr}^{-1} \cdot a_k$, also the solution is unbounded if $X_k \leq 0$ and if at least one $X_k \leq 0$, consider the X_n and determine the leaving variable.
- Write down the result obtained from steps 2 and 5 above in a revised simplex table.
- Convert the leaving element to unity and all other element of the column k to zero and improve the current basic feasible solution.
- Go to step 4 and repeat the procedure until an optimum basic feasible solution is obtained or an indication of an unbounded solution.

For the purpose of this research work the bye product of GEEPEE Nigeria Limited were used.

Table 1: There are Four Products Produced in the Company, as Follows

NAME OF TANK	LITRES	GALLON	HEIGHT (mm)	CODE
COMBO	46000	10000	2600	2XWT
ATLAS	32000	7000	2900	2XWT
RAMBO	23000	5100	2600	WT23
JUMBO	16000	3500	1900	WT160C

Source: Field Survey October, 2010.

Table 2: The Data Collected were as Follows

NAME OF TANK	MATERIAL POLYETHYLENE (kg)	TIME (Min)	OXYACETYLENE (kg)	PROFIT (DOLLAR)
COMBO	14	6	20	60
ATLAS	12	4	15	45
RAMBO	12	3	15	30
JUMBO	10	3	12	27
MATERIALS AVAILABLE	97	42	100	

Source: Field Survey October, 2010.

The Linear Programming model is formulated as:

$$\text{Max (Z)} = 60x_1 + 45x_2 + 30x_3 + 27x_4$$

Subject to:

$$14x_1 + 12x_2 + 12x_3 + 10x_4 \leq 97$$

$$6x_1 + 4x_2 + 3x_3 + 3x_4 \leq 42$$

$$20x_1 + 15x_2 + 15x_3 + 12x_4 \leq 100$$

$$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0, x_4 \geq 0 \text{ for all non-negativity condition.}$$

By introducing the slack variable in the objective functions above we have:

$$\text{Max (Z)} = 60x_1 + 45x_2 + 30x_3 + 27x_4 + 0S_1 + 0S_2 + 0S_3$$

Subject to:

$$14x_1 + 12x_2 + 12x_3 + 10x_4 + 0S_1 + 0S_2 + 0S_3 = 97$$

$$6x_1 + 4x_2 + 3x_3 + 3x_4 + 0S_1 + 0S_2 + 0S_3 = 42$$

$$20x_1 + 15x_2 + 15x_3 + 12x_4 + 0S_1 + 0S_2 + 0S_3 = 100$$

For non negativity condition:

$$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0, x_4 \geq 0, S_1 \geq 0, S_2 \geq 0, S_3 \geq 0$$

The augmented matrix is obtained as:

$$A = \begin{bmatrix} 14 & 12 & 12 & 10 & 1 & 0 & 0 \\ 6 & 4 & 3 & 3 & 0 & 1 & 0 \\ 20 & 15 & 15 & 12 & 0 & 0 & 1 \end{bmatrix}$$

$$B = \begin{bmatrix} 97 \\ 42 \\ 100 \end{bmatrix}$$

$$C = [60 \ 45 \ 30 \ 27 \ 0 \ 0 \ 0]$$

$$C_b = [0 \ 0 \ 0 \ 1]$$

$$B_{curr}^{-1} = \begin{bmatrix} C_B & 0 \\ C_{BB}^{-1} & 1 \end{bmatrix}$$

$$B_{curr}^{-1} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$A = \begin{bmatrix} 14 & 12 & 12 & 10 & 1 & 0 & 0 \\ 6 & 4 & 3 & 3 & 0 & 1 & 0 \\ 20 & 15 & 15 & 12 & 0 & 0 & 1 \\ -60 & -45 & -30 & -27 & 0 & 0 & 0 \end{bmatrix}$$

$$B = \begin{bmatrix} \mathbf{b} \\ \mathbf{0} \end{bmatrix}$$

$$B = \begin{bmatrix} 97 \\ 42 \\ 100 \\ 0 \end{bmatrix}$$

To obtain the net evaluation ($Z_j - C_j$) we have:

$$Z_j - C_j = (C_{BB}^{-1} I) \cdot A$$

$$= \begin{bmatrix} 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 14 & 12 & 12 & 10 & 1 & 0 & 0 \\ 6 & 4 & 3 & 3 & 0 & 1 & 0 \\ 20 & 15 & 15 & 12 & 0 & 0 & 1 \\ -60 & -45 & -30 & -27 & 0 & 0 & 0 \end{bmatrix}$$

$$= [-60 \ -45 \ -30 \ -27 \ 0 \ 0 \ 0]$$

In the net evaluation of $Z_j - C_j$ is the highest negative, then x_1 enters the bases so that:

$$X_1 = B_{curr}^{-1} \cdot b$$

$$X_b = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 97 \\ 42 \\ 100 \\ 0 \end{bmatrix}$$

$$X_b = \begin{bmatrix} 97 \\ 42 \\ 100 \\ 0 \end{bmatrix}$$

Table 3: To Draw the Revised Simplex Tableau we have:

X	X_b	B_{curr}^{-1}	X_1	Ratio
S_1	97	$\begin{bmatrix} 1 & 0 & 0 & 0 \end{bmatrix}$	14	6.929
S_2	42	$\begin{bmatrix} 0 & 1 & 0 & 0 \end{bmatrix}$	6	7
S_3	100	$\begin{bmatrix} 0 & 0 & 1 & 0 \end{bmatrix}$	20	5
Z	0	$\begin{bmatrix} 0 & 0 & 0 & 1 \end{bmatrix}$	-60	0

1st Iteration

Converting the leading element to unity and all other, element to zero, we have:

$$R'_2 \rightarrow \left(\frac{1}{20}R_2\right) \text{ this becomes}$$

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 14 \\ 6 \\ 1 \\ -60 \end{bmatrix} = R'_2$$

To obtain the next net valuation $Z_j - C_j$ we have:

$$Z_j - C_j = [0 \ 0 \ 3 \ 1] \begin{bmatrix} 14 & 12 & 12 & 10 & 1 & 0 & 0 \\ 6 & 4 & 3 & 3 & 0 & 1 & 0 \\ 20 & 15 & 15 & 12 & 0 & 0 & 1 \\ -60 & -45 & -30 & -27 & 0 & 0 & 0 \end{bmatrix}$$

$$Z_2 - C_2 = [\ 0 \ 0 \ 15 \ 9 \ 0 \ 0 \ 3]$$

Since $Z_j - C_j \geq 0$, i.e. there is non-negative value in the net evaluation, the current feasible solution is optimum. Hence;

$$X_b = B_{curr}^{-1} \cdot b$$

$$X_b = \begin{bmatrix} 1 & 0 & \frac{-7}{10} & 0 \\ 0 & 1 & \frac{-7}{10} & 0 \\ 0 & 0 & \frac{1}{20} & 0 \\ 0 & 0 & 3 & 1 \end{bmatrix} \begin{bmatrix} 97 \\ 42 \\ 100 \\ 0 \end{bmatrix}$$

$$X_b = \begin{bmatrix} 27 \\ -28 \\ 5 \\ 300 \end{bmatrix}$$

Finally $X_1 = 5$; $Z = 300$

CONCLUSION

The data collected from the industry on four types of Tanks produced, namely Combo, Atlas, Rambo and Jumbo was subjected to statistical analysis using the Revised Simplex Method. It was observed that if GEEPEE NIGERIA LIMITED can produce five units of Combo Tanks with an objective Coefficient of Sixty Dollars, it will give an objective value contribution of Three Hundred Dollars.

To this extent and based on the model formulated, and the analysis carried out that the amount of polyethylene and oxyacetylene used in the production of different sizes of plastic material produced with the allotted time attached to each product; Combo Tanks (of height 2,600mm, containing 4,600 litres i.e. 10,200 gallons of liquid) assures a profit margin of three hundred dollars if the quantity produced stood at 5 within the specified period of time.

RECOMMENDATIION

After it has been established in the course of this research work that among other products, Combo Tanks assures more profit in GEEPEE NIGERIA LIMITED. We thereby recommend that: The management of GEEPEEE NIGERIA LIMITED should give more attention to the production of the product (Combo) than other products because it seems to give the highest profit.

In the same vein, critical examination should be carried out on other products on their contribution to the growth or success of the company, if their profit margin is very low, then their production can be ignored. Finally, any product having an adverse effect or contributing losses to the profit margin of the company can be stopped and the company invest more on the production of Combo to generate more profit.

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ALLELOPATHIC EFFECTS OF RHAZYA STRICTA DECNE ON SEED GERMINATION AND SEEDLING GROWTH OF PENNISETUM TYPHOIDES

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Abstract

Rhazya stricta Decne. an evergreen poisonous shrub of the Apocynaceae family locally known as Ganderi, is a wild plant widely distributed in the hilly area of District Karak Pakistan and comparable habitats throughout the world. This study was design to investigate the allelopathic potential of *R. stricta* stem and leaves on *Pennisetum typhoides*. Results showed that 10g aqueous extracts of leaves and 48 hours treatment present inhibitory effect on germination percentage, radical length and seminal root number and the effect was found significantly higher than that recorded in the stem and control treatment. The inhibitory effects were increased proportionally with the extract concentration and treatment duration. These findings indicate that *P. typhoides* sown in fields which had leaf and stem litter of *R. stricta* will be adversely affected regarding germination, growth and ultimately resulting in lower yields of *P. typhoides*.

Keywords: Allelopathy, Aqueous Leaf Extract, Aqueous Stem Extract, *Rhazya stricta*.

INTRODUCTION

Plants live in association in groups depending upon the ecological requirements; they have generally the same structural and morphological adaptations. Whenever two or more plants occupy the same niche in nature, they compete with each other for various life support requirements (Caton *et al.*, 1999). Rice in 1984, defined allelopathy as the effects of one plant (including microorganisms) on another plant via the release of chemicals into the environments. Allelopathy regards these effects due to chemicals released by them, or the breakdown products of their metabolites (Willis, 1994). Allelopathy has been suggested as a mechanism for the impressive success of invasive plants by establishing virtual monoculture and may contribute to the ability of particular exotic species to become dominants in invaded plant communities (Hierro, 2003; Kanchan and Jayachandra, 1979). Allelopathy is expected to be an important mechanism in the plant invasion process because the lack of co-evolved tolerance of resistant vegetation to new chemicals produced by the invader. This phenomenon could allow the new introduced species to overlook natural plant communities (Hierro, 2003). In fact, allelopathic interference is one of the important mechanisms for the successful establishment of invasive exotic weeds (Ridenour & Callaway, 2001).

Rhazya stricta Decne., an evergreen poisonous shrub, has covered large hilly areas of District Karak. Pakistan. *Rhazya stricta* like other weeds compete with the main crops for nutrients and other resources and hamper the healthy growth ultimately, reducing the yield both qualitatively and quantitatively. Ahmad *et al.*, 1983 and Al-Yahya *et al.*, 1990 have reported the presences of alkaloids, glycosides, triterpenes, tannins and volatile bases in the leaves of this plant. To explore allelopathic potential of *R. stricta* we examined effect of aqueous extract of leaves and

stem of this plant on seed germination and seedling growth of *P. typhoides* specie growing naturally together with *R. stricta*.

MATERIALS AND METHODS

Collection of plant materials

Plants of *R. stricta* was collected from District Karak, Khyber Pakhtonkhwa, Pakistan. Plants tissues were washed several time with water and dried in open air and under natural light. Leaf and stem samples were grounded and the powdered material were stored in plastic bottles at room temperature.

Preparation of aqueous extract

Five and ten gram of air dried leaves and stem of *R. stricta* were grounded, mixed with 100 ml distilled water and left for 24 hr at the room temperature (average during day: 25°C) in dark conditions . Aqueous extract was obtained as filtrate of the mixture and final volume was adjusted to 100 ml; this gave 5 and 10g aqueous extract. The extract was considered as stock solution.

TREATMENTS AND EXPERIMENTAL DESIGN

Ten uniform and surface sterilized seeds (2% sodium hypochlorite for 15 min) of *P. typhoides* were kept for germination in sterilized petri-dishes lined double with blotting paper and moistened with 10 mL of 5 and 10g concentrations of aqueous extracts. Each treatment had five replicates (total number of test seeds: 10 x 5 = 50). One treatment was run as control with distilled water only. The petri-dishes were maintained under laboratory conditions (room temperature 25°C at mid day, and diffused light during day). The whole experiment was repeated once.

PHYSICAL PARAMETERS

After seven days, the seedling root length (cm), shoot length (cm) were measured while number of germinated seeds and seminal root number were counted.

STATISTICAL ANALYSIS

The data obtained was subjected to three way analysis of variance, Randomized Complete Block Design (RCBD) and the mean values were separated at $P < 0.05$ applying Least Significant Difference Test (LSD).

RESULTS

Table. 1. Allelopathetic Effects of *R. stricta* on Germination Counts of *P. typhoides*

Duration	24hr		48hr		Means
	5g	10g	5g	10g	
Control	100	100	100	100	100
Leave	80	62+	78	84	76*
Stem	78	90	96	68	83
	86	84	91.33	84	
	85		87.66		

Three way ANOVA (RCBD) (df 1, 44) showed significant effects of leaves ($F=24.7483$, $P < 0.05$) on germination. Comparison of extracts, duration and concentration showed significant effects of 10g concentration of leaves in 24hr treatment ($F= 10.6142$, $P < 0.05$). (Table. 1).

Table. 2. Allelopathetic Effects of *R. stricta* on Plumule Length Counts of *P. typhoides*.

Duration	24hr		48hr		Means			
	5g	10g	5g	10g	M1	M2	M3	M4
Control	51.24	51.24	51.24	51.24	51.24	51.24		
Leave	18.12	5.44+	24.42	12.42	15.1*	11.78+		8.93+
Stem	44.42	47.52	43.52	19.90	51.79	45.97		
M5	37.92	34.73	39.73	27.85+			31.29*	
	36.32		33.79					

M1= Mean of each extract (5 & 10g), M2= Mean of 24h of 5g+10g Leaves extract, M3= Mean of 10g in 24 & 48hr, M4= Mean of 10g leaves extract in 24 & 48hr, M5= Mean of 10g in 48hr.

Three way ANOVA (RCBD) (df 1, 44) showed significant effects of leaves (F=239.0506, P< 0.05), and 10g concentration (F= 30.1707, P< 0.05) on Plumule length. Comparison of extract (Stem and leave of *R. stricta*) and duration (F=20.2093, P< 0.05) and extracts and concentration (F= 7.7343, P< 0.05) showed significant effect of 24 hr treatment and 10 gram concentration of leaves extract respectively. In comparison of concentration and duration 10g concentration in 48hr showed significant effect (F= 10.0136, P> 0.05) and comparison of extracts, duration and concentration showed significant effects of 10g concentration of leaves extract in 24hr treatment (F= 10.8186, P< 0.05). (Table. 2).

Table. 3. Allelopathetic Effects of *R. stricta* on Radical Length Counts of *P. typhoides*.

Duration	24hr		48hr		Means
	5g	10g	5g	10g	
Control	80.08	80.08	80.08	80.08	80.08
Leaf	4.29	2.27+	6.68	4.08	4.33*
Stem	28.96	36.97	36.13	3.84	26.47
	37.77	39.77	40.96	29.33+	
	38.77		35.14		

Three way ANOVA (RCBD) (df 1, 44) showed significant effects of leaves (F=204.7997, P< 0.05) on radical length. Comparison of duration and concentration (F= 4.7034, P< 0.05) showed significant effect of 48 hr treatment and 10 gram concentration of extract. Comparison of extracts, duration and concentration showed significant effects of 10g concentration of leaves in 24 hr treatment (F= 4.5068, P< 0.05). (Table 3).

Table. 4. Allelopathetic Effects of *R. stricta* on Root Number Counts of *P. typhoides*.

Duration	24hr		48hr		Means	
	5g	10g	5g	10g	M1	M2
Control	2.52	2.52	2.52	2.52	2.52	2.52
Leave	0.80	0.62	0.78 *	0.84	0.76	0.71+
Stem	1.74	1.62	0.96	0.68	1.25	1.68

1.69	1.59	1.42	1.35
1.64		1.38 *	

M1= Mean of each extract (5 & 10g), M2= Mean of 5g & 10g in 24h.

Three way ANOVA (RCBD) (df 1, 44) showed significant effects of leaves (F=400.9321, P< 0.05) and 48h treatment (F= 23.3889, P< 0.05) on seminal root number. Comparison of extract and duration showed significant effects of leaves extract in 24 hr treatment (F=33.8362, P< 0.05) (Table. 4).

DISCUSSION

In the present study allelopathic effects of *R. stricta* was observed on germination and seedling growth of Bajra. From preliminary screening it was found that leaf and stem extract had the strongest allelopathic effect on seed germination. The study demonstrated that leaves aqueous extracts of *R. stricta* exhibited significant inhibitory effects on seed germination and seedling growth of test specie. This indicates the availability of the inhibitory chemicals in higher concentration in leaves than in stem. Tefera 2002 also reported that foliar leachates have been more phytotoxic in nature.

The present investigation revealed that aqueous extract of *R. stricta* at various concentration levels inhibited the germination percentage, radical length, Plumule length and seminal root numbers. The comparative analysis between germination percentage and extract concentration showed that 48h treatment of 10g leaves extract have produced more inhibitory effect on germination of *P. typhoides*. Its effectiveness on germination and growth suggests that leaves and stem of *R. stricta* may act as a source of allelochemicals after being released into soil or after decomposition that intern negatively affects the neighboring or successional plants. The observed different phytotoxicity of *R. stricta* may be attributed to the presence of variable amount of phytotoxic substances in different parts that leach out under natural conditions. Some recent studies indicating the phytotoxic/ allelopathic effect of aqueous extracts of weeds include *Parthenium hysterophorus* (Singh *et al.*, 2003), *Brassica nigra* (Tawaha and Turk, 2003), *Raphanus raphanistrum* (Norsworthy, 2003) and *Ageratum conyzoides* (Batish *et al.*, 2002). All these studies indicate the release of phototoxic chemicals during the preparation of aqueous extracts. Based on this, studies were further extended to explore the impact of *R. stricta* (especially) leaves, as they possessed greater phytotoxicity on the emergence and growth of weed plants.

CONCLUSIONS AND RECOMMENDATIONS

The present investigation revealed that aqueous extract of *R. stricta* at different concentration levels inhibited the germination percentage, radical length, Plumule length and seminal root number of *P. typhoides* seedlings. Its effectiveness on germination and growth suggests that leaves of *R. stricta* may act as a source of allelochemicals after being released into soil or after decomposition. The presence of allelochemicals negatively affects the neighboring or successional plants. There is a need to provide information to farmers about *R. stricta* and their allelopathic effects. Further studies are suggested to clarify the possible physiological mechanism related to allelopathic effect on plants.

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SYSTEMIC CORRUPTION IN NIGERIA: A THREAT TO SUSTAINABLE DEVELOPMENT

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Abstract

It is not exaggeration of the tragic events of the country since independence, to say that all efforts to establish a just and efficient administration have been frustrated by corruption. The evil exists in every facet of our society. You bribe to get your child into a school, you pay to secure a job and you also continue to pay in some cases to retain it. Corruption is an act which deviates from the formal rules of conduct governing the actions of some one in a position of public authority because of private regarding motives such as wealth, power or status. Sustainable development in human society is not a one sided process rather multi-sided issues; individuals perceive development as increase in the skill and ability, it is viewed as maximum freedom, the ability to create responsibility. This paper tries to look at the issues affecting sustainable development in Nigeria. The author viewed the concept of corruption, the causes as well as the effects of corruption on the economy.

Keywords: Corruption, Sustainable Development

INTRODUCTION

Nigeria is a typical of a country in Africa whose development has been undermined and retrain by the menace of corrupt practices. Without doubt, corruption has permeated the Nigerian society and in the words of Achebe any one who can say that corruption in Nigeria has not yet been alarming is either a fool; a crook or else does not live in this country. The situation has become bad to the extent that as far back 1993, keeping an average Nigeria from being corrupt and a goat from eating yam (Achebe, 1988). It is not exaggeration of the tragic events of the country since independence, to say that all efforts to establish a just and efficient administration have been frustrated by corruption. The evil exists in every facet of our society. You bribe to get your child into a school, you pay to secure a job and you also continue to pay in some cases to retain it. You pay 10 percent of every contract obtained, you dash the tax officer to avoid paying taxes, you pay the hospital doctor and nurse to get proper attention, and you pay the policemen to evade arrest, this catalogue of shame can continue with an end (Tokunbo, 1972).

The prevalence of these activities in various aspects of our lives has a tremendous adverse effect on the quality of life of this country, our living standards and national psyche. Corruption brings a nation no good. The resources meant for water supply, roads, education, health and other basic and social services that are captured and stolen by a handful of Nigerians through corrupt acts stultify economic and social development hence creeping poverty all over the place. It is saddening when a certain Australian national can come to our shores and say he was prevailed upon by his Nigerian principals then in government to inflate a contract by the pricey sum of N5.5bn amounts to the highest form of disservice to our country and portrays us as a people who hold down the horns of our parents cow for others to milk (Ekwueru & Daminabo, 2008). What a colossal loss that could have been meaningfully utilized for developmental purposes. In addition to distorting the market place, weakening the economy, encouraging capital

flight and discouraging foreign investment corruption undermines our democracy and promotes mediocrity and bad policies made by bad representatives. These translate to compromise of good governance and extol criminal enterprise in our society as well as being responsible for failed projects for which Nigerian is notorious.

CONCEPTUAL FRAMEWORK

Like most concepts in the social science, corruption does not have a single-allagreeable definition, Ofoeze (2004:20) sees corruption as referring to “any action or inaction of any person, or group (public or private) deliberately perpetrated to secure advantages for oneself, a relation, associate or group(s) in a manner that detract from the accepted regulations, morals, and/or ethical standard or code and hence constituting a travesty of justice, equity and fair play”. Corruption is also seen as “effort to secure wealth or power through illegal means, private gain at public expense, or misuse of public power for private benefit” (Lipset & Lenz, 2000:112). The US Vice President Al Gore is of the view that corruption is a serious crime with devastating consequence. Speaking at the Global Forum of Fighting Corruption, he says it is “a cold vicious, often violent sacrifice of citizen security for a narrow, greedy, private, personal profit on the part of a crooked official” (Zhang 1996 in Tony, 2008:40). The ICPC Act (2000:25) saw corruption as a multi-faceted phenomenon that ranges from the giving and accepting of bribe to other kinds of fraudulent practices.

Corruption is an act which deviates from the formal rules of conduct governing the actions of some one in a position of public authority because of private regarding motives such as wealth, power or status (Khan, 1996). Black and Garner (2000) affirm corruption as an official or fiduciary person who unlawfully or wrongfully uses his station or character to procure some benefit for himself or for another person, contrary to duty and lights of others. The Act went further to posit that corruption covers any illegal use of power by any person(s) for personal or arbitrary purposes. On his part, Toyo (2006:2) posited that corruption “consist of depravity, venality or peculation in playing a social role”. According to him the act normally involves some kind of cover up or diversionary conduct such as falsification, hypocrisy, tyranny, or violence to men or property.

Besides operationalizing corruption, Toyo (2006:6) went further to pontificate that the concept is fostered by a particular economic system capitalism noted for its avaricious credo and emphasis on individualism. Consequently, he insists, Nigeria as a peripheral capitalist country cannot but be immersed in corruption. The logical implication of Toyo’s postulation is that the inequalities in socio-economic status which income of the higher and lower income earners in the country is an added impetus for corruption. Where most civil servants are paid starvation wages, as in Nigeria, it can also serve as a stimulus to bribe taking in order to keep up with the joneses. It is thus not surprising that in-spite of measures put in place to check-mate the scourge of corruption such as oath system for public official and the code of conduct statue enshrined in the 1999 constitution, corruption has continued unabated. Corruption occurs in many forms and it has contributed immensely to the poverty and misery of a large segment of the Nigerian population.

It is the misappropriation of government property or revenues made possible through government regulations (Braguinsky, 1996). Otite states that corruption is the perversion of integrity or state of affairs through bribery, favor or moral depravity. It takes place when two parties have interacted to change the structure or process of society or the behaviour of functionaries in order to produce dishonest, unfaithful or undefiled situations. Corruption transcends bribery but includes treasury looting and the deliberate bending of rules of the system

to favour friends or hurt foes. It is clearly an absence of accountability, law and order (Ottite, 2000).

SUSTAINABLE DEVELOPMENT

Sustainable development in human society is not a one sided process rather multi-sided issues; individuals perceive development as increase in the skill and ability, it is viewed as maximum freedom, the ability to create responsibility. Seer (1977), states that sustainable development involves capital accumulation and economic growth only but the condition in which people in a country have adequate food, job and income inequality among them is greatly reduced. It is the process of bringing fundamental and sustainable changes in the society. It encompasses growth and embraces the quality of life as social justice, equality of opportunity for all citizens, equitable distribution of income and the democratization of development processes. It is the capacity of members of the society to actualize them by participating actively in the social engineering of their destiny. It entails the ability of individuals to influence and manipulate the forces of nature for their enhancement and that of humanity. Economic, political or social development implies more changes in the technical and institutional arrangement by which it is produced. In spite of various concepts, sustainable development is a multi-dimensional and is basically about the process of changes around the spheres of societal life.

CORRUPTION

This paper employs a theoretical explanation of corruption in Nigeria education system. Corruption will be analyzed as “functionalist theory”. Functionalist approach sees corruption as emanating from the social structure of the society, which exerts a definite pressure upon certain individuals in the society to engage in non-conforming conduct. Merton (1957) puts it in another way when he asserts that a society in which there is an exceptionally strong emphasis upon specific goals without corresponding institutional procedures, will inevitably lead to what Durkheim called norm less or deviation. Each culture establishes goals and interests which members of society are encouraged to pursue and prescribes the method to be followed in seeking these approved objectives. It is when these means fail to match the goal of the individual in question that the individual becomes socially disorganized (Meitoba, 2000). As a matter of fact, the Nigerian society tends to over emphasize individual goal attainment at the expense of the legitimate means of achieving these set goals. In Nigeria, material acquisition has become the ultimate goal and the society does not appear to be concerned with how one “makes” it. All that is important is that one has “arrived”. The marked discrepancy between the goals and means in our society invariably leads to various forms of corruption such as embezzlement of public fund, offering and acceptance of bribe, electoral rigging, examination malpractice, drug abuse (Agbonifo, 1985).

Types, Nature and Characteristics of Corruption

Some researchers have taken a holistic (broader) approach in the discussion of corruption by dividing it into many forms and sub-divisions. These according to Taylor (2010) include;

Political corruption: This takes place at the highest levels of political authority. It occurs when the politicians and political decision-makers, who are entitled to formulate, establish, and implement the laws in the name of the people, are themselves corrupt. It also takes place when policy formulation and legislation is tailored to benefit politicians and legislators. (The Encyclopedia Americana 1999)

Bureaucratic corruption: This occurs in the public administration or the implementation end of politics. It is the kind of corruption the citizens encounter daily at places like the hospitals,

schools, local licensing office, police, the various ministries etc. Bureaucratic corruption occurs when one obtains a business from public sector through inappropriate procedure (NORAD; 2000 in Victor; 2008).

Electoral corruption: This includes buying of votes with money, promises of office special favours, coercion, intimidation, and Interference with freedom of election [A g example where this practice is common is Nigeria. Votes are bought, people killed or maim in the name of election, losers end up as the winners in elections, and votes turn up in area where votes were not cast) (The Encyclopedia Americana, 1999, the words in parenthesis are mine).

Other forms of corruption may include

Bribery: The payment (in money or kind) that is taken or given in a corrupt relationship. These include “kickbacks”, “gratuities”, “pay off”, “sweeteners”, “greasing palms scratching back” etc (Bayart et al 1997:11)

Fraud: This involves some kind of trickery, swindle and deceit counterfeiting, racketing, smuggling and forgery (Ibid).

Embezzlement: This is seen as the theft of public resources by public officials. It is when an official of the state steals from the public institution in which he/she is employed. In Nigeria the embezzlement of public fund is one of the most common ways of wealth accumulation, perhaps, due to lack of strict regulatory systems.

Extortion: This is money and other resources extracted by the use of coercion, violence, or threats to use force. It is often seen as extraction from below. (Bayart et al 1997:11) **Favoritism:** This is mechanism of power abuse implying a highly biased distribution of state resources. However, many see this as a natural human proclivity to favour friends, family, and anybody close and trusted.

Nepotism: This is a special sort of favoritism in which a public office holder prefers his/her kinfolk and family members. Nepotism occurs when one is exempted from the application of certain laws or regulations or given undue preference in the allocation of scarce resources (NORAD, Ch.1, Ch.2 Jan. 2000; Amundsen 1997 and Girling 1997).

Causes of Corruption

The causes of corruption are myriad; and they have both political and cultural variables. Some evijence points to a link between corruption and social diversity, ethno linguistic fractionalization, and the proportion of a country’s population adhering to different religious traditions (upset and Lenz, 2002). Studies, again has noted also that corruption is widespread in most non-democratic countries, and particularly, in countries that have been branded neo-patrimonial, Kieptocratic, and Prebendal (NORAD, 2000). Thus, the political system and the culture of a society could make the citizens more prone to corrupt activities. However, let us focus on the fundamental factors that engender corrupt practices in less developed nations, including Nigeria. Some of the factors are (i) The great inequality in the distribution of wealth (ii) political office as the primary means of gaining access to wealth; (iii) conflict between changing moral codes; (iv) the weakness of social and governmental enforcement mechanism; and (v) the absence of a strong sense of national community (Bryce 1921). The causes of corruption in Nigeria cannot deviate significantly, if at all, from the above factors. However, obsession with materialism, compulsion for a shortcut to affluence, glorification, and approbation (of ill-gotten wealth) by the general public are among the reasons for the persistence of corruption in Nigeria. (Ndiulor, March 17, 1999).

Effect of Corruption to National Development

The consequences of corruption on a nation's socio-political and economic development are myriad. The foremost effect of corruption is that it not only leads to a reduction in economic growth and development by lowering incentives to invest, it also leads to a divestment in such economies. Serious investors are always wary of offering bribes before being allowed investment rights or operational licenses. This is due to the fact that there is no guarantee that greased officials may keep their side of the agreement, and with no official cover the address in case of contract breach, the fleeced investor is on his own (Epele, 2006:11). Applied to the above is the fact that foreign investors are also prone to withdraw their capital from a country with high incidence of corruption because the risk involved in doing business such nations sometimes far outweighs the benefits. Granted that it has been argued that corruption provides both local and foreign investors the leverage to surmount bureaucratic impediments, yet the number of such successful deals is a far cry from the avalanche of investors that have stripped off their hard earned money. Corruption also alters the pattern of government expenditure. Experience has shown that in highly corrupt countries, officials through government funds more into large and hard-to-manage projects, such as airports or highways than on social services like health and education.

It has been a stumbling block to people enjoying the social fruits of good governance (Ibrahim, 2003).

Corruption contributes immensely to inhibition of economic performance; it negatively affects investment and economic growth, which is antithetical to national development. If corruption discourages investment, limits economic growth and alters the composition of government spending, it unconsciously hinders future economic growth and sustainable development (SelloTmam, 2004). Corruption contributes to the problem of mass poverty and rendered millions of Nigerian citizen's unemployed and uneducated. The poverty profile of Nigerians appears to be worsening. The UNDP Development Report 2001 places Nigeria at no 148 out of 173 countries surveyed. The situation worsens in 2003 report, which put Nigeria at 152 among the 175 countries covered in the 'It is truism that mass poverty has been a breeding ground for all forms of extremism in the frequent outbreak of ethno-religious violence in some parts of Nigeria (FRN, 2001 & Obadan, 2001)

In Nigeria, corruption led to decaying infrastructure, inadequate medical services, falling educational standards, mismanagement of foreign loans, bloated imported bills and public expenditure, reduces production capacity, distortion of the economy through waste and misallocation of resources in 2001, ..4 lost more than N23 billion to corruption (Salu & Aremu, 2004).

The Cross Road of Corruption

To arrest this tardiness, we must fall back to the society as a whole. This is because; the school exists as an agent of the larger social, economic and political context, which fosters them (Levin 1978:24). By implications schools correspond to the, institution of the larger society and serve the functions assigned to them for producing the social, economic and political relationship reflected by the prevailing institutions and ideologies. Implicit in this correspondence principle is what Enoh (2007:8) calls stimulus - response relationship. It cannot be doubted that education is the response to whatever stimulus it receives from the social, economic and political systems. Corruption is now a generated thing were the people who are in power leave seat of government for their relation teaching them the foot step, it has been legalized but we believe no mater how it has eaten deep into the soul of Nigeria, there is still hope lets not give up tomorrow is pregnant better Nigerians are taking the positions of authority and they are taking us to that place we have

always dreamt. Before we got to where we are now we were nothing after rain there is sun, not there cums day. Let us not loose faith it will only take time.

The argument here is not that educational change will not have some changes in the political and economic spheres. The truth remains that the changes occur rather subtly and slowly given that it operates through the mind whose transformation can then go to change these elements of society. When the defects of the elements of society, politics, economics and the social systems are approached directly rather than through the mediating role of education, a redounding effect on education would emerge.

CONCLUSION

The reality on ground that is that despite our experimentation with various political government institutions and anti corruption campaigns, none has succeeded in reducing let alone eliminate corruption from today's politics. Nigerian leaders and even followers have not paid any lip service the crusade to find a lasting solution to the service problem of corruption. It cannot be doubted that education is the response to whatever stimulus it receives from the social, economic and political systems, therefore it is obvious that you do not reform a response in order to bring about reforms in the stimulus. This implies that correspondence principle suggests that a given political, social or economic situation will automatically call for the educational system suitable to it. If this is the case and of course it is, all educational reforms are better off being affected through a natural response to whatever changes are going on in the social spheres.

RECOMMENDATIONS

1. Leadership must display transparency, honesty, probity, accountability, purposefulness and commitment to good ideals of the society before the followers will be convinced of the genuineness of such crusade.
2. The predilection for short cuts should be discouraged and made punishable
3. Family units must rise up to their primary responsibility of giving the first lessons in morality to their wards.
4. The moral fabric of the society should be strengthening through explicit examples of commitment, pragmatism, honesty, justice and fairness.
5. Reward system should be equitable enough where hard work should be adequately compensated and recognized in all facets of our national life.
6. A credible and effective system vigilance mechanism should be put in place.
7. Poverty and unemployment must be seriously tackled, we commend the efforts of federal government for introducing poverty alleviation programme especially for unemployed youths in Nigeria but still the ideals of the programme was defeated by greedy politicians who hijacked it for their kits and kinsmen. Nigerians should avoid being used as perpetrators of corruption, instead be on the vanguard against this ugly trends, it is a battle to be fought by all and with the resources of all so that together we can build a corrupt free society.

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META ANALYSIS OF MICRONUTRIENT DEFICIENCY DISORDERS AND THEIR MAPPING IN RAJASTHAN

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Abstract

The meta analysis has been carried out from the collection of published papers and reports from different medical colleges and through on line searching through internet bibliographic searches from Medlars PubMed, EMBASE, and Cochrane databases. The data consists of 15 publications to study the effect of Vitamin - A among school children . The duration was considered to be for a period of 10 years. We have used a binomial model to estimate the results. The data analysis revealed that the educational intervention and combined intervention and the cohorts were non-homogeneous ($P < 0.001$ and $P < 0.01$, respectively); however, the behavioral intervention cohort was homogeneous ($Q = 52.48$, $d.f. = 35$, $P=0.36$). The overall ES for behavioral interventions was 0.06 (95% confidence interval [CI] = 0.03–0.08); there were no significant differences among the behavioral & educational interventions which had an overall ES of 0.10 (95% CI =0.05–0.16). The overall ES of the combined interventions was 0.08 (95% CI = 0.04–0.14). While stratifying the combined interventions the behavioral had the largest impact (ES = 0.38). The mapping for three micronutrient deficiency disorders for the Rajasthan with ecological variations among the districts has been mapped out. This will be useful to many researchers and health administrators for identifying the incidences among the MND's at district level and can implement the state level nutritional programmes

INTRODUCTION

Meta Analysis is collection of data systematically and synthesizing the results from individual studies to estimate overall size. Studies with positive results are more likely to get published than those studies with negative results. By using only the results of more positive studies leads to publication bias. We have used different methods to detect this publication bias. The present study was started in the year 2008 which is aimed with the objectives: Meta Analysis of available published or unpublished information of three important Micronutrient Deficiency Disorders namely Vitamin A, Iron Deficiency Anemia(IDA) and Iodine Deficiency Disorders. To study regional/ecological variations of these three micronutrient Deficiency Disorders in Rajasthan by systematic reviews and To map out the districts for three micronutrient deficiencies in the western region.

MATERIALS AND METHOD

The data of meta analysis was collected through literature search for the Vitamin A Deficiency (VAD) Iron Deficiency Anemia (IDA) and Iodine Deficiency Disorder (IDD). The systematic review of these meta analysis were carried out. The data consists of 15 publications to study the effect of Vitamin - A among school children . The duration was considered to be for a period of 10 years. We have used a binomial model to estimate the results and rank correlation method proposed by Begg and linear regression method proposed by Egger & Trim and Fill

method to evaluate bias. The publication bias was adjusted by using “Trim & Fill method. The analysis was done using EPI META package³. The effect size and the standard errors were calculated for all the studies and were depicted in the figures

The data for meta analysis was collected through literature Gene Glass, (1976) search for the Vitamin A Deficiency (VAD). A total of 124 studies were collected by Systematic review of these 15 studies only met the criteria for meta analysis and the re-analysis has been carried out. For 15 publications on the effect of Vitamin A among school children. The duration was considered to be for a period of 10 years. Binomial model Has been used to estimate the results and rank correlation proposed by Begg and linear regression method proposed by Egger & Trim and Fill method to evaluate publication bias, Jick et al. (1973), Eager, M and smith GD, Phillips AN (1997), Greenhalgh T ,(1997). The publication bias was adjusted by using “Trim & Fill method. The analysis was done using REVMAN package Mehta CR, Patel NR, Gray R, (1985). The mapping of districts has been done from the data collected by using GIS and reported in the maps. All the micronutrients VAD, IDA and IDD VCD are far below the recommended levels of RDA as per ICMR, RDA Reference values ICMR value shown with different colors in the maps and the cut offs were also shown, Thompson SG, Pocock SJ, (1991), Lakshminarayana, J. Singh B. Madhu (2009).

RESULTS AND DISCUSSION

The re-analysis of the data revealed that the educational intervention and combined intervention and the cohorts were non-homogeneous ($P < 0.001$ and $P < 0.01$, respectively); however, the behavioral intervention cohort was homogeneous ($Q = 52.48$, d.f. = 35, $P=0.36$). The overall ES for behavioral interventions was 0.06 (95% confidence interval [CI] = 0.03–0.08); there were no significant differences among the behavioral & educational interventions which had an overall ES of 0.10 (95% CI =0.05–0.16). The overall ES of the combined interventions was 0.08 (95% CI = 0.04–0.14). While stratifying the combined interventions the behavioral had the largest impact (ES = 0.38). Meta Analysis of studies of interventions improved the heterogeneity among the studies and gave valid Conclusions. The mapping of districts has been done from the data collected by using GIS and reported in the maps. All the micronutrients VAD, IDA and IDD VCD are far below the recommended levels of RDA as per ICMR values which were shown with different colors in the maps and the cut offs were also shown. In regards to VAD the districts with green color are having >200 gm are better in comparison to others which is showing significant results ($P<0.05$). Similarly the IDA the districts with <30 are deficient in anemia which were colored with yellow. In case of iodine non of the districts were meeting the requirements and there are no studies to report so VCD is shown which is also deficient and the cut off values taken were <30 are very much deficient and shown significant different ($P<0.05$) when compared with other states data. The color with light blue are deficient districts

FINDINGS

The study has provided information of three micronutrient deficiency disorders through Meta Analysis for the entire state of Rajasthan with variations in different ecological/geographic regions The mapping for three micronutrient deficiency disorders for the Rajasthan with ecological variations among the districts. This will be useful to many researchers and health administrators for identifying the incidences among the MDD's at district level and

can implement the state nutritional programmes on micronutrients. With this approach this can become nodal centre and member of Cochrane data bases for western desert region. This will be an innovative work and well documented scientific study on MDDs and the strategies can be developed and informed to state govt. for intervention programmes to be launched and for implementing the control programmes in the districts.

CONCLUSION

There are very few studies from desert part of Rajasthan, Intervention studies are to be planned in the desert. Strategies can be developed to improve the micronutrient deficiencies in desert part of Rajasthan. The MND like VAD, IDA and IDD VCD are far below the recommended levels of RDA as per ICMR values which were shown with different colours in the maps and the cut offs were also shown. The deficiency is existing in all the districts very few districts are some what better compared to the rest of the districts. This study will be useful to many researchers and health administrators for identifying the incidences among the MND's at district level and can implement the state level nutritional programmes.

Table-1: Calculations of Estimates of Intervention Studies and Odds Ratios of Different Studies on Micronutrients

Study Ref.	a	b	c	d	n	Var.	Weight	OR	Wt x OR	Q
1	2	14	33	22	71	0.15	6.51	0.1	0.62	2.88
2	1	3	22	19	43	0.80	1.25	0.17	0.22	0.43
3	12	39	44	24	109	0.09	11.7	0.23	2.69	3.34
4	7	6	11	13	37	0.56	7.18	0.37	2.68	1.07
5	14	41	45	25	125	0.06	16.7	0.13	2.16	2.68
6	8	12	25	30	75	0.25	4.00	0.22	0.88	3.52
7	22	46	52	28	148	0.06	16.7	0.14	2.33	3.36
8	33	27	36	31	127	0.13	7.69	0.38	2.92	1.96
9	5	17	35	24	81	0.14	7.14	0.32	2.28	2.54
10	23	32	26	28	109	0.13	7.69	0.41	3.15	2.22
11	20	16	28	25	89	0.20	8.62	0.48	4.13	1.89
12	7	6	11	13	37	0.56	7.94	2.37	18.22	20.61
13	46	23	97	115	281	0.13	100.2	0.82	82.17	4.75
14	35	39	34	32	140	0.11	0.91	0.14	0.13	3.62
15	14	41	42	22	119	0.07	14.29	0.74	10.57	4.16

Fig 2: Map Showing Vitamin - A Deficiency (VAD) in Different Districts of Rajasthan

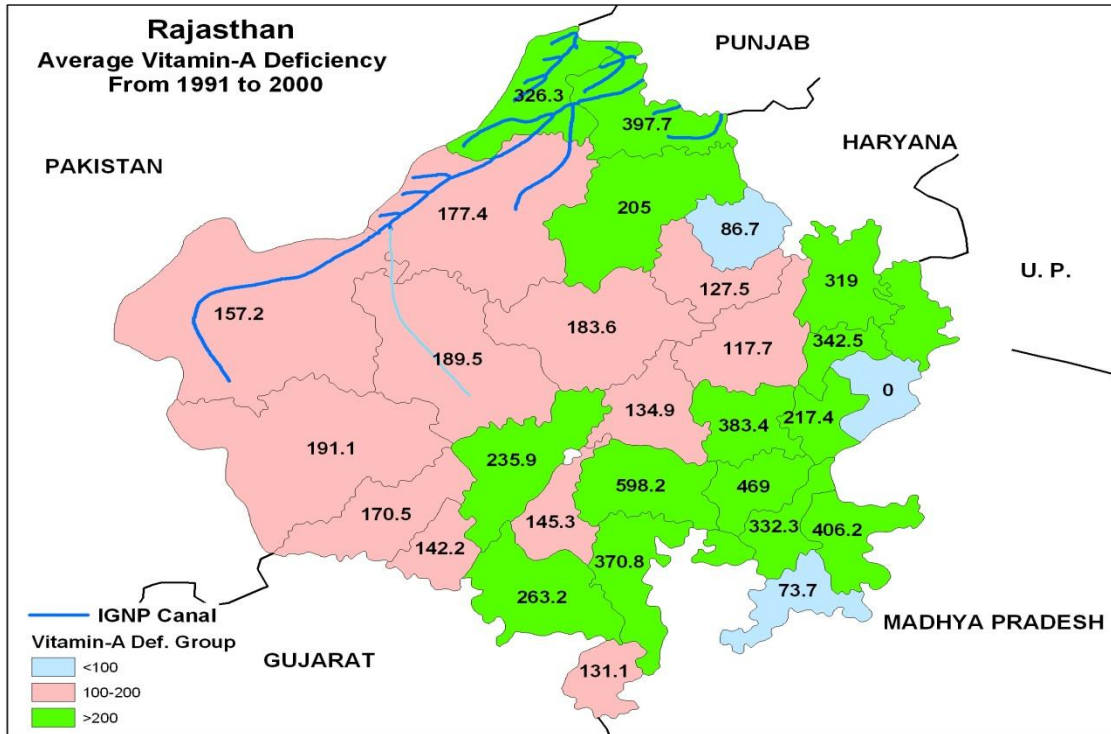
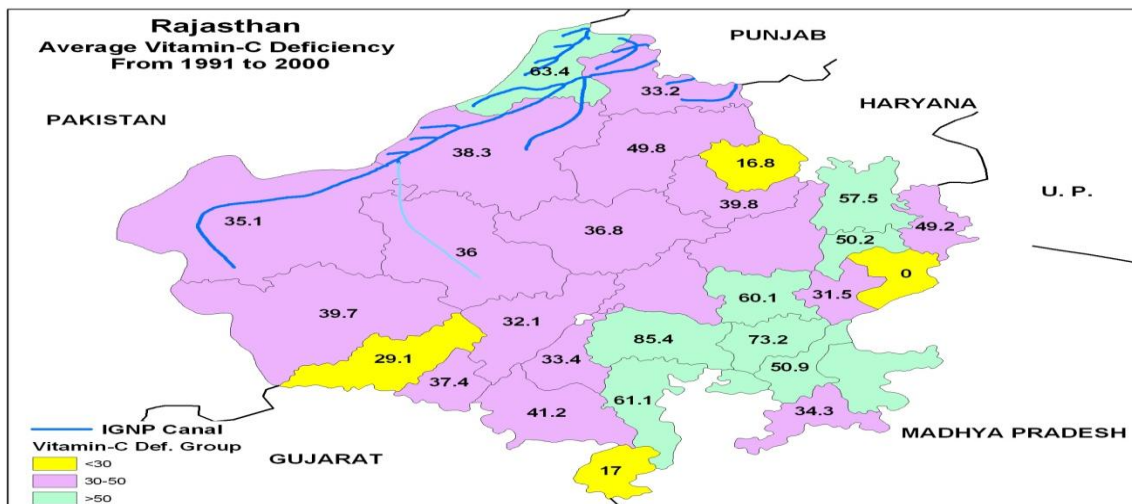


Fig 3: Map Showing Vitamin-C Deficiency (VCD) in Different Districts of Rajasthan



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STATISTICAL ANALYSIS ON THE AWARENESS AND SAFEGUARDING AGAINST SOCIAL ENGINEERING: A CASE STUDY OF FEDERAL POLYTECHNIC ILARO

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Abstract

This paper attempts to discuss the concept, forms and safeguarding against social engineering attacks as a means of security measures to individuals, organisation and governmental functions. Illustrations were made on how social engineering attacks can be lunched prevented and also reduced to the barest minimum. The paper also exposes various ways of perpetrating the evil and how such menace could be detected, security measures to be put in place and educating people through seminars and workshop on the existence of social engineering attacks, the menace in careless handling of vital information as well as procedures for avoiding information leakages. It also summarizes the relevance of security in day to activities and how to improve on security lapses as a means of safeguarding against social engineering attacks so that it can benefit the society at large. Data was collected on social awareness by the top, middle and lower management staff of Federal Polytechnic Ilaro. From the analysis it was observed that social engineering attacks was still in the awareness stage, the preparation involved the management staff only and the commitment varies and increases from the staff union to officer, to management staff and finally the senior staff.

INTRODUCTION

Security is as old as the creation of the world itself, in the olden days, it was not as important as it is today due to the development of modern technologies and the ability to beat security by the technology so developed. Social engineering is a strategy for obtaining information people wouldn't normally divulge, or prompting an action people normally wouldn't perform, by preying on their natural curiosity and/or willingness to trust. Perpetrators of scams and other malicious individuals combine social engineering with email in a number of ways. Many advanced countries pay more attention to their securities; in spite of these, social engineers still operate and succeed in such environments; a typical example is the world trade centre attack carried out on the September, 2001, in the United State of American. New policies are in place for online business transactions and focusing their attention on security, it was also extended to the health care system so that they could be held accountable for patients protected health information. This was backed up with an Act HIPAA (Health Insurance and Portability and Accountability Act). Also in United States' schools must be adhere to FERMA (Family Educational Rights and Privacy Act) this Act protects the privacy of students education records. It is paramount to every organisation and individual to have adequate security measures for all vital records and transactions.

According to the Federal Trade Commission (FTC) reported in 2005 that "more than one million consumer fraud and identify theft complains that have been fitted with Federal, State and Local law enforcement agencies and private organisations. The survey released on April 2, 2006 by the United States Department of Justice about 3.1 percent of American household became victims of identity theft in 2004. The survey revealed that now, more than before,

individuals are at a high risk of having personal information stolen and used by criminals for their self aggravidisements. The land mark are debt, bad credit, higher interest rates and charges that are criminal in nature, the victims are not free until they are prove innocent. Recovering from this menace could take years or even a life time. Sufferers of this theft are left with a permanent stain to wipe off.

Moreover, in order to protect confidential information, all possible security measures shall be put in place, for an individual, organisation or governmental Agents/Agencies the security measures to be adopted emanates from the use of passwords to access electronic data equipment; also unauthorised personnel should not be allowed entrance to a work place where clasified information or equipment is located. Packet sniffing – the act of encrypting data to prevent malicious intruders should also be put into place. Privatising records are essential to prevent spying or break – in from the outside, this can be done by using intrusion preventing systems, access control lists, anti – spyware software and the use of firewalls. It is evident that for individuals, organisations and agencies there should be protection of personal electronic information by using passwords for access and having security tools in place, at home or workplace sensitive electronic data can be used through the process of authentication, authorization and accounting methods.

Finally, no matter the type of security measure put in place, an individual, organisation or agencies are still at risk of having their information stolen. Grander (2006) pointed out that “by merely trying to prevent infiltration on a technical level and ignoring the physical – social level, we are leaving ourselves wide open to attack”. Although many security systems have been developed to prevent intruders from accessing high value systems, an organisation cannot be totally free of social engineering.

Social engineering is the name given to a category of security attacks in which someone manipulates others into revealing information that can be used to steal data, access to systems, access to cellular phones, money or even your own identity. Such attacks can be very simple or very complex. Gaining access to information over the phone or through websites that you visit has added a new dimension to the role of the social engineer. Basically social engineering is the acquisition of sensitive information or in appropriate access privilege by outsider, based upon the building of an appropriate trust relationship with insiders. The goal of social engineering is to trick someone into providing valuable information or access to that information. It is the act of manipulating people into speaking or acting contrary to their normal manner. The goal of a social engineer is to fool someone into providing valuable information or access to that information. They prey on human behaviour, such as:

- The desire to be helpful
- The tendency to trust people
- The fear of getting into trouble

The sign of a truly successful social engineer is that they receive information without raising any suspicious as to what they are doing. People are usually the weakest link in the security chain. They employed different methods to persuade and influence others in other to achieve their objectives of obtaining unauthorized information so as to perpetrate fraud, network intrusion, industrial espionage, identity theft, or simple to disrupt the system or network (Granger, 2001). A few examples of tactics used include impersonation, phishing and dumpster diving.

Social engineering can be broken into two viz: Human based and computer based. Human- based refers to person-to-person interactions to retrieve the desired information, whereas the computer based refers to having computer software that attempts to retrieve the desired

information. Huber et al (2009) noted that Automated Social Engineering uses artificial conversations where the human victims talk to a computer program that mimics human behaviour. Automated Social Engineering (ASE) is the process of automatically executing social engineering attacks. Social engineering targets human weaknesses of the user instead of vulnerability of a technical system. As an example of ASE, Robert Epstein reports in the Scientific American Mind (2007) how he was fooled for a considerable amount of time by a computer program that pretended to be a Russian woman. The human based includes:

IMPERSONATION

This is the greatest techniques used by social engineers to deceive people e.g. pretending to be an employee of an organisation tricks are often used by pretending to be in the information technology (IT) department so as to obtain information. A simple phone call requesting an employee's password is usually an easy way to get access to information; by assuming that the phone call comes from the IT department, employee disclose the password willingly without question, especially after that employee has been told, what seems to be a legitimate reason for the request. The human tendency to be helpful, trusting others and having tendency to protect themselves as well as fear of getting into trouble makes the use of impersonation very well for social engineers. The ability to be highly responsive to assertions of authority, even in the absence of the person in the position of authority (Rush, 1999). For instance, a low cadre, help desk employee may be intimidated by a phone call from someone claiming to be the secretary of marketing demanding a reset or adjustment in his passwords so that he may log in to the system immediately. Due to fear the help desk might not ask for proper credentials of the caller before abiding to the request.

Phone is a universal device used to conduct social engineering attack, it is a device used to obtain information from people at home. People can receive phone calls at home from banks requesting for information about their credit card and their accounts details. This makes people to divulge information concerning their accounts to someone over the phone that claims to represent the bank. Such phone calls could lead to releasing the following vital information; credit card number, social security number, bank account number. This vital information is released to the social engineer by either offering something of value to the card holder or the fear of some problems in the account of the victim.

PHISHING

Wikipedia (2005) defines phishing as, the act of sending an e-mail to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft. It is the most common online social engineering; it includes e-mail spoofs (Granger, 2006). The e-mail directs the user to visit a website where they are asked to update personal information. The website is set up only to steal the user's information. Phishing is similar to impersonation but instead of face to face contact; the contact is through e-mail or other online mechanism.

DUMPSTER DIVING

This occurs when people are not aware of the value of information they possess and are careless about protecting it. It involves careless throwing away of vital documents such as policy manuals of a company as well as company's phone book. Although the information obtained through these documents could be used for foot printing. Granger (2006) defines foot

printing as “the art of gathering information (or pre-hacking).... it’s commonly done to research a predetermined target and determines the best opportunities for exploitation”.

The individuals at home are just as vulnerable to dumpster diving as an organisation. Many people throw away vital information such as credit card statements, bank statements, and other mails containing personal information without hesitation. Such information might not be used immediately to suit the required purpose but can be used for foot printing; impersonating a representative of a credit card company is a lot easier for a social engineer when he or she possesses the cardholder’s account information.

PROTECTION AGAINST SOCIAL ENGINEERING

Social engineering attacks are almost an incurable disease since it involves the human element. Grandner (2001) defines security as “security is all about trust, trust in protection and authenticity. Generally agree upon as the weakest link in the security chain, the natural human willingness to accept someone at his or her word leaves many of us vulnerable to attack”. There are common defences that may be put in place such as:

- Everyone that enters the building (contractors, business partners, vendors, employees) must show identification.
- Passwords are never spoken over the phone.
- Passwords are not to be left lying around.
- The use of ID technology.
- Invest in shredders.

An organisation should also provide training programs for all categories of workers including security guards, receptionists, help desk employees and management on various forms of social engineering attacks their preventive measures and actions to be taken so as not to release vital and confidential information to an unknown visitor. There should be sound policies and procedure in place to cover the following areas:

Account set up, password change policy; help desk procedures, access privileges, violations, unique user identification, confidential information handling, modem usage and acquisition, secure sensitive areas, privacy policy, centralized security, focus point etc.

People in top management posts should be guided by rules and regulations not to give orders that are sensitive in nature to their subordinates e.g. commanding a help desk employee on phone to reset password by the vice president of marketing. The help desk employee could insist on receiving proper credentials before obeying such instructions i.e. there should be documented procedures.

On the other hand, seminars and workshops to employers will serve as a guide to social engineering attacks and this will enable them to use their best judgement as a defence mechanism. Somebody who is aware of social engineering attack receiving an email from a company requesting that an individual must update his or her account information will definitely know it is phishing attack and would not consent to a possible bogus company’s website through a link on that email. That person would either go directly to the company’s website through a separate browser window, or call the company to verify that the email was in fact legitimate.

Awareness through seminar and workshops would also allow people to be more careful of what they throw away in the trash. When people recognise the value of information they possess, they will handle it with care. Appropriate cautions will also be put in place against all forms of attack such as “dumpster dive” for valuable information, recognition should be given to the use of shredder to do away with confidential information and give proper monitoring to those who dispose of trash.

Finally, if you feel you have thwarted or perhaps been victimised by an attempt at social engineering, report the incident to your manager and to the security personnel immediately.

SUMMARY OF FINDINGS

From the field survey we conducted in Federal Polytechnic, Ilaro with forty staff of the institution who responded to our questionnaire and interviews we find out that the implementation of safeguarding against social engineering in Federal Polytechnic, Ilaro, is still in the AWARENESS STAGE, with strength value of 3.50. On the other hand the actual implementation was found to be significantly less than advanced with value of 1.85 sharing that the implementation stage is still very low especially in the educational institution like ours, some institutions are yet to be aware. The level of thoroughness of preparation stood at 3.70 which was a little above average level.

Moreover, the finding also shows that the C.E.O., management staff and senior staff are very committed to the ideas of safeguarding against social engineering particularly its application in Educational institutions. However, the staff unions are comparatively less committed. A reward and Recognition system in place tends to reward individual more than team achievement. This trend if sustained could weaken team spirit and threaten the success of safeguarding against social engineering attack training for awareness at all levels.

- Training for awareness at all levels.
- Top Management commitment.
- Incorporating safeguarding into corporate strategy.
- Choice of safeguarding coordinator.
- Setting up of a safeguarding steering committee.
- The corporate culture.
- Sustenance of the programme for continuity.

We found that the identified factors to be in line with the prescriptions of the literature on the subject. We are not surprised at this trend as Nigerians are known to be avid readers and knowledge seekers.

RECOMMENDATIONS

It is recommended that: the continuous social engineering education should be undertaken at all levels, even for those sectors that have already acquired a high degree of awareness. Educational institutions should integrate safeguarding against social engineering attack resulting into their reward systems. Appraisal systems should be similarly treated.

Safeguarding against social engineering should form part of the induction training for new staff so as to give them an early orientation; since attitudes once formed, are difficult to influence.

Finally, Management should be patient with problem staff of long tenure, who have developed resistance to change. Training on 'Management of Change' should be done *pari passu* with social engineering education.

CONCLUSION

In this study, we carried out a survey of extent of implementation of safeguarding against social engineering by questionnaire and interviewing 40 staff of Federal Polytechnic, Ilaro. Based on our findings it is still very much at the awareness stage and more effort and commitment is required to get it beyond that stage. From the findings reported in this paper more attention should be paid to creating awareness of safeguarding against social engineering so that we can attain a higher level of curbing the menace before the next millennium.

Organisations must protect vast information so as to prevent consumer fraud and identity theft. The discoveries of modern and advanced technologies increases security risks and this led to attacking more importance to security for individuals, companies and even government. Social engineering is a technique used by hackers and other criminals to persuade people to divulge confidential information, or allow unauthorised access, for their personal gain or for malicious purposes. Various techniques exist for social engineering attack this includes impersonation, phishing and dumpster diving and are used to achieve their goals. These attacks are difficult to control but can only be reduced or minimized because it involves human effort, training through seminars and workshops against the menace of social engineering attacks is a better means of minimizing the menace by various organisations.

Moreover, individual and organisations can try to protect their confidential information by storing their data on a system that requires password-only access, putting the system in a secure room that allows only authorised admission, and spending much money as possible on security tools to protect the data through that does not mean that the data is not vulnerable to social engineering attack.

Finally, training people which includes formal education against the menace of social engineering attack and organising seminars and workshops will prevent social engineering attacks from thriving in any organisation. Other ways of preventing this attack includes the generation of overall awareness, once people are aware of the critical data they possess; the need to protect it for possibility of exploitation this will lead to building a strong defence against social engineering attack thereby leading to its decline.

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EXCEL FEED FORMULATION AND FEEDING MODELS

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Abstract

A feed formulation model has been developed using Microsoft excel package. This excel – assisted feed formulation model has been developed by use of simple arithmetics. It is user-friendly and does not require complex or repeated calculations at different levels, or when feed ingredients are changed. It only requires the cueing-in of ingredients and their required quantities. This, on a click shows the new protein and energy levels. It therefore implies that, one keeps adjusting the nutrient quantities until the required protein and energy levels are met. A feed management model is also been developed. The model gives an estimate of feed requirements of birds at various ages. It estimates total feed and cost of feed required, thus a least cost approach as it saves cost from feed wastage. These Microsoft excel – assisted packages are intended for presentation and criticisms for a possible software development.

Key words: Excel Assisted, Feed Formulation, Feed Management, User-Friendly, Ingredients, Protein and Energy Levels.

INTRODUCTION

Feed formulation and feed management have been major concerns to poultry nutritionists all over the world. These have resulted in the production of feed formulation feed management softwares available for purchase and download from the internet. The available methods of feed formulation such as Pearson's square, modified Pearson's square, substitution methods and various computer models of least cost formulation – Stochastic, Linear and Stochilinear programming models have serious limitations. Pearson's square which is the simplest accommodates only two ingredients, which made room for modified Pearson's square. These allow for different calculations at every level when feed ingredients are changed. The other methods are much more sophisticated in feed formulation.

These excel - assisted models are much more easy to use and do not require calculations at every step or when ingredients are changed, but that ingredients be cued-in only, and adjusted until the required protein and energy levels are met, and that required information are also cued-in for the required feed intake. This allows for prudence in the management of feed which attracts between 70 and 80% of the total production cost. It is very much user-friendly and requires only simple arithmetics.

These models are intended for practical livestock farmers and teachers and students of animal production and management in tertiary institutions.

Table 1: Feed Formulation

NUTRIENTS	INCLUSION	% CP	% CONT.	ENERGY	% CONT.
Guinea corn meal	0	0.1	0	33	0
Cashew seed meal	0	0.12	0	2	0
Bread fruit seed meal	0	0.12	0	2	0
Maize bran	0	0.1	0	9	0
Rice polishing	0	0.1	0	13	0
Rice	0	0.07	0	10	0
Sesame seed meal	0	0.42	0	11	0
Sunflower seed meal	0	0.42	0	11	0
Ipil ipil	0	0.2	0	9	0
Kidney beans	0	0.26	0	14	0
Chick peas	0	0.21	0	18	0
Potatoes	0	0.02	0	4	0
Mollasses	0	0.03	0	13	0
Millet	0	0.12	0	12	0
Wheat	0	0.18	0	15	0
Sorghum	0	0.1	0	14	0
Cotton seed meal	0	0.51	0	27	0
Poultry dropping	0	0.28	0	14	0
Jackbean meal	0	0.31	0	32	0
Feather meal	0	0.85	0	23	0
Maize cob	0	0.02	0	5	0
Citrus pulp	0	0.52	0	27	0
Cane mollases	0	0.03	0	23	0
Cassava leaf meal	0	0.14	0	0	0
Cassava peel meal	0	0.5	0	20	0
Cassava tuber	0	0.24	0	33	0
Rice bran	0	0.12	0	16	0
Blood meal	0	0.8	0	28	0
Palm kernel cake	0	0.18	0	87	0
Brewer's grain	0	0.26	0	25	0
Palm oil	0	0	0	94	0
Maize	0	0.1	0	34	0
Soybean	0	0.44	0	28	0
Groundnut	0	0.46	0	32	0
Fishmeal	0	0.61	0	18	0
Wheat bran	0	0.11	0	0	0
Bone meal	0	0	0		
Premix	0	0			

Salt 0 0
0

TABLE 2: ILLUSTRATION

Maize	60	0.1	6	34	2040
Soybean	5	0.44	2.2	28	140
Groundnut	15	0.46	6.9	32	480
Fishmeal	5	0.61	3.05	18	90
Wheat bran	10	0.11	1.1	0	2750
Bone meal	3		19.25		
Premix	1.5				
Salt	0.5				
	100				

FORMULAR CHECK

PEARSON'S SQUARE



CALCULATION

$20.4/34 * 100 = 60\% \text{ MAIZE}$

$13.6/34 * 100 = 40\% \text{ SOYBEAN}$

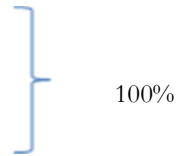


TABLE 3: FEED CONSUMPTION

FEED INTAKE FOR POULTRY	NO OF BIRDS	°C	D. WT. (g)	AV. LV. WT.	Kcal – GRTH /D	SUST ENANCE	F. EN	TDER (g)	F.I./ DAY(Kg)	F.I. (K)
WEEK 1	200	30	0.3	1	5	104	2700	0.03852	7.70370	53.52

WEEK 2	200		30	0.4	1.3	5	135.2	2700	0.05007	10.0148	70.10
WEEK 3						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 4						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 5						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 6						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 7						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 8						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 9						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 10						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 11						5	0	0	#DIV/0!	#DIV/0!	#D
WEEK 12						5	0	0	#DIV/0!	#DIV/0!	#D

FEED INTAKE FOR LAYERS	NO BIRDS	OF TEMPERATURE	D. GAIN(g)	WT.	AV. WT.	LV.	AV.EGG WT.	LAYING RATE	Kcal GROWTH/D	-
WEEK 23	1000	30	4		1.6		58	80%	20	
WEEK 24										
WEEK 25										
WEEK 26										
WEEK 27										
WEEK 28										
WEEK 29										
WEEK 30										
WEEK 31										
WEEK 32										
WEEK 33										
WEEK 34										

LIVESTOCK FEED PRODUCTION AND FEEDING MODELS

Farmers are often gifted technical innovators. The technology they develop is very useful because it uses low-cost resources available on local farms. However, knowledge of these innovations is often restricted to a small area. Although many valuable items of technology have been developed by research institutions, they are often too expensive for small-scale farmers to be able to adopt them. Labour-saving farming methods based on low-cost inputs which are locally available are often more suitable for small farms than the technology developed on research stations, and can make an important contribution to the sustainability of small farms in the region (FFTC,2007).Livestock feed formulation models such as feeding trials and the Pearson's square are the simplest, but have the problem of long periods of trials and having only two ingredients accommodation. The other methods are more reliable as they accommodate more than two ingredients.

Ration (or feed) formulation does not merely involve mathematical calculations to meet the requirement of the birds, since the result of the calculation may turn out to be impractical and not ideal for feeding of poultry. An experienced Poultry nutritionist, therefore, needs to evaluate the feed formulation before it can be given to the birds. Factors to be considered in making good feed are:

- 1. Acceptability to the birds.** The ration being formulated has to be palatable enough to stimulate intake by the birds. Feed refused by the birds is worthless, since feed has to be consumed and utilized.
- 2. Digestibility of the feed.** The nutrients in the feed have to be digested and released into the gastrointestinal tract to be utilized by the birds. Rations with high fiber content cannot be tolerated.
- 3. Cost of feed ingredients.** The requirement of the birds can be met through several combinations of feed ingredients. However, when the cost of these ingredients are considered,

there can only be one least-cost formulation. The least-cost ration should ensure that the requirements of the birds are met.

4. Presence of anti-nutritional factors and toxins. The presence of anti-nutritional factors in the feed, such as anti-trypsin factor in soybean meal, affects the digestion of some nutrients by making them unavailable to the animal. Some feed ingredients may also contain toxic substances, which may be detrimental to the animal when given in excessive amounts. The inclusion of these feed ingredients should therefore be limited or eliminated from the formulation. There are several methods in formulating rations. All of them have the same objectives of providing the required balanced nutrients at the least possible cost.

1. Trial-and-error Method. This is the most popular method of formulating rations for poultry. As the name implies, the formulation is manipulated until the nutrient requirements of the birds are met. This method makes possible the formulation of a ration that meets all the nutrient requirements.

2. Linear Programming (LP). This is a method of determining the least-cost combination of ingredients using a series of mathematical equations. There are many possible solutions to each series of equations, but when the factor of cost is applied, there can only be one least cost combination. An electronic computer is capable of making thousands of calculations in a very short time. However, the machine is incapable of correcting errors resulting from incorrect data and errors in setting up of the program. Therefore, the resultant rations obtained from linear programming will be no better than the information and values which are entered into the programming. Before using the LP approach to ration formulation, the user should be familiar with the LP program or software package to be used. Numerous companies market computer software for feed formulation. The software varies from very simple and straight-forward to very complex packages intended for large feed manufacturers. Examples of these softwares are Winfeed stochastic and linear programming feed formulation (Mirza, 2004). Others include Myfeed and Autofeed. These approach requires:

1. Available feed ingredients. It is necessary that all the available ingredients are listed along with the unit cost, as long as the number does not exceed some practical figure.

2. Nutrient composition of feed ingredients. Tables of feed composition using average or typical values may be used but chemical analysis of a representative sample should be used if available.

3. Ration specifications. This generally represents the nutrient requirements and ingredient limits. In each case, the formulator specifies either a lower limit and/or an upper limit for each item.

4. Information production. After providing all the necessary information, the computer produces formula that will meet the desired specifications at the lowest possible cost. However, the formula should be feasible, both from a mathematical standpoint and from a nutritional standpoint (Shouq, 2008). Many intensive livestock industries have since developed simulation models that can provide optimum nutrient levels based on individual production conditions. Affordable computing technology has also introduced concepts such as "least cost", "total amino

acid" and even "profit maximisation". Other popular concepts include digestible formulation, precision feeding, ideal proteins and modelling, all of which have been adapted to some extent in livestock sectors worldwide (Shapiro, 2008).

Excel Feed Formulation and Feeding Models

These models as developed requires:

1. Feed ingredients, their protein and energy contributions
2. Manipulations of these ingredients which changes the protein and energy levels as you click (Table 1). The ingredient levels is the only thing the formulator should vary to get the protein/energy levels required.
3. Feed consumption model requires the formulator to input:
 - a. Number of birds housed
 - b. The environmental temperature
 - c. Daily/weekly weight gains, and
 - d. Feed energy level
 - e. Then, a click will give you the quantity of feed to be fed per day/week

This excel – assisted model has been developed to suite our environment and elsewhere as the ingredients are drawn locally and from elsewhere. This allows for flexibility in the use of ingredients. It also allows any person that has access to a computer with excel package to formulate his feed without additional cost. The cost of feed is also reduced as feed wastage can be avoided. The farmers knows from this model what quantity of feed is required by the birds.

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MOBILE PHONE RADIATION AND BIOLOGY**Uju Isidore U¹, Okwu P.I² and Ifeagwu N³**¹*Anambra State University, Uli, Anambra State, Nigeria*²*Electronic Development Institute, Awka, Anambra State, Nigeria*³*Enugu State University of Technology, Enugu, Nigeria**Email: isidoreuche2003@yahoo.com***Abstract**

Many people have a hard time fathoming that something that they cannot see, touch, smell, taste or hear can harm them so much. However, we are constantly immersed in a sea of Electromagnetic Radiation (EMR) and it can affect life markedly. The rapid growth rate of mobile phones, phone masts and wireless communication systems, alongside various reports of possible adverse effects on living things, has caused increased concern around the world over the potential effect of electromagnetic pollution on health and the environment. "There have been many instances of harmful effects of electromagnetic fields from such seemingly innocuous devices as mobile phones, computers, power lines and domestic wiring. They include an increased risk of cancer, loss of fertility & unpleasant physiological symptoms....." At present the technology is being increasingly used with almost no effective precautionary advice to the public and urgent guidance is needed in order to alert the public and especially our children about the inherent dangers of over exposure to electromagnetic radiation. EMR need to be identified measured and remediated to significantly reduce its sources in our environment.

INTRODUCTION**ELECTROMAGNETIC POLLUTION AND HUMAN ENVIRONMENT**

Radiation is energy that travels and spreads out as it goes. When all of the possible forms of radiation are classified and arranged according to wavelength or frequency, the result is the Electromagnetic Spectrum. The electromagnetic spectrum includes types of radiation that range from extremely low energy, long wavelength, and low frequency energy like Radio energy to extremely high energy, short wavelength, high frequency energy types such as x-ray and Gamma

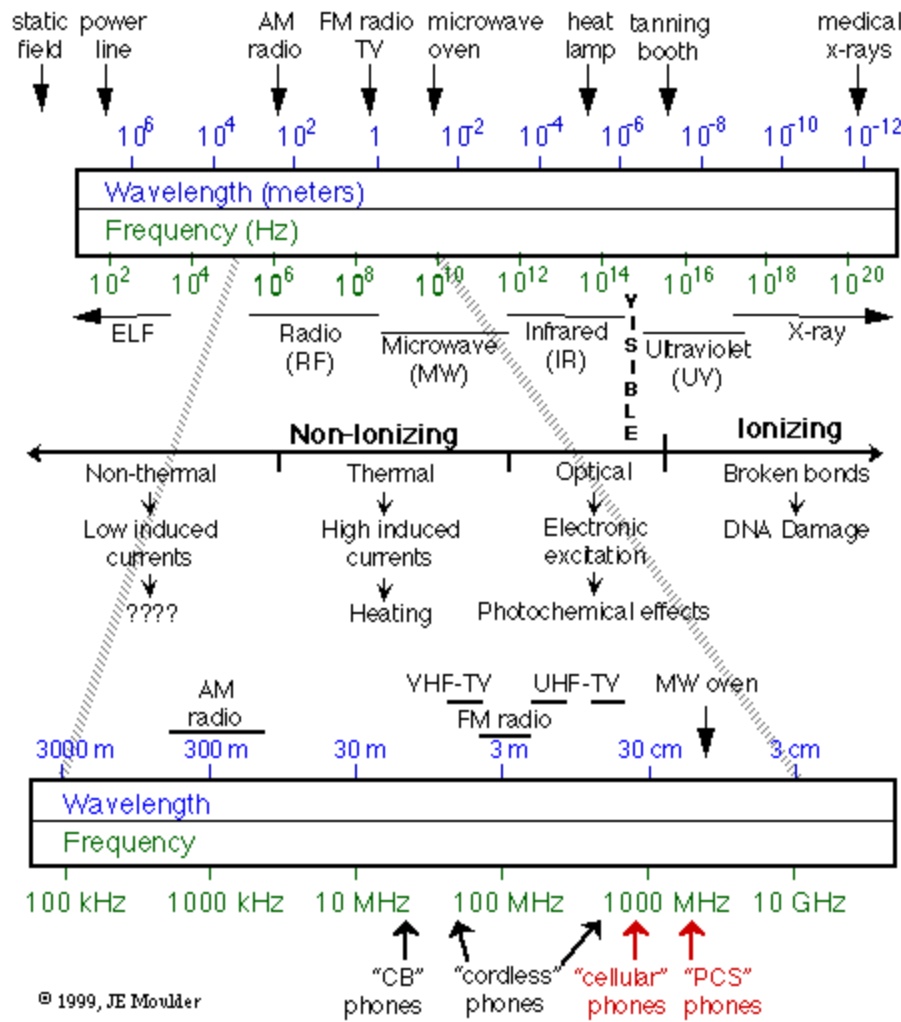


Fig.1. Electromagnetic Radiation spectrum

Radio Frequencies (RF), Electromagnetic Fields (EMF) and X-rays are all produced by electromagnetic sources, and are part of the electromagnetic spectrum. The difference between them is the frequency of their source.

All electromagnetic energy falls somewhere on the electromagnetic spectrum, ranging from extremely low frequency (ELF) radiation to microwaves, x-rays and gamma rays. (See fig.1)

The electromagnetic (EM) spectrum is just a name that scientists give a bunch of types of radiation when they want to talk about them as a group. It's a proven fact that at extremely high frequencies, like that of x-rays, the electromagnetic waves have enough force to damage ionic and covalent bonds and damage DNA and other human tissue. This is known as ionizing radiation. Since X-rays have the power to damage the genetic material of cells, they can lead to cancer and birth defects—which is why you wear a lead vest during x-rays to protect the surrounding areas from unnecessary damage. At lower frequencies, such as the microwave range used by mobile phones and base stations, the energy emitted is too low to damage chemical bonds

(non-ionizing radiation). This is the primary argument used by those who believe that cell phone radiation is completely harmless and choose to live in ignorant bliss.

Although Extremely Low Frequencies (ELF's emitted from appliances and power lines) and Extremely High Frequencies (ultraviolet and gamma rays) are known to be carcinogenic, the scientific community is extremely hesitant to attach any kind of danger to the in-between frequencies where cell phones operate. All modern electronics emit electromagnetic radiation. Radio waves, microwaves, visible light, and x rays are all examples. Electromagnetic waves are produced by the motion of electrically charged particles. These waves are also called "electromagnetic radiation" because they radiate from the electrically charged particles. They travel through empty space as well as through air and other media.

The internal circuits of personal computers generate EM fields. Also, cathode ray tube (CRT) eg. TV displays generate EM energy over a wide band of frequencies. As do mobile phones. To prove this simply place a radio receiver of any kind and use it at the same time as you use your personal computer, or mobile phone and you will probably hear RF noise in the receiver that originates in the computer or from the phone.

EMI (electromagnetic interference) is the disruption caused by an electromagnetic field. This is why mobile phones are not allowed to be used in hospitals, aeroplanes or petrol stations. The EM radiation emitted from them can interfere with sensitive equipment and poses a danger to safety. EMI was traditionally used to describe how one EM field emitted from one electronic device effects the operation of another electronic device, EMI can now also be used to help explain the ways in which EM radiation effects living things. But just HOW are electromagnetic fields and information-carrying radio waves capable of causing damage in human body?. Life has become busier for most without a doubt. This has lead to the invention of many "modern conveniences" to save precious time and to make life easier. However in this process we have at times created issues that are severely affecting health without realizing it. And we are constantly immersed in a sea of Electromagnetic Radiation and it can affect life markedly. These areas need to be identified, measured and remediated to significantly reduce sources of EMR in our environment.

Electromagnetic fields are found in a vast array of applications such as:

- Power lines
- Computers and wireless mouses
- Mobile phones and their masts
- Cordless phones
- Wireless internet
- Bluetooth
- Electric blankets
- Baby monitors
- Electric alarm clock
- Electrical Appliances like TV

The transmitter in mobile phones operates on about 0.75 watt (or much less, if you're close to a base station) to 1 watt of power, with 2 W at peak usage. This electric current running through the transmitter circuit also creates an electromagnetic field around it. As the electric

current moves back and forth, the fields continue to build and collapse, forming electromagnetic radiation.

Thus, cell phone radiation is generated in the transmitter, and is emitted through the antenna in the form of radio waves. In the case of cell phones, the frequencies of these radio waves fall in the low microwave range.

Most experts base their cell phone safety recommendations on the basic sinusoidal wave, also known as a “carrier signal.” However, what they fail to recognize is that the danger does not come just from the carrier wave but also from a modulated signal that actually carries the data or your voice, which operates at a different frequency than the carrier signal. Making matters worse, modern Digital Service and PCS cell phones—as opposed to analog cell phones—have two additional low frequency magnetic fields associated with them.

“Time division multiple access” (TDMA), is one of the systems currently used to increase the number of people who can communicate simultaneously with a base station. The process of TDMA results in a continuous low frequency pulsing at 8 to 34 Hz. Some phones also have the energy-saving discontinuous transmission mode (DTX), which emits yet a third, even lower frequency that pulses at 2 Hz when the user is listening and not speaking.

Since extremely low frequency radiation (ELF) has been shown to cause cancer—like leukemia—these additional ELF’s raise new questions.

Many warn that our current technology is in fact far more dangerous in this respect than previous analog models.

MOBILE PHONE RADIATION AND HUMAN BIOLOGY

Electrical waves pass straight through our bodies and an electric current is generated within. This is how an aerial works – waves come in and electricity is generated. The electricity generated in our bodies, like all electric currents, goes to ground (if able) and, like all electric currents, takes the path of least resistance. Unfortunately, the path of least resistance is through our bodies. To travel through our bodies the waves use the 10% of our pathways that carry 90% of our traffic, rather like freeways in peak hour. This 90% of our traffic consists of:

- Hormones which help regulate the functions of the body
- Antibodies which help fight disease
- Neurotransmitters which carry messages around the body

Thus 90% of our bodily functions can be severely affected by these harmful electrical currents. Although cell phone radiation is of low intensity, it is the oscillatory similarity between this pulsed microwave radiation and certain electrochemical activities within the body that raises serious concerns, according to the study [Physics and biology of mobile telephony](#), published in *The Lancet*. The body is essentially a very sensitive electromagnetic instrument, controlled by highly complex and orderly oscillatory electrical processes. Each one of these electro-biological processes vibrate at a specific frequency—some of which happen to be close to those used in modern GSM cell phone technology.

The pulsating, low-intensity microwaves from mobile phones can exert subtle, non-thermal influences on the human biology simply because microwaves are *waves*. As such, they have properties other than just intensity (which is the only part regulated by safety guidelines). Therefore, much in the same way as a radio can receive interference, your biological processes can be interfered with by the oscillatory aspect of the incoming radiation.

Highly organized electrical processes at the cellular level are especially vulnerable to interference from cell phone radiation, because their frequency happens to fall within the microwave range. Many of these biological activities are influenced by metabolism, meaning that the effect of

the radiation will be different from one person to another. The effect could also depend on the type of cell phone used, as different cell phones emit radiation at different frequencies.

Ultra-low intensity microwaves can affect processes as fundamental as cell division, and the TDMA frequencies of 8-34 Hz, and the DTX pulse frequency at 2 Hz, correspond to the frequencies of alpha and delta brain waves. {15} Therefore, the body has a two-fold sensitivity to cellular phone signals: The microwave radiation itself, plus the lower frequency oscillations of the TDMA and DTX signals. In addition to that, there's also the packet rate of newer 3G phones, which is 250 Hz. One good example of how someone may be vulnerable to the non-thermal electromagnetic influence is the ability of a flashing light (at about 15 Hz) to induce seizures in people with photosensitive epilepsy. It's not the energy absorption itself that causes the seizure. Rather it's because the brain recognizes the information being transmitted via the pulsating light, since it is delivered at a frequency the brain uses.

In fact, the cells in human body are loaded with receptors that specifically respond to these signals. So when you are exposed to these information carrying radio waves, the receptors are stimulated. Once that happens the delicate microtubular connections between the cells become impaired. Once they start to fail, the cells "lock up" and retain far more heavy metals and free radicals, which can wreak havoc in the body. In 2004, a Swedish physicist named Bo Sernelius, stumbled across a [surprising finding](#) that suggests non-thermal mobile phone radiation can cause a massive increase in the forces that living cells exert on each other. He discovered that electromagnetic forces might act on cells by affecting the attractive forces between them, without thermal heating.

HOW?

Water molecules have poles of positive and negative electrical charge that create attractive forces between cells, known as van der Waals forces. Van der Waals forces are much weaker than chemical bonds. And, whereas chemical bonds need high frequency ionizing radiation in order to break, van der Waals forces are disrupted by much smaller thermal fluctuations. These intermolecular forces may be weak, but without them, life as we know it would be impossible. Sernelius found that the water molecules inside cells will try to align their positive and negative poles with the alternating field produced by cell phone radiation. The result? They all end up pointing in the same direction, and this strengthens the van der Waals forces.

In the fields of 850 MHz (around the frequency used by mobile phones), the van der Waals forces leap—from a billionth-billionth of a Newton, to micro Newton strength—a massive jump of around 11 orders of magnitude. Although it's still only theoretical, this may be the missing link when trying to explain tissue damage from non-ionizing, non-thermal radiation. Stronger attractive forces between cells can also make them clump together, and cause blood vessels to contract. All in all, I believe the evidence is clear that EMF's can indeed harm your health, and that you would be best served to do whatever you can to limit your exposure to as many sources as possible.

One of the main concerns associated with cell phone use is that the phone is pressed to the head. Since electromagnetic radiation shoots out—at the speed of light—in all directions, this radiation can penetrate into the brain. And, as Dr. Mercola discussed in the article, [Cancer Institute Warns of Cell Phone Risks](#), electromagnetic radiation can penetrate almost straight through the entire brain of a 5-year old child.

The effect of these microwaves can be explained using the analogy of putting a frog in water. If you put a frog in boiling water, it will jump out. However, if you put a frog in cold water and gradually heat the water, you can cook the frog because the frog's body will adjust to the slight changes in temperature and it will not notice it is being cooked. Using wireless broadband,

Bluetooth, cordless phones, mobile phones & blackberry devices all use the microwave spectrum of radiation energy to work. This means that when we use them they are slowly cooking us as they heat up our cells without us being able to sense it until the symptoms start to appear.

In 1971 the US Government stated “Unless adequate monitoring and control based on fundamental understanding of biological effects are instituted in the near future, in the decades ahead, man may enter an era of energy pollution of the environment comparable to the chemical pollution of today. The electromagnetic hazard was identified in 1971 – to what extents are you exposed today? As we cannot see, touch, smell, taste or hear this radiation the only way to measure the levels are with a number of specific instruments designed for various types of radiation.

MOBILE RADIATION STUNTS CROP GROWTH

Mobile phones may have become ubiquitous in rural areas and popular among farmers. But electromagnetic radiation emanating from them may be stunting the growth of agricultural crops and plants, preliminary research has revealed. Studies carried out at Panjab University, Chandigarh, suggest that electromagnetic field (EMF) radiation from cell phones could choke seeds, affect germination and early growth. This is said to be the first such study on the impact of EMF radiation on seeds. Though different groups of scientists have been studying the effect of mobile radiation on human beings, there has been no conclusive outcome yet. But Panjab University scientists have found definite clues on the ill-effects of electromagnetic radiation on crops and plants.

The results were surprising - they indicated that the radiation emitted from the cell phones inhibited germination and early growth of the pulse. The germination of the seeds exposed to two and four hours of cell phone radiation reduced by 18 and 30 per cent respectively, compared to seeds that were not exposed to any radiation.

THE BIRDS, THE BEES AND ELECTROMAGNETIC POLLUTION

This is another article written by Andrew Goldsworthy, covering the understood mechanisms by which animals use the Earth's magnetic field for navigation, and how man made electromagnetic radiation may cause a number of potentially severe problems.

"Animals use their cryptochrome pigments for both magnetic and solar navigation.

They also control the activity of the immune system. Weak electromagnetic fields can

affect all of these functions with disastrous consequences."

RESEARCH AND FINDINGS

The [2004 REFLEX report](#) also summarizes multiple projects from a dozen different research groups, on the genotoxic potential of radio frequency radiation. Agents that can damage

cell DNA are called genotoxins, and are presumed to have carcinogenic potential. The REFLEX report received a lot of attention because of the genotoxicity reported, including: Intermittent, but not continuous, Extremely Low Frequency ELF-EMF exposure damages DNA in human cells. DNA damage is dependent on the frequency, but higher frequency does not necessarily correlate with more damage. The frequencies causing DNA damage were ranked, from high to low damage, as follows: 50 Hz, 16 2/3 Hz, 3 Hz, 300 Hz, 550 Hz and 30 Hz.

DNA strand breaks after ELF-EMF exposure and it is dependent on the person's age, with older individuals showing a higher rate of DNA damage.

DNA damage through ELF-EMF radiation is cell type specific. For example, human melanocytes (deep layer epidermal cells that synthesize melanin) reacted, whereas skeletal muscle cells did not. ELF-EMF radiation generated several types of chromosomal abnormalities in human cells.

The radiation of wireless communication indeed has effects on the central nervous system, influences the functioning of the brain and causes damage to DNA. That is confirmed by 25 experts who studied the relevant scientific literature of 2000 to 2004. The investigation was done by the working group 'Mensch Umwelt Technik' (MUT) of the Jülich research institute in Jülich, Germany. The results were presented to the public on May 9th, 2005. The experts guess that the effects on the central nervous system can not cause health problems, though this opinion has no scientific base. The influence on the brain results in shortened or prolonged reactions time and less or more mistakes, depending on the parameters of the radiation. The experts think the damage to DNA is not a problem, since it would not lead to cell damage.

This investigation was ordered and paid by T-Mobile, a provider of mobile communications. The experts only studied scientific reports and did not pay attention to the many experiences of people suffering from health effects of modern radiofrequency radiation. The complaints of these people however fit in perfectly with the effects on the central nervous system, increased neuronal activity and influence on the functioning of the brain. The damage to DNA moreover fits in well with the results of epidemiologic investigations, finding an increased risk of cancer in the neighbourhood of antenna towers. The experts however state that the results of epidemiologic investigations are not conclusive and more research is needed. In the meantime they advise to keep mobile calls short and not to use a mobile phone in a moving car without outside antenna nor at a far distance from the antenna tower.

Risk Groups

Young and healthy people are not at risk, say the experts. However, the radiation of mobile communication systems (probably combined with other factors) could be harmful to other groups, like children, elderly or sick people, babies and pregnant women. Probably the pulse-modulated radiation has most effect on the central nervous system and brain. The working mechanism is non-thermal and not yet understood. Pulse-modulation is used by e.g. GSM, UMTS, DECT, WLAN, WIFI, TETRA and many other wireless systems. The experts say headaches and problems with concentration and remembrance could be related to the radiation of mobile phone systems, but according to the literature other complaints probably are not. Having studied the scientific literature, they doubt if electrohypersensitivity (EHS) exists, but they emphasize that the absence of evidence is not evidence of absence.

No Consensus

The experts studied the permeability of the 'blood brain barrier', the risk of cancer, the damage to DNA, the effects on the brain and central nervous system and the disturbance of well-being. About the permeability of the 'blood brain barrier' there is no consensus. The experts think the 'blood brain barrier' could fail under stress or thermal conditions, but without relevance to health. There is no consensus about the damage to DNA. However, the experts think this cannot be relevant biologically and to health, since the literature does not mention cell damage as a consequence. Laboratory tests with animals do not show an increase of cancer. Nevertheless the experts say there could be an increased risk of cancer in humans in the long term. They advise to be on the safe side and keep mobile phone calls short.

CONCLUSION AND RECOMMENDATIONS

Long-lasting adverse effect on important cells of our immune system can have strong relationship with health risk from mobile telephony. *In vitro* studies indicate that the duration of exposure can be more important for non-thermal effects than intensity and therefore, effects of microwaves from base stations on primary human cells should be studied.

Remember, the damage from cell phone exposure will take many years to surface, and there are rarely any initial symptoms, just like smoking and lung cancer. At this point, you cannot completely avoid wireless radiation from all sources, such as WI-FI, since they are so pervasive. Getting rid of your cell phone altogether can help protect you. But even if you don't want to take that step, you can still minimize your exposure and reduce your risks by following these common sense guidelines.

1. Remove any plugged in devices in and around sleeping areas; including electric blankets, waterbeds, extension cords and clock radios.
2. Check where your meter box is and don't sit or sleep near here.
3. Do not have wireless emitting devices in the home. Yes, this means wireless internet too! These bring in and emit microwaves radiation which can pass through brick walls, so there is no escape for the body. If you must have them, turn them off when not in use.
4. Do not site your buildings near or under a power lines.
5. Children should never use cell phones: barring a life-threatening emergency, children should not use a cell phone, or a wireless device of any type. Children are far more vulnerable to cell phone radiation than adults for a number of reasons. First, their thinner skull bones allow for greater penetration of radiation. The radiation can enter all the way into the midbrain, where tumors are more deadly. In addition, children's cells reproduce more quickly, so they're more susceptible to aggressive cell growth. Their immune systems are also not as well developed as adults. Lastly, children face a far greater lifetime exposure.
6. Reduce your cell phone use: turn your cell phone off more often. Reserve it for emergencies or important matters.
7. Use a land line at home and at work: although more and more people are switching to using cell phones as their exclusive phone contact, it is a dangerous trend and you can choose to opt out of the madness.

Reduce or eliminate your use of other wireless devices: you would be wise to cut down your use of these devices. Just as with cell phones, it is important to ask yourself whether or not you really need to use them every single time. It's important to realize that portable phones are also highly problematic. Recent research has linked portable house phones to an increased heart rate in people who are electromagnetically sensitive.

8. Use your cell phone only where reception is good: the weaker the reception, the more the power your phone must use to transmit. And the more power it uses, the more radiation it emits, and the deeper the dangerous radio waves penetrate into your body. Ideally, you should only use your phone with full bars and good reception.
9. Turn your cell phone off when not in use: as long as your cell phone is on, it emits radiation intermittently, even when you are not actually making a call.
10. Keep your cell phone away from your body when it is on: the most dangerous place to be, in terms of radiation exposure, is within about six inches of the emitting antenna. You do not want any part of your body within that area. It's worth nothing that your cell phone manual will actually tell you the minimum safety range of operation for your phone, even when not in use. For example, the iphone states the phone must be at least 5/8 inch away from your body or ear for "safe operation." Almost all of them state that the cell phone "should NOT be worn or carried on the body."
11. Use safer headset technology: wired headset will certainly allow you to keep the cell phone farther away from your body. However, if a wired headset is not well-shielded—and most of them are not—the wire itself acts as an antenna attracting ambient radiation and transmitting radiation, not only directly to your brain, but also all along your torso. The best kind of headset to use is a combination shielded wire and air-tube headset. These operate like a stethoscope, transmitting the information to your head as an actual sound wave; although there are wires that still must be shielded, there is no wire that goes all the way up to your head.
12. Use a shielded case: there are some shielded cases on the market, but you could also purchase a certain kind of EMF-shielding fabric. Making a pouch from this fabric to put inside your regular case can help shield up to 99.9 percent of the radiation emitted if you cover the entire phone and antenna. If you wrap most of the phone but leave the antenna out, you'd still achieve a significant reduction in radiation, but it would not be nearly as effective as wrapping up the entire phone. This is a particular useful solution to significantly reduce unnecessary radiation exposure if you simply must carry the phone on your body.

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ESTIMATING AND ADJUSTING FOR PUBLICATION BIAS OF VITAMIN A DEFICIENCY (VAD) IN META ANALYSIS

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INTRODUCTION

Meta Analysis is collection of data systematically and synthesizing the results from individual studies to estimate overall size. Studies with positive results are more likely to get published than those studies with negative results. By using only the results of more positive studies leads to publication bias. We have used different methods to detect this publication bias. The present study was started in the year 2008 which is aimed with the objective To estimate & detect the effect of publication bias in meta-analysis of vitamin A deficiency and adjusting for the bias.

OBJECTIVES

1. Meta Analysis of available published or unpublished information of three important Micronutrient Deficiency Disorders namely Vitamin A, Iron Deficiency Anemia(IDA) and Iodine Deficiency Disorders.
2. To study regional/ecological variations of these three micronutrient Deficiency Disorders in Rajasthan by systematic reviews and
3. To map out the districts for three micronutrient deficiencies in the western region.

MATERIALS AND METHOD

The data of meta analysis was collected through literature search for the Vitamin A Deficiency (VAD)Lakshminarayana, J. and Madhu B. Singh(2008). The systematic review of these meta analysis were carried out. The data consists of 15 publications to study the effect of Vitamin - A among school children . The duration was considered to be for a period of 10 years. We have used a binomial model to estimate the results and rank correlation method proposed by Begg and linear regression method proposed by Egger & Trim and Fill method to evaluate bias. The publication bias was adjusted by using "Trim & Fill method. The analysis was done using EPI META package³. The effect size and the standard errors were calculated for all the studies and were depicted in the figures

METHODS FOR DETECTION OF PUBLICATION BIAS

Funnel plot, Begg's Rank Correlation method

Egger's and smith, 1997. Regression method

Trim and Fill method (which also adjust for publication bias.)

A funnel plot is a plot of each trial's effect size against measure of its size, such as the

precision, the overall sample size, or the standard error.

Trim and Fill Method

It is a method to evaluate bias in funnel plots.

Firstly, the number of “asymmetric” trials on the right side of the funnel is estimated.

It trims off or removes these trials from the funnel leaving a symmetric remainder to estimate the true center of the funnel. The trimmed trials are then replaced and their missing counterparts imputed or “filled”

RESULTS

The two sided P values from the methods of Begg and Eger are 0.04 and 0.05 indicating the possible existence of publication bias. By Trim & Fill method ignoring publication bias the fixed effect model was fitted to see the overall estimates of pooled Odds Ratio is 1.16 with 95% CI (0.69, 1.82) Eger, M and smith GD (1985). A Funnel plot was plotted which Asymptotical, indicating the presence of publication bias was. When Trim & fill method was applied, one study which had missing variables was filled and we obtain an overall estimate of pooled odd ratio 0.98 with 95% CI (0.42, 1.56). The effect size and standard error were calculated for all the studies and depicted in the figure1 and 2. The figure 1 shows that there exists no publication bias and figure 2 shows studies with publication bias among the studies. The studies with publication bias the points show skewed distribution. If there is no publication bias the points show normal distributed (Funnel shaped) .

Fig.1

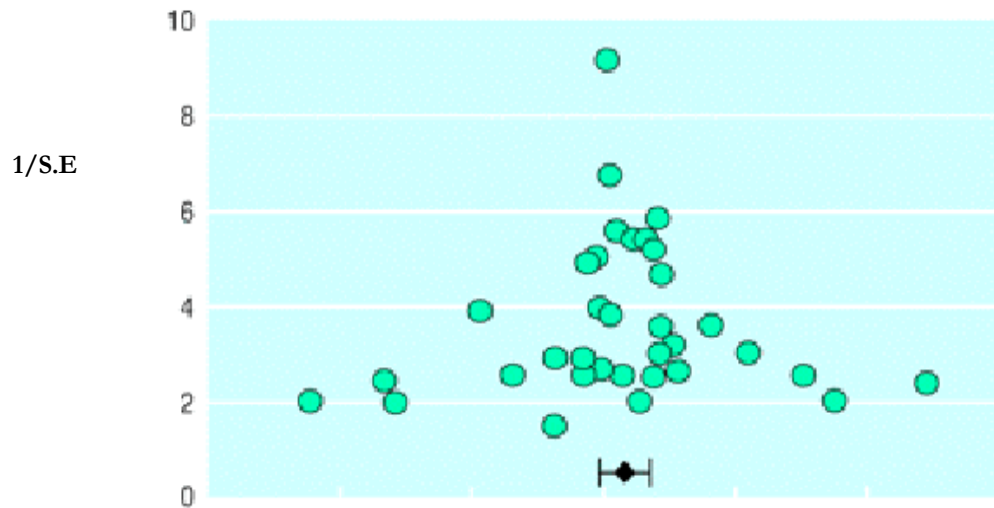
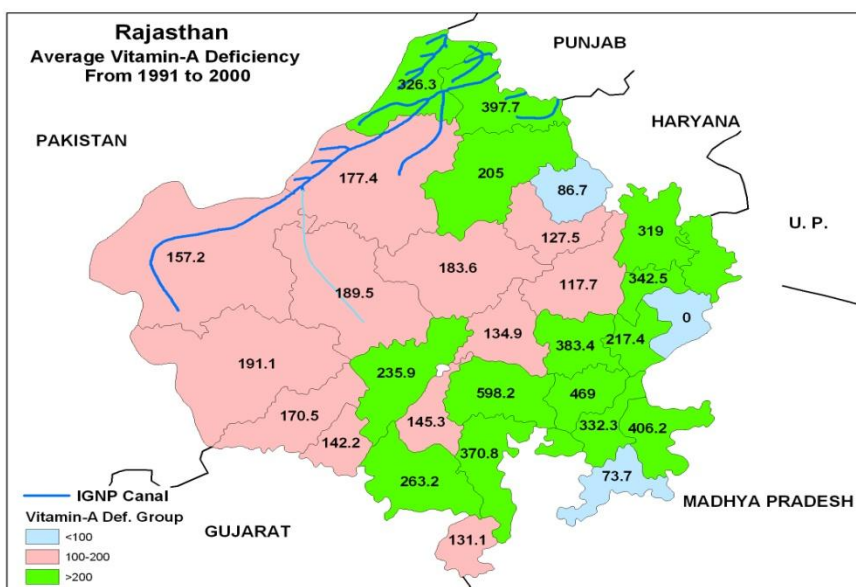
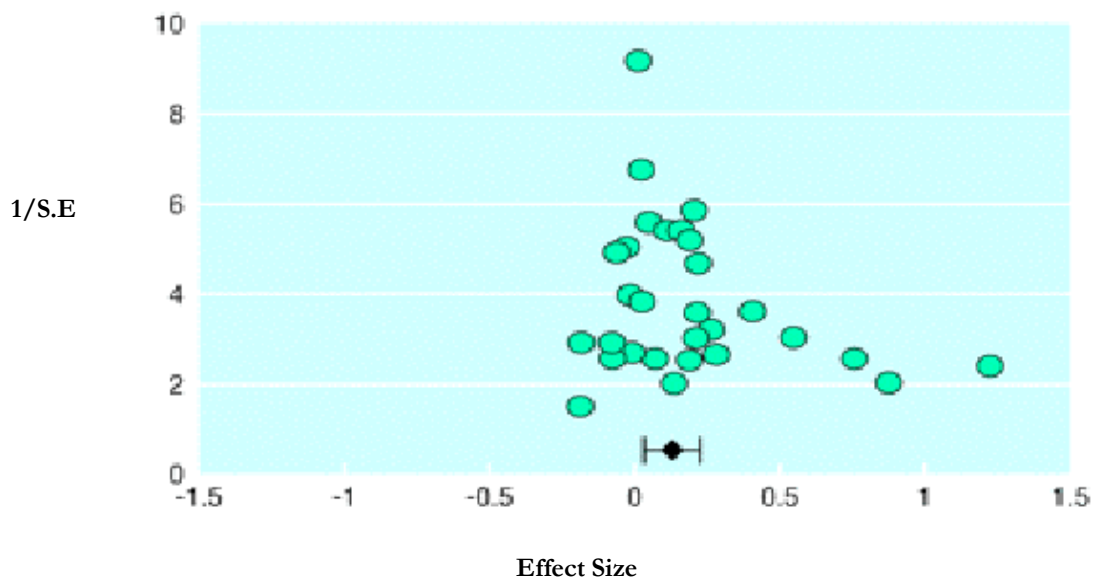


Fig. 2



CONCLUSION

The overall estimate of pooled odds ratio is reduced in the adjusted model. Thus this method gives reliable estimates and gave us the potential to derive and to see the incorrect conclusions drawn, if the publication bias do exists among the published studies. After correcting for bias by different models the over all conclusions could be drawn that the intervention studies are to be planned in the desert areas of Rajasthan for the improvement of the health of the people

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AGGREGATE ANALYSIS OF THE IMPACTS OF TELECOMMUNICATION INFRASTRUCTURAL DEVELOPMENT ON NIGERIAN ECONOMY

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Abstract

The world has become a global village with communication being an indispensable tool in the entire globalization process. The roles of Telecommunications and Information Technology (IT) have become highly essential in this process. In Nigeria, development in this vital sector has been very phenomenal and the usage of Telecommunication (GSM) has become very prominent with noticeable effect on several economic aspects. It is however instructive to investigate the effects of this latest technology on communication on the Nigerian Economy. The study examined the effects of telecommunication infrastructural development on the Nigerian economy and examined the growth implication. Secondary data was used for the study. Data collected was analyzed with econometrics technique, in the econometrics technique used, model was specified and Ordinary Least Square method (OLS) was used in estimating it. However, the findings revealed that telecoms have influenced the economy by increasing their market access and reduced distribution cost, which invariably affected the service provider cost. Also, the study revealed how GSM has enabled Nigerians to transact their businesses easily resulting in higher productivity; reduction in poverty level and prevalence through increase in income generating capacity and business expansion; improved living standard; boosted economic capacity, and stimulate the economy to achieve the desired macroeconomic policy targets.

Key Words: Tele-density, Telecommunication and Gross Domestic Product (GDP)

INTRODUCTION

The world has become a global village with telecommunication being an indispensable tool in the entire process of globalization. However, it is not in dispute that Telecommunications and Information technology (IT) play essential roles in this process. This is obviously why development in this vital sector over the years has been phenomenal all over the world. In fact, this is why emerging trends in socio - economic growth shows high premium being placed on Information and Communication Technology (ICT), by nations, organizations and homes. Nigeria, fortunately, has not been left out of this race for rapid development in the telecom industry. Unlike in the past, governments consider telecommunications service to be so vital to national interest and economic development that it was placed directly under their control in most countries until fairly recently, when deregulation and competition were introduced (Lee, 2003). These recent advances in telecommunications technology have been an important vehicle in permitting information exchange to develop as a valuable commodity for moving the country into post industrial and information based economic growth. In this present world, a modern telecommunication infrastructural development is not only essential for domestic economic growth, but is a prerequisite for participation in increasingly competitive world markets and for attracting new investments.

Given this development, the perspective on telecommunications development research today should concentrate on how best to increase and include telecommunication as an essential component of the economic development. Telecommunication infrastructural development should indeed be seen as an indispensable precedent in economic development. According to World Bank (1995), late starters in the telecommunications, “will risk exclusion from the global economy and face severe comparative disadvantage on their goods and services”. The development of telecoms in the world began in the 1830s. According to Ajayi, Salawu and Raji (2008), Sir Charles Wheatstone constructed the first commercial electrical telegraphy and Sir William Forthergill Cooke Samuel Morse on the other side of the Atlantic Ocean independently developed another version of electrical telegraphy that he unsuccessfully demonstrated on 2nd September 1837. Soon, after Alfred Vail developed the register and was successfully demonstrated on 6th January, 1938. The first transatlantic telegraphy label allowing transatlantic telecommunication for the first time was successfully completed on 27th July, 1866. Alexander Bell invented the conventional telephone in 1876 and the first commercial telephone services were set-up in 1878 and 1879 in both Haven and London (ITU, 1999).

Further development of telecoms in the world was prompted by the need to provide seamless telecommunications throughout Europe. In the early 1980s, analogue mobile telephony grew rapidly and operators found it increasingly difficult to interconnect the various networks in Europe. On the basis of this, a study group called “Group Special Mobile” was formed and was tasked to provide a standardized system for mobile telephony, which was realized seven years later. However, Nigeria today has not been left out of this race for rapid development, after years of gross under-development; the nation’s telecom was liberated with the return of democracy in 1999 and the deregulation of the telecoms sector. This led to the granting of Global System for Mobile Telecommunication (GSM) licences by the Nigerian Communication Commission (NCC) to three providers like Econet, MTN, and M-tel. This was followed by the licensing of the Second National Operator (SNO), in 2003; that is, Globalcom and Universal Access Service licenses of 2006 which include fixed telephony, VSAT and internet service providers. Also, in March 2008, the NCC gave license to another GSM operator known as Etisalat (Aigbinode, 2008).

The recognition that telecommunications development is an important input in a household or a nation’s production function has major implication for development policy. In Nigeria, given the long years of decadence, the factors responsible for the slow growth in telecoms sector in spite of the encouragement and enormous investment by the government before the deregulation in the 1990’s were not looked into. In addition, the fact that the trend and the revolution of the development of telecommunication (GSM) growth on Nigerian Economy have not received a great deal of attention from researchers prompted this study and it is against this background that this study has been conceived and inspired

LITERATURE REVIEW

Early work on economic growth and development highlighted the necessity of adequate infrastructure as a basis for development. Hirschman (1958) recognized the importance of social over-head capital, which he defined as those services without which primary, secondary and tertiary production activities cannot function. The social over-head capital includes all public services from law and order through education and public health to transportation, communications, power and water supply.

According to Belaid (2002), fewer studies focus on specific telecommunications infrastructure and their role in economic performance. The main ones concentrate on a

contribution of telecommunications in reducing transaction cost, increasing TFP (Total Factor Productivity) of the private sector and diffusion of new technologies, which will remedy the problem of the developing countries. To Star and Bowker (2002), infrastructure is embedded within other structures and technologies; it is transparent in use, not needing to be reinvented at each use and only becoming evident when it breaks down. Ricketts (2002), viewed telecommunications as aiding the coordination of information flow, provides opportunities for increasing the efficiency of interaction and coordination, and in this manner influences the success of economic activities. Economic activities require significant levels of interaction and coordination in order for them to be conducted successfully and efficiently.

Alleman, Rappoport and Taylor (2004), asserted that a modern telecommunication infrastructure is not only essential for domestic economic growth, but also a prerequisite for participating in increasingly competitive world markets and for attracting new investments. Governments and private agencies in both developed and less developed countries spend large sums of capital on infrastructure investment so as to positively influence economic activities in terms of employment, value added, productivity, capital formation and income. Furthermore, investing in telecommunication like other infrastructure investments will increase the demand for the goods and services used in their production and increase total national output. And most telecoms investment positively affects economy in three ways:

- First, it reduces the cost of production ;
- Second, it increases revenue and
- Third, it increases employment through both direct and indirect effects.

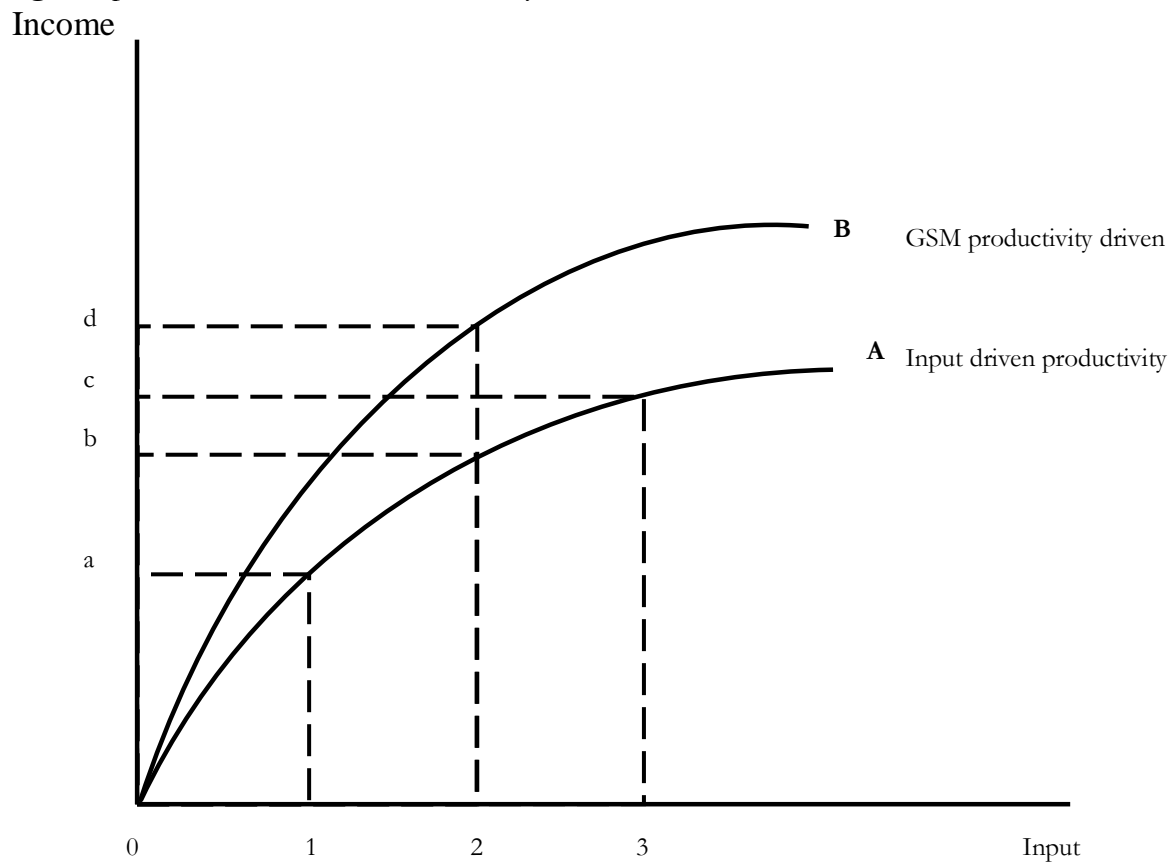
Vuong (2008), reported how mobile phones promotes economic growth through an example of Fishermen in the South of Indian by communicating through mobile phones, they were able to sell their fish in markets where the demand was high. This resulted in less waste of fish, higher benefits and lower cost of doing business, more access to information, which leads to more efficient operations which in the end affect the economic growth. Also, Roller and Waverman (2001) and Waverman, Meshi and Fuss (2005), in their studies on telecoms, opined that telecoms infrastructure can lead to economic growth through many different ways. Firstly, according to them, investing in the telecom sector itself leads to growth; Secondly, increased demand in telecom related goods and services e.g. producing cables, machines, extra workloads etc. contributes to growth. More importantly, as telephone technology improves, people communicated more regularly over bigger distances.

According to Rodini, Ward, and Woroch (2003), Telecommunications has impact on Human and Social capital through history, theory and growth in the developing world in Development Economies. In recent years, there have been a large number of telephone demand studies that emphasized the substitution or complementary between fixed and mobile telephone services. While some of these studies find substitution between mobile phones and fixed phones systems using consumer phone data. Vagliasindi, Guney and Taubman (2006); Minges (1999); Madden and Coble-Neal (1999); and Okada and Hatta (1999), found out that mobile phones and fixed phones are moderate substitutes and that the lower the penetration rates of fixed phones, the stronger the substitutability between fixed and mobile phones. This may be similar to the African situation (including Nigeria) since telephone penetration rates are low in Africa compared to other parts of the world. It is therefore, interesting to note that telecoms infrastructure has strong positive effects on economic growth, especially for a developing country like Nigeria.

THEORETICAL FRAMEWORK

This study examined the impacts of telecommunication development on Nigerian economy under the framework of the theory developed by Mankiw, Romer, and Weil (1992). However, since the prevalent usage of GSM is likely to improve living standard of users. Theoretically, the aggregate improvement will translate into economic growth. Figure 1.1 illustrates how telecommunication improvement brings about growth through productivity gain.

Fig 1: Input Driven and GSM-Productivity- Driven Income Growth Curve



When input (income, human capital and labour) is increased from 1 to 2 units, income increased from a to b. with additional inputs, the income is increased, but at a decline rate from b to c. This is because it is subject to decreasing returns. A movement along individual productivity function A reflects the income growth gained from additional inputs. Income growth through improvement in productivity can be derived from the application of improved technological innovations (such as usage of GSM). This can cause the productivity to rise upward from A to B, and without any additional inputs, the output will grow from b to d, which comes only from improvement in productivity (production –driven income growth). Another source of productivity growth is savings in transaction cost that result from the usage of GSM. This is made possible through what can be termed 'mobile—command' which covers all financial and commercial transaction that take place through the use of GSM. In addition, GSM generates economic growth through generation of direct and indirect employment. The direct employment include those that work in service provider companies, those that deal in retail and whole sale trading of recharge cards, handsets, batteries, chargers, etc. it also include those that provide repairs and engineering services.

METHODOLOGY OF THE STUDY

Ordinary Least Square (OLS) method was used to estimate the parameters of the model. The normality assumption on the error term in regression model suggests OLS as the best-unbiased estimator (Gujarati, 1995). This was because the OLS estimator of σ^2 is $\sum \hat{U}_i^2 / (n-k)$ where n and k are the total numbers of observations and estimated parameters takes into account the number of degree of freedom. The aim of the regression analysis was to obtain and test for significance of the parameters in the model. This aim can best be achieved using OLS method, which yields unbiased, consistent and efficient estimates. Such result lends itself to easy and clear interpretation.

The Growth Model

The growth model is specified mathematically as;

$$GDP = F (TELED, LGSM) \dots\dots\dots(1)$$

This can be expressed in a linear form as:

$$GDP = \Phi_0 + \Phi_1 TELED + \Phi_2 LGSM \dots\dots\dots(2)$$

If we include the error term, equation (2) can be rewritten as

$$GDP = \Phi_0 + \Phi_1 TELED + \Phi_2 LGSM + U_i \dots\dots\dots(3)$$

Where GDP = Gross Domestic Product

TELED = GSM Tele-density

LGSM = GSM connected lines

Φ_0 = constant Factor

Φ_1, \dots, Φ_n = slopes of the variables for estimation.

U_i = Error term

On theoretical ground, (a priori) we expect the parameters to take positive signs i.e. $\Phi_1, \Phi_2, >0$. This mean there should be positive relationship between GDP growth rate, GSM Tele-density and GSM connected lines.

DISCUSSION OF THE RESULTS

The model postulate that the level of economy depends on the volume of GSM services rendered and telephone density. The data period is from 2001 to 2008 (Appendix, Table 2.1). This was the most appropriate period as GSM started effective in Nigeria in 2001, while data on 2009 is still unavailable. The result of the regression as reported in Table 1.1 showed that both the GSM connected lines (GSM) and Tele-density (TELED) have significant impacts on Gross Domestic Product (GDP). For instance, GSM variable is positive with 0.165 and 7.07 as coefficient and t-value respectively. It implies that an increase in number of GSM connected lines may translate to about 1.7% increase in GDP. As the GSM connected lines increases, it will result in greater employment and income

generation. It would also result in lower cost of doing business as cost on travelling as well as transaction cost will reduce. These reductions in cost boost investment and promote more production of goods and services. It also resulted to increase in productivity and efficiency. With respect to the tele-density, as expected, the sign is negative but significant. Higher density implies that the higher number of people has no access to telephone. As the density reduces the telephone lines per 1000 person reduces and more people have access to telephone. Therefore, Nigerians are able to transact and promote their business easily, resulting in higher productivity and increase in standard of living.

Table 1: Regression Results on Effect of GSM on the Growth of Nigerian Economy

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	10.55028	0.339110	31.11165	0.0000
LGSM	0.165212	0.023346	7.076657	0.0009
TELED	-0.004021	0.002822	-1.425070	0.2135
R-squared	0.985432	Mean dependent variable		13.16703
Adjusted R-squared	0.979604	S.D. dependent variable		0.211796
S.E. of regression	0.030247	Akaike info criterion		-3.878829
Sum squared residual	0.004574	Schwarz criterion		-3.849038
Log likelihood	18.51531	F-statistic		169.1061
Durbin-Watson stat	1.536237	Probability (F-statistic)		0.000026

Source: Data analysis, 2010.

The result of the regression as reported in the table above shows that both the GSM connected lines (GSM) and Tele-density (TELED) are significant and affect gross domestic product (GDP) positively.

- i The Coefficient of The Multiple Determination R^2 : The coefficient of the multiple determination stood at *0.979604* (i.e. 97%). This means that the explanatory variables: GSM Tele-density and GSM connected lines accounted for 97 percent of the total changes in the dependent variable (GDP). This shows that the regression result is a good fit.
- ii The Standard Error: The value of the standard error for the entire variables in the model shows that the parameter estimate were statistically significant. These values were less than half of the values of the coefficient of the variables.
- iv Durbin–Watson Statistics: The test for the presence of autocorrelation was performed by making use of the Durbin Watson statistics. The Durbin Watson statistics is 1.5. This was found to be within the normal region which falls within the determined region (i.e. $1.5 < d < 4$) and imply that there is negative first order serial autocorrelation among the explanatory variables.
- v The GSM lines variable was correctly and positively signed. It was also statistically significant. The expected outcome of this coefficient is a positive one. The implication of this result is that, if GSM lines increases in the long-run, all other things being equal, the economy will grow. It shows that a percent rise in GSM lines will cause as much as 17 percent growth in the gross domestic product. This result indicated that GSM lines have the greater influence on the growth of Nigerian economy. From economic point of view, if GSM lines increases, it would reduce the cost of business such as cost on mobility and travelling as well as transaction cost. This reduction in cost would boost investment and promote more production of goods and services.
- vi With respect to the Tele-density, contrary to expectation, the sign is negative but significant. Higher density implies that; the higher the number of people who has access to telephone as the density reduces, the telephone lines per 1000 person reduces and fewer people will have

access to telephone. The implication of these results is that Tele-density is still very low to permit an overall increase in output growth in Nigeria.

SUMMARY OF FINDINGS

- (i) The Nigerian economy is predicted to have naturally gained from emerging into information technology age. Meanwhile, a licensing process universally adjudges to have been rare display of transparency, openness and non – intervention, has turned the fortunes of the country around, and consequently raises investor’s confidence in the Nigerian market and economy.
- (ii) Thus, the outcome of the empirical and stochastic investigations shows that Telecommunication Infrastructural Development has a positive relationship with output growth in Nigeria. The impact is of a higher magnitude. The introduction of Global System for Mobile telecommunication (GSM) led to 17 percent rise in the output growth.
- (iii) In addition, it was discovered that if the Tele-density should increase to a considerable level in Nigeria, there would be industrial and technological transformation and the growth and development of Nigeria economy would be sustained.

CONCLUSION

The Nigerian economy is predicted to have naturally gained from emerging into information technology age, with a licensing process universally adjudges to have been rare display of transparency, openness and non – intervention, has turned the fortunes of the country around, and consequently raises investor’s confidence in the Nigerian Telecoms market and economy. Likewise, Telecommunication has also increased employment generation, reduced transportation costs, increased business efficiency, attracts foreign funds, and a host of other benefits.

RECOMMENDATIONS

From the findings and conclusions presented above, recommendations were made to the management of the regulatory body of mobile Telecommunication in Nigeria; that is, the Nigerian Communication Commission, the GSM operators in Nigeria (both public and private) and the Federal Government of Nigeria. The government should expand tele-density and directly make telephone communications cheap and accessible. To achieve this goal, more licenses should be given to GSM operators in order to allow for healthy competition among the GSM operators.

In addition, the NCC should ensure that the interests of the consumer of telecommunication services are protected by promoting competitive pricing of such services and combating the abuse of market power. Since the success of a very effective telecommunication requires a very efficient and honest administration on the part of the government and on the part of the GSM operators, the NCC should also ensure that consumers are given value for their money, and misleading adverts by the Nigerian GSM operators should be stop as this does not conform to international practices.

Table 2: Telecoms Subscriber Information (Year 2001 – March, 2008)

		2001	2002	2003	2004	2005	2006	2007	Jan 08	Feb. 08	Mar 08
Connect-ed Lines	Mobile (GSM)	266,461	1,569,050	3,149,472	9,174,209	18,295,896	32,184,861	54,413,784	56,492,255	57,720,782	57,622,90
	Mobile (CDMA)	N/A	N/A	N/A	N/A	N/A	N/A	824,741	621,604	702,146	780,938
	Fixed Wired/wireless	600,321	702,000	872,473	1,027,519	1,223, 58	1,673,161	2,449,019	2,454,443	2,417,705	2,537,504
	Total	866,782	2,271,05	4,021,945	10,201,728	19,519,154	33,858,022	57, 87,544	59,568,302	60,840,633	60,941,348
Active Lines	Mobile (GSM)	N/A	N/A	N/A	N/A	N/A	N/A	40,011,296	41,049,103	42,483,091	43,786,542
	Mobile (CDMA)	N/A	N/A	N/A	N/A	N/A	N/A	384,315	413,198	424,325,	567,185
	Fixed wired/wireless	N/A	N/A	N/A	N/A	N/A	N/A	1,579,664	1,453,566	1,430,616	1,545,984
	Total	N/A	N/A	N/A	N/A	N/A	N/A	41,975,275	42,915,867	44,338,032	45,899,711
Installed Capacity	Mobile (GSM)	N/A	N/A	N/A	N/A	N/A	N/A	76,545,308	77,545,308	77,545,308	79,625,308
	Mobile (CDMA)	N/A	N/A	N/A	N/A	N/A	N/A	1,540,000	1,520,000	3,720,000	3,170,000
	Fixed wired/wireless	N/A	N/A	N/A	N/A	N/A	N/A	6,578,303	5,633,251	5,576,481	5,676,481
	Total	N/A	N/A	N/A	N/A	N/A	N/A	84,663,611	84,698,559	86,841,789	88,471,789
	¹ Teledensity	0.73	1.89	3.35	8.50	16.27	24. 18	29.98	30.65	31.67	32.79

Source: Tell, 2008.

¹Teledensity was calculated based on population estimate of 126 million people up till December 2005: from December 2006, Teledensity was based on a population of 140 million.

²Teledensity from December 2007 was based on active subscriber

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CANCUN ACCORD: WILL IT BE A REALITY OR PROVED TO BE A MYTH?**Badar Alam Iqbal¹ and Farha Naaz Ghauri²**¹*Department of Commerce, Aligarh Muslim University, ALIGARH (UP), India*²*Department of Commerce, B.A.M University Aurungabad(Maharashtra), India**E-mail: ba.iqbal.cm@amu.ac.in; badar.iqbal@myamu.in; fngjob@yahoo.com; fngfir@yahoo.com***Abstract**

Global warming or climate change is the most critical and strategic issue of 21st Century. For the last 25 years i.e. from 1985, global warming summits have been taking place. But the real breakthrough has not been come up and the same has become a distant dream. Copenhagen or COP 15 Accord made some head way and as a result, global leaders took note of it. But the same was not considered as a decision and hence, there was no legal binding on the members in respect of cut in global carbon dioxide emissions (chart). Keeping in mind the out come of Copenhagen Summit, it was believed that Cancun summit would give some concrete solution to the problem of global warming or climate change. The Cancun summit out come is mixture of optimism, consensus and compromises. Therefore, the present paper examines Cancun agreement at a glance and the reasons for optimism, consensus and compromises. The paper also opines whether Cancun Accord would be proved to be a reality or otherwise.

Keywords:Bali Summit, Copenhagen Summit, Cancun Accord, Global Carbondioxide Emissions.

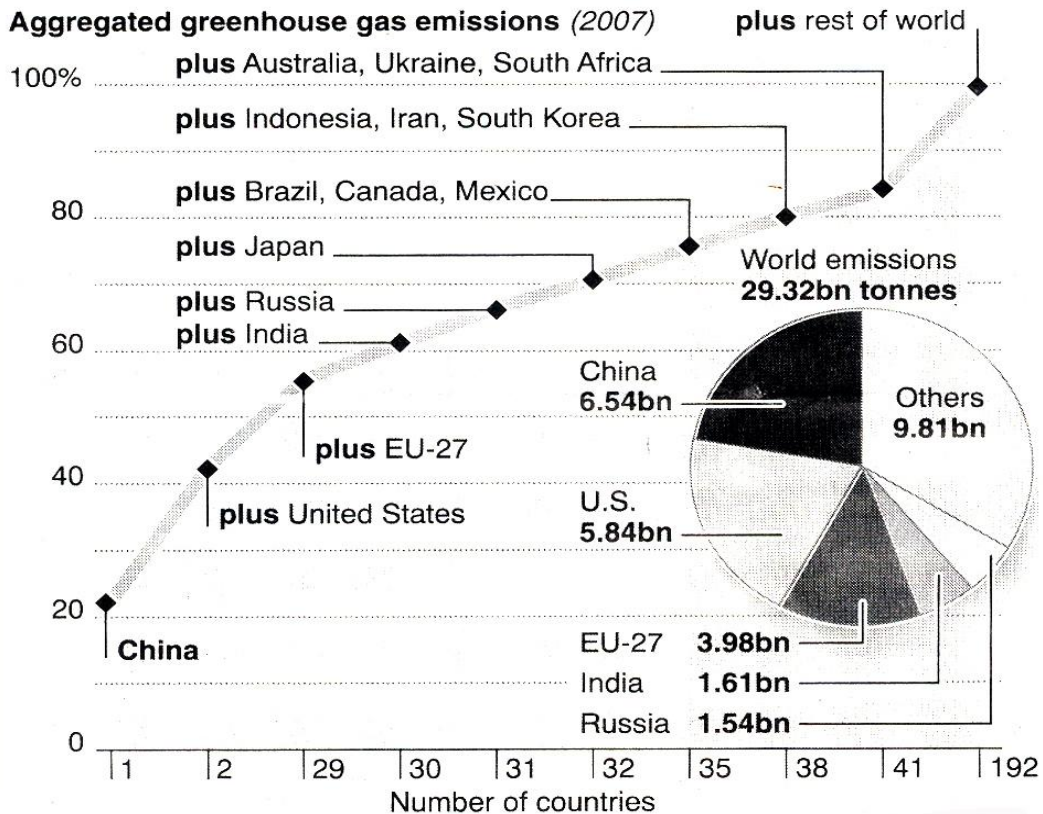
INTRODUCTION

According to the report prepared by World Climate Research Programme (WCRP), the frequency of extreme climate events, their magnitude and extent are rising and there are enough bases for strong action to enforce mitigation and adaptation measures at Cancun Summit. This is because there has been a linkage between climate change and the frequency of heat waves.

Chart 1

World's largest greenhouse gas emitters

UN climate talks in Cancun, Mexico, will attempt to cut greenhouse gas emissions and hold global temperature rises to below 2 deg C. Of the UN's 192 members, just 35 states generate three quarters of all emissions

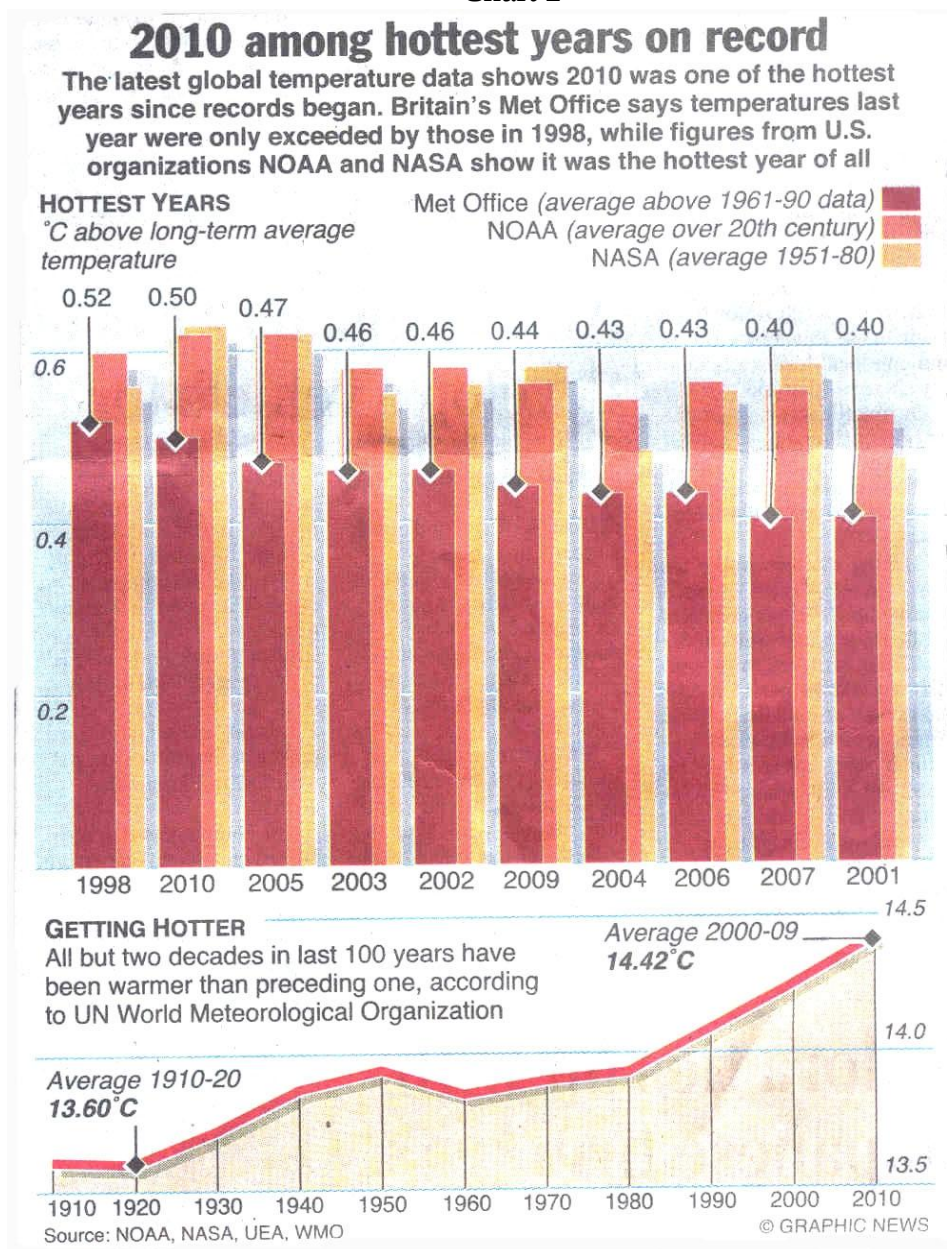


Source: UN Statistics Division, Millennium Development Goals indicators

Since the year 1998, the world has witnessed ten warmest years. The decade of 2000s was warmer than the decade of 1990s and the decade of 1990s was warmer than the decade of 1980s. Global mean sea level is higher now and is rising more rapidly than any other time in the last 3000 years at the rate of nearly 3.4 millimeters a year. Major events from extreme cold winter in Siberia in 2001 wherein the temperature went down to unbearable and unimaginable level of -60; hurricane Catarina in 2004 that developed in the South Atlantic Ocean for the first time, the worst drought in Brazil, the deadliest hurricane since 1928-Katrina, the tropical cyclone Nargis that hit Myanmar; floods in Pakistan and exceptional rainfall in many parts of the globe. The most note worthy trend and feature that has been observed and that is that most of the extreme events like hurricane, tropical storms, heat waves and rainfall have been of regional in nature and character.

The noticed fact is that high temperatures (Chart 2) are likely to be more frequent than cold. The heat wave in July in Russia was worse than the heat wave of Europe in 2003, which was in a class of its own. The heat wave in Russia was unprecedented since 1500s. Even the Inter-Governmental Panel on Climate Change (IPCCs) fourth assessment report warned that the number of heat waves is going to increase and warm nights are on the rise. In years to come, the frequency of tropical storms, hurricanes, cyclones would be higher in magnitude.

Chart 2



In the light of the above observations, it has become imperative for all countries of the world to give serious thinking on the issue and make out immediate attempts to tackle it. Let us examine Cancun Accord which is being considered as a one step forward.

CANCUN AS A VENUE

Forty years ago, Cancun was a small fishing village with a few families. There were some holiday homes but it was a thin Island of lush wetland, connected to the mainland by two narrow strips. Today, a planned tourism and investment policy has transformed Cancun into a posh beachfront with big hotel chains and restaurants to attract more tourists. The other side of it is that Cancun is a living example of ecological devastation; it is the hotels, the tourism and sexual trafficking of women. It is the antithesis of sustainable development

CANCUN ACCORD

The following are the major segments of Cancun Accord:

Cutting Carbon Emissions

In regard to cut in carbon emissions, the major players especially developed or rich countries have made pledges over the last year. To reduce their greenhouse gas emissions by the end of 2020 under COP 15 (Copenhagen) but this was not incorporated in the official UN process. Cancun Accord now formally puts those pledges into UN documentation, although they may increase or decrease in coming years. The Accord merely call on the developed countries to “raise the level of ambition of the emission reductions to be attained by them individually or jointly,” with a view to reducing their aggregate level of emission of green house gases. For the first time developing economies have also agreed upon to look at how they can reduce emissions in coming years. But these economies did not make specific pledges. The most disturbing thing in Cancun Accord is that none of the cuts in emissions are legally binding. The same thing was done in Copenhagen Accord in 2009.

Climate Aid

A new climate green fund was agreed at Cancun to transfer money from the developed or rich countries to developing or poor economies to tackle the consequences, impacts and implications of global warming or climate change. Accordingly, poor nations are considering this as a success at Cancun. This is because, these countries would outnumber developed countries of rich economies on a supervisory panel to be created for this fund that is to be set up in 2011. But no figure was put on how much money will be contributed to this fund.

Deforestation

Formal support was extended for the UN deforestation scheme namely Reducing emissions from deforestation and degradation (REDD) under which developed nations pay poor economies not to chop down forests and so look away carbon emissions. But details in respect of when and specifically what form the scheme would take a shape- whether rich economies would be able to use it to ‘offset’ their emissions rather than make cuts at home are to be clarified.

Kyoto Protocol

The Summit has deferred decisions on Kyoto Protocol; the existing international agreement which is a binding on developed or rich economies to cut emissions to next year i.e. 2011 summit to be held in South Africa. This means whether countries would sign up for a second ‘commitment period’ to cut carbon emissions after the existing deadline of 2012 remained to be seen. This also indicates that decisions on the role and contribution that the Kyoto Protocol would play in an ultimate future legal document that binds the nations to emissions cuts the ‘holy grail’ of the UN negotiations are delayed. There should be no gap between the first commitment period of Kyoto Protocol, which is expiring in December 2012, and the second commitment.

Technology Transfer

The issue of transferring knowledge of clean technology between nations was also backed at Cancun Summit. In this direction, a technology Executive Committee; a Climate Technology Centre; and a network are to be established. But there are no details about the money, place, and time/year and by whom. The most noticeable feature of the Accord is that economies were agreed upon on the principle of having their emissions cuts inspected. The monitoring, reporting, and verification would be based on the size of the nation’s economy, though who would carry out the inspection is not specified in the Accord.

Base Year

The Accord allows flexibility in selecting the base year for setting emissions reduction targets. Emissions trading and the project –based mechanism under the Kyoto Protocol shall continue to be available to Annex1 parties as a means to meet their quantified

emission limitation and reduction objectives. However, the Cancun Accord could have an impact on the Kyoto Protocol since there are no binding emission reduction targets for the developed or rich nations and it favours a pledge and review system of voluntary emission reduction commitments.

Vague Provision

The Cancun Accord recognize that deep cuts in global greenhouse gas emission are required as documented in the 4th (IPCC) to reduce greenhouse gas emissions and curb the rise in global average temperature below 2 degrees Celsius above pre-industrial levels. In the absence of any fixed target, this could be an inadequate and insufficient as well as vague provision.

Human Rights

In the last 25 years history of climate change or global warming, for the first time the Cancun Accord has given much emphasis that in all climate change related actions, human rights must be respected. Accordingly, the Accord also recognizes the need to engage with a broad range of stake-holders namely- youth and persons with disability and call for gender equality and effective participation of women and indigenous people in effective action on all aspects of global warming.

Funding

On funding horizon, the Cancun Accord calls for information on the fast start finance promised at Copenhagen (COP 15) by the rich nations. These participants' countries endorse the pledge by the developed economies to make available at least US \$ 100 billion annually till 2020 and say a significant share of this new multilateral funding should follow through the Green Climate Fund. This new fund would be operated through UNFCCC financial mechanism.

Reasons for Optimism

The balanced package dubbed as Cancun Accord builds on the decisions taken a year ago i.e. 2009 at Copenhagen. The Accord also lays the ground work for further progress in the future. The Cancun Accord comprise understanding on a system of transparency, a fund to help developing economies, a system of technology sharing and parameters for funding deforestation efforts in developed nations. The Cancun Accord represents a step towards operationalising the Bali Action Plan.

The Cancun Accord built on the growing clout of the Basic countries namely-Brazil, South Africa, India, and China. In particular, India played a proactive role in shaping the Accord, contributed by outlining the framework for a global monitoring system for both developed and developing nations, a technology mechanism, brining in the concept of equitable access to sustainable development.

Most importantly and strategically, for the first time in the history of global warming, the Accord brings the United States of America (USA) into a regime that is sort of comparable to that applicable to other industrialized nations The USA, a major player in hammering out this Accord ensured that while there was progress on all the segments on the Bali mandate, the issue of transparency was given primacy.

On the other side, the European Union (EU) has given up its leadership position in climate change negotiations and instead concentrated on broader goals. Europe continues to lead by example. The EU wanted a Second Commitment period for Kyoto Protocol, and that has been worked out.

The main reason for the optimism is the importance of the Accord lies in the fact that for the first time, a United Nations document has acknowledged that global warming must be kept below 2 degree Celsius compared to the pre-industrial temperature. The targets set by rich countries to reduce emissions and measures taken by developing nations to reduce the growth of emissions would now be listed in the UN system. Not only this, a system has been put in place to efficiently track efforts to reduce and limit emissions as well. A new adaptation Committee would support economies as they establish climate protection plans. A mechanism

for bringing an improvement in forestry and preventing emissions by building natural carbon sinks has also been put in place.

The only hold out to the process was Bolivia, which felt that Cancun Accord was not enough of a response to the environmental cons. For an Accord starved UN climate process, Cancun Summit is fairly enough. Environmentalist however disagreed with the Accord. They believe that Cancun may be saved the process but it did not yet save the climate.

Still Complex Issue

Faced with this great wall of un-enlightened self-interest, it may be tempting to say that humans have not yet evolved to the point where we are clever enough to handle as a complex a situation as climate change. Few may agree that democracy may have to be put on hold for a while. But the very complexity of the issue shows the opposite. Dictatorships are conspicuously bad at complex problems. Why should they be any better at stopping climate change than they are planning economies? The more complicated and extensive a problem is, the more it matters that as many people and organizations as possible are engaged upon solution.

The developed or rich economies need to believe in what they are doing, and be able to shape decisions affect them so they could be in their interests. These countries need to be connected in networks that share knowledge and power. Developing democracy is as important and strategic in the response to climate change as developing green technologies. It is also the best manner to vault the great wall of self-interest, because, unlike most responses to climate change, it does not involve paying for benefits that will largely be enjoyed by others. The world enjoy the benefits of invigorated democracy and strengthened communities ourselves-whatever happens to the climate, and whatever the weather. Diplomacy and multilateralism have triumphed, as many have said, but where has that left the task of combating climate change? If finance was the lure at Cancun, just as it was last year to get opposing countries to support the Copenhagen (COP 15) Accord, then at least that must translate into reality. Otherwise much more than optimism will be needed at Durban (South Africa) where the Climate Summit will be held in 2011.

Developed Countries not interested

Those (193 countries) who had gathered at Cancun in the hope of influencing global climate policy got, instead, a slew of agreements (Accord) that left open the emission reduction targets for developed nations, which must have pleased the United States, the Japan and the others who are not in favour of binding cuts. The USA has another reason to be pleased i.e. the mitigation pledges it had orchestrated at Copenhagen (COP 15) were adopted in the United Nations Framework. It should come, then as no surprise that the US has gone back with a transparency agreement in place and no binding emission cuts. They lose nothing since in any case they are not the part of the Kyoto Protocol.

It is very ease to be disheartened by the out come of Cancun Summit to take major measures in respect of an international agreement on fighting global warming. Despite apparent broad consensus on the threat that the climate change poses and the need for urgent action, short-term national interest is still being put before long-term collective good by the industralkised economies especially the USA and the Japan. Fortunately, world leaders across the world are not waiting to act and hence, cooperation at the regional level for instance between Russia and China, is a eye opener that there is a will and there is a way to combat climate change problem.

At Cancun, national Governments for one reason or the other were resisting concessions required to break the logjam. Regional blocks appear more interested in apportioning blame than finding solutions. International organizations, however well intentioned, seem so far unable to bridge the divides. But away from the international arena, Businesses are not waiting for global agreement to reduce energy consumption. The need to cut

costs, as well as to help safeguard the environment, is making energy conservation a major preference for firms in Russia and the around the world.

Governments world-wide are re-examining their resources of energy generation capacity. Renewable energy is also attracting Governments help. The USA is spending a huge amount of US \$ 66 billion to explore, develop and harness alternative fuel resources. The European Union (EU) is trying hard to generate 20 per cent of its total need of power renewable by 2020. China has passed a US \$ 47 billion green energy bull and is using subsidies and other financial tools to enhance investment in wind and solar power.

The most pertinent fact to point out here is that as the world largest producer of greenhouse gases, enabling China to continue developing its economy without a huge rise in carbon emissions is critical and strategic to tackling climate change. Even if its per capita levels are still way below the US levels, China has now overtaken the United States of America as the globe biggest greenhouse emitter. Here too there is a reason for optimism. China is very much aware of the challenge and has promised-as a part of its attempt to kick start the post Kyoto negotiations- to reduce emissions per GDP unit by as much as 45 per cent by the end of 2020.

It is necessary to understand why the Russian and Chinese Governments have such big ambitions for energy cooperation. Energy exports from Russia to China are now estimated to raise as much as 60 folds over the present decade. To help transfer the power efficiently, China is investing the equivalent of US \$ 250 billion on the needed improvement in the grid. The prices are three times up in China as compared to Russia, a compelling business case for both nations to cooperate is very clear. The ongoing debate in China on the introduction of an internal carbon price would only lead to more attractiveness of Russian hydro.

There are instances for such cooperation. The European Union (EU) is considering for creating a super-grid to enable the region to benefit from solar power generated in North Africa. Two important nations of the EU namely- Norway and Denmark are collaborating on the interchange of hydroelectric, thermal and wind power to lower cost of electricity generation and output. Mongolian has also a plan that wind energy is to be transmitted to South Korea and Japan.

Other View Point

It is certainly true that given the current state of play in climate change policies across many countries that have the approval of both developed economies and the majority of developing nations falls short in many ways in terms of concrete, far-reaching solutions on the critical issues in global climate governance. Critical red lines that different nations and groups laid out even during the meeting at Cancun have been quietly modified. But the fact of agreement between the rich and developed economies is not insignificant- and to deny it would be to miss the critical and strategic feature of the climate issue as a global problem and challenge. To put it differently, the absence of an outcome at Cancun would have launched the multilateral process into uncharted waters with the risk, and its incalculable consequences, that the process itself would be scuttled or rendered effectively non-operational.

Cancun Summit was also marked by a relatively self-confident approach from the large developing countries, particularly China and India. China had made a strong propaganda for projecting what it was already committed to in its domestic climate talks, which the large contingent had little to counter with except for erudite discussions on climate policy by its NGOs. India had much more muted presence, apart from the media savvy, but nevertheless there was much interest in its policies and attitudes.

While acknowledging that developed countries have historical responsibility for the bulk of accumulated greenhouse gas emissions in the earth's atmosphere, which is what is causing global warming, the US and other developed economies argue that the current emissions' trajectories of major economies like China or India would neutralize their own emissions reductions and hence, climate change would continue to take place. This apparent mathematical logic appears to have convinced many within our own civil society and political ranks. Another

more compelling mathematical logic has been deliberately obscured. If we all agree that the increase in global average temperatures should not exceed say 2 degree Centigrade by 2050, this corresponds to a certain stock of GHGs in the atmosphere. To reach that level, reduction in emissions required globally would have to be distributed over several countries. What the UNFCCC incorporated is a principle of equitable burden sharing in this respect rather than symmetry of legal obligations.

Developed countries took on a legal commitment to undertake absolute emissions reductions not only to meet the requirements of keeping global warming which scientifically determined acceptable levels, but also, and this is fundamental, to vacate atmosphere space sufficient to accommodate the rising emission of developing economies, inevitable in the latter's course of economic and social development. If developing nations were encouraged to take mitigation measures beyond their own capacities, then such steps would have to be enabled and supported by financial and technological transfers from developed nations. What is now taking place in the negotiations; it is the wholesale overturning of these fundamental provisions of the UNFCCC.

What Cancun Agreements have confirmed is that emerging economies namely-India, China, Brazil, Mexico can neither expect any financial nor technological transfers to support their development actions. Meeting any obligations these economies assume in a future climate regime would come up at the cost of meeting urgent and compelling developmental imperatives. The approach and attitude of rich nations is typical of other discriminatory regimes. They get to keep what emerging nations have because emerging economies got here first.

Strategy for Success in Durban 2011

If the negotiations on Climate Change see the light of success, then the following are the basic principles or issues to be followed by every nation in coming Durban Summit in 2011.

a) Multilateral headway on climate change can not happen without a clear cut binding agreement on reduction in greenhouse gas emissions. Hence, Kyoto Protocol is in the right perspective and right direction. Therefore, every nation has to accept that there must not be any time gap between the first and second commitment. What is needed is to make it as a sound and strong base for future talks and also make it most effective and efficient to deliver the desired goods to the globe in general and member countries in particular.

b) In whatever form the accord is drafted, negotiated; finalized and adopted the very basic principle based on natural justice i.e. "common but differentiated duties, responsibilities and accountabilities" required to be accepted and implemented in the true spirit, zeal and sincerity. Rich nations must take responsibility sportingly as they are the largest contributor greenhouse gas emissions. Accordingly, these countries should be more dutiful and accountable to the world. These nations must take corrective steps in the right perspective and direction. Added to this, emerging economies namely-China, India, Brazil, Mexico and South Africa must also own responsibilities of reducing greenhouse gas emissions and must also take corrective measures.

c) In order to meet the challenge of global warming, the creation of financial resources is inevitable. Pledging of funds should not remain as a myth. It must be transformed into reality. Creation of fund worth US \$ 100 billion should see the light of the day. The existing levels of pledges are at the low ebb and can not serve the purpose of reduction of emissions and adaptations. The process of creating such fund is very slow and at the will of the contributors.

d) In Cancun Summit, the US and the China were the major players in the negotiations. Any agreement or accord with the consent of these two nations would become useless and in fractious. The consent of the US and China in regard to MRV and differentiated responsibilities is the need of the hour.

e) Any accord should on climate change should not hold hostage or become a hinder in respect of two vital strategic issues namely- multilateral trade negotiations and transfer of technology to the needy economies.

When 1993 countries would gather at Durban, South Africa in 2011, it is their moral duty and responsibility to contribute positively and constructively in saving the planet. They must think at least once that they have to play an encouraging role in saving the climate which may create far-reaching consequences, impacts and implication to the world wherein all are we living. Every one must hope that a sense would prevail upon the nations to come out with some concrete plan, policies and programmes of saving the earth from further decay.

CONCLUSION

From Copenhagen (COP 15) in 2009 to Cancun (COP 16) very little headway has been made out in the negotiations on Climate Change or global warming. But the most unfortunate thing is that no concrete solution to the problem which is the biggest challenge of 21st Century. Developed nations who are responsible for this mess are not serious in their attitude, approach and solutions. These countries or the major players are not realizing that if immediate measures are not taken then the humanity (people) would face unbearable and unimaginable consequences and impacts. What is immediate required is the consistency, continuity and diversity in the attitude, approach and practices. The next COP 17 at Durban, South Africa must give a rethinking on the challenge and out come must not be a myth but must be transformed into reality.

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ECONOMIC VIABILITY OF YAM MINISSETT PRODUCTION AND THE PROBLEMS AFFECTING MINISSETT ENTERPRISE IN OGBA/EGBEMA NDONI LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA

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Abstract

This study investigated the economic viability of Yam Minisett Production and the problems affecting minisett enterprise in Ogba/Egbema/Idoni Local Government Area of Rivers State. A sample size of one hundred (100) respondents, was purposively and randomly selected, and was used for this study. Data collected were analyzed using costs/returns analysis to determine the viability of yam Minisett production and statistical mean derived from Likert rating scale with four options, to determine the problems associated with yam Minisett production/enterprise in the area. The result, revealed a Net Farm Income (NFI) of ₦76, 810.00 and a Gross Margin (GM) or a Return to Management (RM) of ₦82, 620.00, an indication that yam minisett production is profitable/viable. The result shows that the Gross Margin alone is capable of taking care of another cycle of production of seed yam conveniently without sourcing for extra fund elsewhere. Also shown, was the Return per Naira (R/N) from seed yam production which was put at 0.91, and which means that, from every ₦1.00 employed in the production of seed yam in the study area, 91k was realized, which is another indication of the viability of seed yam production. Problems identified in their order of degrees include: yam minisett production as a micro business for poor people (with weighted mean score = 3.38); cost of labour (3.00); lack of awareness of yam Minisett production as an enterprise (2.96); land acquisition problem/soil problem (2.82); fertilizer unavailability (2.70), etc. Based on the findings, this study recommended among others that: Extension Agencies in the area should beef up their awareness strategies in sensitizing the farmers, women and youths inclusive to go beyond practicing Minisett techniques only to raise seed yams for household use, but should embrace it as a viable business to earn a good living; Also, that Governments/ non-governmental organizations should not slack in giving incentives in form of grants, subsidies, soft loans and other farm inputs to productive farmers in the area. These incentives should be timely so as to achieve the purpose for which they are given.

Key-Words: Economic Viability, Minisett Production, Problems Affecting Enterprise, ONELGA.

INTRODUCTION

Yams (*Discorea* spp.) in general are important in the farming systems as well as in the traditional cultures of several countries. All the major species of yam are indigenous to Africa, particularly West and Central Africa, which produces over 80% of the world's production (NARP, 1993). According to the International Institute of Tropical Agriculture (IITA) 2001 and Akinsame (1975), the yam zone in West Africa stretched from Cote d'Ivoire to Cameroon and it is especially important throughout the coastal West Africa where about 60 million people obtain more than 200 dietary calories per day from it.

Yam is a perfect staple food appreciated for its taste and cultural role. It is a major source of energy in diet of west African people, especially yam growing zone, with Nigeria being the largest producer of yam (Offei, Ofusa-Anim, Teiko, and Yamaki (2006) and Uguru, (1996), accounting for over 70% of the total world annual producer of the yam estimated at 20-24 million metric tones. The production because of its large starch content is eaten fresh when

boiled, roasted, baked or fried. It is also processed into crude flour by drying thin slices in the sun, and then pound or grind into flour. The flour is used in West Africa for FU-FU. Yam can further be processed into instant flakes producing a food similar to instant potato. Yam can also be made into fried chips. Also most starch industries use yam as one of their important raw materials. It provides job opportunities to both the producers and sellers of yam. It also provides income for dealers' improvement. The peels serve as feeds to livestock (such as pigs, goats, rabbits, etc.) and as good component of farm yard manure (F.Y.M). It is used as a laboratory crop for scientific investigations. It is propagated by tuber and most recently by yam sets, which are portions of large tuber of ware yam used for breeding purpose.

Yam production has been on the decline despite the increasing demand for local consumption and for export. Some of the constraints to yam production are unavailability of planting material, soil degradation/lack of soil nutrients, poor handling and storability (Tetteh and Saakwa, 2004). In order to solve the problem of unavailability of planting material, 'Yam Minisett Technology' (YMT) was introduced by the National Root Crop Research Institute (NRCRI), and has been found useful (ARMTI (1993). The Yam Minisett Technology involves essentially the cutting of yam tuber to produce seed yams for the next season production of ware yams, for domestic consumption and for other industrial uses. Production of yam minisett like every other agrarian enterprise, involves costs and returns through which its profitability is determined. It is the economic aspects of all agricultural productions of crops and livestock that qualify them as an enterprise or not, and which may encourage a would-be farmer/firm to embark on any of the agro-enterprises of his/her choice. In the study area, much work has been done on yam propagation, using yam minisett techniques by various extension agencies (Green River Project, Total Fina ELF in Rural / Community Development). Though, not much has been known about the economic potentials and problems of yam minisett production in the area.

Despite the fact that efforts have been made through concerted extension services to make farmers aware of the techniques and to encourage them practice it in the area, not many farmers have been moved to take up yam minisett production as an empowering business for survival. This is what prompted the study in order, to investigate the economic viability of yam minisett production and it's associated problems in Ogba/Egbema/Ndoni Local Government Area (ONELGA) of Rivers State.

METHODOLOGY

Data used in this study were obtained from primary and secondary sources. Primary data were gathered from personal interview (through questionnaire) and direct discussions with yam minisett farmers and marketers of seed yams in the study area. Secondary data were obtained from Journals, Research Reports, Published texts and Internets.

A sample size of one hundred (100) respondents, Ten each from Ten (10) communities which were purposively and randomly selected, were used for this study. This number (100 respondents) to the researcher is a logical representation, considering the number of yam minisett farmers and marketers in the study area.

Data collected were analyzed using Costs/Returns Analysis adopted from Akinpelu and Ogbonna (2005), in Odinwa, Benson and Otuaga (2009) to determine the viability of yam Minisett production and statistical mean derived from Likert rating scale with four options, such as: Strongly agree (with 4 points); Agree (with 3 points); Disagree (with 2 points) and Strongly disagree (with 1 point), to determine the problems associated with yam Minisett production/enterprise in the area.

Mathematically the Cost/Returns Analysis model is expressed as:

$$NFI = GFI - TC (VC+FC) \text{ ----- (1), and}$$

$$R/N = \frac{NFI}{TC} \text{ -----, (2)}$$

Where NFI = Net Farm income
 GFI = Gross Farm income
 VC= Variable cost
 FC= Fixed cost
 TC= Total cost
 R/N = Return Per Naira.

While the critical mean 2.5 derived from 4-point likert rating scale (4+3+2+1/4) was used to accept or reject an item as a problem of yam Minisett production in the study area.

RESULTS AND DISCUSSION

From the Analysis of Costs and Returns of Yam Minisett production per plot of land in Table 1, it was shown that the Gross Farm Income (GFI) of ₦161, 280.00 was realized from the sale of 16,128kg of seed yams obtained as yield per plot of land within one farming season. It showed a Total Cost (TC) of ₦84, 470.00, with the Variable Cost (VC) constituting the major cost (93.1%) of production. The analyses also indicated that cost of labour in yam miniset production was the highest- ₦48, 600.00, which accounts for 57.5% of the total cost. This was followed by the cost of the planting materials (seed yams), which recorded ₦22, 400.00, about 26.5% of the total cost. This finding agrees with (Tetteh and Sacra, 2004) that some of the constraints to yam production are unavailability of planting material, soil degradation/lack of soil nutrients, poor handling and storability.

The analysis further, revealed a Net Farm Income (NFI) of (₦76, 810.00) and a Gross Margin (GM) or a Return to Management (RM) of ₦ 82,620.00, an indication that yam Minisett production is profitable. Lastly shown from the analysis, was the Return per Naira (R/N) from seed yam production which was put at 0.91. This implies that in every ₦1.00 tied to the production of seed yam in the study area, 91k was realized, an indication of more than 50% return to every financial commitment to seed yam production in the area.

Table 1: Showing the Costs/Returns Analyses of Yam Minisett Production per plot of land.

A	Budget Items Sales	Unit Of Count	Quantity/ Plot(Kg)	Price/Unit (₦)	Total Value (₦)	%
	Sale of Seed yams	Kg	16,128	100.00	161,280.00	
	Total Revenue(TR)				161,280.00	
B	Cost Items					
I	Fixed Cost Items		Quantity	Unit Price	TOTAL(₦)	%
	Rent on land	50 by 100 ft	1 plot	4,000.00	4,000.00	
	Depreciation on fixed assets Cutlass, spade, hoe, head pan etc.				1,280.00	
	Opportunity cost of fixed capital at 20%				530.00	
	Total Fixed Cost(TFC)				5,810.00	6.9
ii	VARIABLE COSTS ITEM					
a.	Operating inputs	Unit of count	Number			
	Seed yams	0.8kg	280	80.00	22,400.00	26.5
	Manure	Bags of 25kg	12	150.00	1,800.00	
	Twine rope				1,500.00	
	Apron plus	sachet	2	400.00	800.00	
	Stick for staking		168	10.00	1,680.00	
	Cost of transportation				2,500.00	
	Total operating cost				30,060.00	35.6
b.	LABOUR INPUT ITEM		MANDAYS	UNIT PRICE	TOTAL	

Land clearing		2	1,500.00	3,000.00	
Seedbed preparation	56 beds/plot	4	1,500.00	6,000.00	7.1
Planting		3	1,500.00	4,500.00	
Manure application		1	1,500.00	1,500.00	
Weeding		2	1,500.00	3,000.00	
staking		2	1,500.00	3,000.00	
Training of vine		6	1,000.00	6,000.00	7.1
Harvesting/packing		3	1,500.00	4,500.00	
Barn preparation/banning		4	1,500.00	6,000.00	7.1
Transportations		-----	-----	3,000.00	
Opportunity cost of variable capital at 20%				8,100.00	9.6
Total labour cost				48,600.00	57.5
Total Variable Cost(TVC)				78,660.00	93.1
TOTAL COST (TFC+TVC)				84,470.00	100

Source: Field Survey, 2010.

Costs/Returns Analysis from table 1:

$$\begin{aligned} \text{Net Farm Income (NFI)} &= \text{Gross Farm Income (GFI)} - \text{Total Cost (TC)} \\ &= 161,280.00 - 84,470.00 \\ &= \underline{\text{N}76,810.00} \end{aligned}$$

$$\begin{aligned} \text{Return to Management (RM)} &= \text{Gross Farm Income (GFI)} - \text{Variable Cost (VC)} \\ &= 161,280.00 - 78,660.00 \\ &= \underline{\text{N}82,620.00} \end{aligned}$$

$$\begin{aligned} \text{Return per Naira (R/N)} &= \frac{\text{Net Farm Income (NFI)}}{\text{Total Cost (TC)}} \\ &= \frac{76,810.00}{84,470.00} \\ &= 0.9 = \underline{91\text{kobo}} \end{aligned}$$

The analysis in table 2, showed that one of the major problems of yam minisett production in ONELGA, was the fact that yam minisett production was regarded as a small enterprise for poor farmers (with weighted mean score = 3.38). It means that one of the serious reasons why people do not embrace minisett production in the area was its relegation to the background of poverty. Next major problem was the labour cost of yam minisett production (with the weighted mean score of 3.0). This finding agrees with the result in table 1 which put the labour cost of minisett production in the area at 57.5% of the total cost, and which constitutes the highest cost in the production .

The result also showed that lack of awareness of yam minisett production as a viable business with the weighted mean score of 2.96; land acquisition/soil problem with the weighted mean score of 2.82; non-availability of fertilizer with the weighted mean score of 2.70; and pests and diseases with the weighted mean score of 2.63 as well as storage cost with the weighted mean score of 2.50, were also identified as major problems in the enterprise of yam minisett in ONELGA. This finding on storage cost was supported by Komolafe (2004), who pinpointed storage problem as a serious factor to be considered in yam production. While the techniques involve in the production; marketing of seed yam; transportation; and stealing of seed yams from the farm/barn were identified as no problem areas in minisett transaction.

Table 2: Showing the Problems Associated with Yam Minisett Production in the Study Area.

S/NO	Possible Problems	Weighted Score	Weighted Means(x)	Remark
1	Lack of awareness of yam minisett enterprise in the area	296	2.96	**
2	Yam minisett as a micro enterprise for poor people	338	3.38	**
3	Techniques involved in the production	226	2.26	*
4	Harvesting operation of yam minisett	198	1.98	*
5	Pests and diseases problems	263	2.63	**
6	Storage cost	250	2.50	**
7	Marketing of seed yams	176	1.76	*
8	Non availability of Fertilizer /application	270	2.70	**
9	Land acquisition/soil problem	282	2.82	**
10	Labour cost	300	3.00	**
11	Transportation	186	1.86	*
12	Stealing of seed yam from the farm/barn	221	2.21	*

$$X = 27.77$$

$$\text{Critical Mean} = 2.5$$

Source: Field Survey, 2010.

Note: ‘**’, means accepted as a problem, while ‘*’, means not accepted as a problem.

Other findings in table 3(a) showed that those engaged in the production of yam Minisett in the area were little more than other yam minisett dealers (38% +29%), but in a very small scale. While 33% of the farmers engaged purely on marketing of seed yams. The same tables 3b, revealed that majority of the farmer’s (80%) farms were less than one (1) plot of land, hence the record of low productivity of seed yams in the area.

The study further revealed that land for farming is mainly acquired by rent (67%) and weakly followed by inheritance tenureship (14%). This accounts for small farm size and eventual low output of seed yams in the area. Seed yams for planting in the area were obtained through purchase (52%) from neighboring communities. While only 25% of seed yams were self-sourced, which is not always enough. Also identified in table 3(e) was the optimum time/period (April – May) for planting minisett and for better productivity in the study area.

Table 3: Showing the type of Minisett enterprise; Size of farm land; Sources of farm land; Sources of planting material (seed yams); and Time of planting yam minisett.

S/No. A	Types of Yam Minisett Enterprise	Number	Percentage (%)
	Yam Minisett Farming (Production)	38	38
	Marketing of Seed Yam	33	33
	Both Farming and Marketing	29	29
	None	-	-
	Total	100	100
B	Size of Farm Land in Plots	Number	(%)
	0.5	80	80
	1.0	12	12
	1.5	6	6
	2.0	2	2
	Total	100	100
C	Sources of Farm Land	Number	(%)
	By Rent	67	67
	By Inheritance	14	14
	By Purchase	7	7
	By Gift	12	12
	Total	100	100

D	Sources of Planting Material (Seed Yam)	Number	(%)
	By Self	25	25
	Through Purchase	52	52
	Through Cooperatives	5	5
	As Incentive From(Govt., Ngos, Cooperatives Etc.)	18	18
	Total	100	100
E	Time of Planting Yam Minisett	Number	(%)
	February – March	-	-
	March – April	22	22
	April – May	68	68
	May – June	10	10
	Total	100	100

Source: Field Survey, 2010.

CONCLUSION

From the findings, it was noted that yam Minisett production in the area of study is viable, but one of the greatest problems among others, in this enterprise was its relegation to the background of poverty. The people saw yam Minisett production as a business for poor people. Also, it was revealed that the type of awareness created in the area through extension was limited to the practice of yam Minisett techniques as a means of producing seed yams for household use in the coming season and not as a business. Therefore, Extension Agencies in the area should beef up their efforts in sensitizing the farmers, (women and youths inclusive) to go beyond practicing Minisett techniques only to raise seed yam for household use, but to embrace it as an empowering and a viable business to earn a good living. Also Government and non-governmental organizations should not slack in giving incentives in form of grants, soft loans and other farm inputs (such as planting materials, farm tools, farm chemicals like fertilizers, pesticides, herbicides etc.), to identified and distinguished farmers in the area. And these incentives should be timely so as to achieve the purpose for which they are given.

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EFFECTS OF SYNCHRONIZED MULTIMEDIA ON MOTIVATION AND ACADEMIC PERFORMANCE OF STUDENTS IN BIOLOGY

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Abstract

Multimedia [MM] materials and equipment are instructional materials which teachers and trainers use as alternative means of communication to transmit curriculum content to the learner. MM combines two or more different types of instructional materials at the same time in a presentation. They have synchronization potentials and can be effectively used to facilitate teaching and learning process, arouse learners' interest, support and reinforce students learning, influence better academic performance in learners, aid mastery learning, among other things. This paper presents the results of research studies carried out to determine the effect of synchronized MM use on motivation and academic performance of students in Biology. Pearson product correlational analysis indicated lack of correlation between use of synchronize MM and students' motivation while t-test indicates significant difference between biology students who were taught with synchronized MM (mean score, 51) and the control group (mean score, 23). The control group who were taught the same Biology devoid of synchronized MM package performed poorly. We recommend that there is need for government to provide multimedia in secondary school and the biology teachers to make transition to use modern MM devices and adopt different approaches for biology instruction and laboratory activities rather than the traditional or conventional talk-chalk method.

Key words: Biology, Synchronized, Multimedia, Motivation, Academic Performance

INTRODUCTION

Science (and Technology) education is the foundation for sustainable national development by protecting human societies from ignorance, illiteracy, disease and poverty (Tandi, 2009). The teaching of biology starts from Nursery through primary to secondary and tertiary institutions and is the basis for such courses as medicine, biochemistry, microbiology, zoology, botany and even environmental sciences. Biology education is meant to expose the learners to biological nature (facts, principles and concepts), processes and attitudes and then equip them with skills of a professional biology teacher. The objectives of the biology curriculum as provided in the National Policy of Education (FME, 2004) include:

- Adequate laboratory and field skills in biology
- Meaningful and relevant knowledge
- Ability to apply scientific knowledge to everyday life on matters on personal and community health and agriculture;
- Reasonable and functional scientific attitudes.

Teachers who are the implementers of the curriculum have a sacred duty in ensuring that the biology students attain the above goals. Incidentally, the learners have their peculiar

characteristics which may manifest special learning needs (Elliot, Kratochwill, Cook and Travers, 2001). Learners expect that the materials and method of instruction should be easily transferable to the real world. Thus, the task of the teacher includes, among others, to provide the materials and experiences to aid learning and meet the learner's expectations (Ogwo, 2004).

Multimedia (MM) can be relevant in teaching various school subjects including biology. MM involves "the use of two or more different types of instructional media in a presentation" (Bartsch, 2009). Supporting this view above, Mayer (2001) noted that an instructional delivery involving the use of VCD/DVD or Power point or 16mm film, for example, is a MM presentation, in that, still pictures, text, graphics, motion picture, background sound as well as some narrations are synchronized and or combined at the same time in order to enhance learners' understanding of a concepts. In this approach, timekeeping and coordination of different media are involved. It also includes use of interactive elements such as graphics, text, video, sound and animation at the same time to deliver lesson (Eneh, 2002; Kellerman, 2004; Dike, 2008; Nkweke, 2010).

Synchronization of MM involves coordination of simultaneous processes to complete a task, be it a task involving film production and utilization, where image and sound are synchronized simultaneously in presenting information to target audience; Digital telephony, video and digital audio where synchronization process and where streams of sampled data are manipulated; Electric powers, where alternator synchronization is required when multiple generators are connected to an electric grid; Digital electronic systems, as arbiters are needed such as microprocessors to deal with asynchronous inputs; Automotive transmissions, where synchronizers allow the toothed rotating parts (gears and splined shaft) to be brought to the same rotating velocity before engaging the teeth; Hypermedia, where data, text, graphics, video are used as elements in a hypertext system. In this case, all the various forms of information are linked or synchronized together so that a user can easily move from one to another and Photography, where synchronization is required in order to achieve good photographic production (Staylor, 2002).

The use of MM in instruction, among other things, reduces learning time, reduces cost, creates room for instructional consistency, mastery learning, increases retention, increases safety, increases motivation, increases access as pupils/students instruction is not confined to times when the instructor is available. Learners enjoy interactive learning and it is efficient, effective and flexible; facilitates communication, appeals to senses of sight and hearing at the same time, provides concrete basis for understanding abstract and difficult concepts and makes for a more meaningful and permanent learning (Staylor, 2002; Kellerman, 2004).

The emergence of modern educational technology in recent times has provided MM equipment like cine film, video-conferencing, 16mm projector film, video disk, satellite (Akaninwor, 1999) but Samaras, Giouvanakis, Bousiou and Tarabanms (2006) opined that MM equipment and programmes are constantly changing, and the range used will depend on the work place. It may include both hardware and software: personal computers and laptops, software programmes e.g. power point, TVs and videos, microphones/amplifier, compact discs, DVDs, projectors, CD burners, scanners, digital cameras, etc.

The teacher is expected to use different techniques, methods and media to facilitate learning in the classroom.. When lectures are augmented by examples, questions, demonstrations, and visual presentation, teaching becomes more appropriate, according to Efebo (1996). Most MM practitioners reflect a cognitive-perceptual philosophy. They have emphasized the values of synchronized MM as a means of involving several senses of the learner and of combating "Verbalism" in the classroom (Kerbyson, Packwood and Joy, 2001).

Due to knowledge explosion all over the world via the internet and worldwide web, biology literacy has also expanded. Recent advances in fields such as biochemistry, ecology, genetics, molecular biology and physiology have made biology a central focus in most human activities including problems on food, water, pollution, health, ecosystem management and

conservation etc. Biological literacy and problem solving skills are therefore relevant in view of the above global issues. Therefore, to be able to handle them, a multidisciplinary and interdisciplinary approach that focuses on the learner's inquiry is required. The biology teachers are expected to select and use appropriate instructional media during lesson presentation (Taylor, 2009). Synchronized MM are not only relevant and useful in the context of its use to facilitate learning to achieve a specified and replicable learning outcome, but in enhancing participatory learning when the learners are directly involved in the process of classroom interaction (Onyegegbu, 2006). And hence MM is an effective instructional media which the teacher can use to deliver learning experiences to Biology students and, therefore, improve the later in Biology courses. This paper therefore examines the effect of synchronized MM on biology students' motivation to learning and academic performance.

STATEMENT OF THE PROBLEM

The Biology curriculum over the years has been delivered mechanically or by rote learning, which makes instruction teacher-centered. Hardly can vital abstract contents in Biology be effectively communicated to the learners theoretically. They need to be taught using relevant materials. The teacher and his/her method of teaching may have being a major source of student's poor academic performance in biology. Most teachers still prefer using the 'chalk and talk' method in instructing learners. Although MM could facilitate meaningful learning of biology, it is rarely used, whereas this method is considered as a good strategy for improving cognition (Seweje, 1987). A good deal of expected learning outcomes is not realized in Biology in our senior secondary schools [SSS] as a result of non-availability of instructional materials as well as lack of effective utilization of appropriate teaching materials (Adeyegbe, 1993; Nwagbo, 2008). The Biology Chief examiner's reports have in recent years indicated a steady decline in candidates' performance in biology at SSCE (WAEC, 2005; Umeh, 2006).

PURPOSE OF THE STUDY

This purpose of the study is as follows:

1. To determine if the use of synchronized MM motivate interests of students in Biology
2. To investigate into the effect of MM on the academic performance of Biology students.

Research Questions

The study was guided by the following research questions:

1. To what extent does the use of MM materials motivate interest of biology students during instructional development?
2. What are the effects of the use of MM materials on the academic performance of students in biology?

Research Hypotheses

The research questions were translated into the following hypothesis:

1. There will be no significant relationship between motivation of biology students and use of MM
2. There will be no significant difference between the mean score of biology students taught with synchronized MM and the mean score of students taught without it.

METHODOLOGY

Research Design

A survey design was used to find out if the use of MM in instruction arouses students' interest in Biology. Quasi-experimental design was also used to determine performance of biology students when taught with and without MM], while correlational design was to ascertain whether the use of MM devices in instruction motivates interest of students in learning Biology.

Study Population and Sample

The target population of the study comprised of all Biology teachers (35) and students (3000) from 15 public secondary schools in Port Harcourt. The purposive sampling technique was used to select four secondary schools and a stratified random sampling technique to select 50 biology students from each school, totaling 200 students and 10 Biology teachers. The selected schools are G.S.S. Elikahia, C.S. S. Nkpolu, C.S, S. Oroworukwo and G.G.SS Oromineke. To ensure that the sample size is a true representation of students of equal intelligence (high and low intelligence), a test was administered to students. Those who scored 70% and above were divided into two equal groups, to form Experimental and Control groups, and those who scored between 40% to 49% were also shared equally into two groups. One group was added to the Experimental group and the other group added to the Control group, making it 100 in each group.

Research Instrument

The following sets of instruments were used for data collection:

Questionnaire

A 4-point Likert questionnaire titled 'Multimedia Motivation Questionnaire' [MMQ] was used to find out from Biology students if the use of MM by teachers motivates their interest in learning the subject.

Biology Achievement Test [BAT]

BAT consisted of 50 multiple choice objective test items. Test items covering topics in *Ecology* were selected from past May/June SSCE biology examination question papers and administered to study groups(experimental and control) in order to determine the effect of use of MM on biology performance of students.

Researcher's Made Instructional Package

Researcher's made instructional package are in two forms:

- (I) A lesson plan on Biology. The teacher used it to teach a topic in Biology to SS 1 students
- (II) A synchronized VCD recording to help students visualize for further clarification on the same lesson being presented by the Biology teacher. It was produced with the assistance of a Video/Television technical crew.

The teacher taught a lesson on a topic to two groups of students - Experimental group and Control group, using the lesson plan. The experimental group received treatment whereas the control group did not. In other words, while the Biology teacher was teaching his or lesson to the experimental group, the researcher assisted by projecting to a film screen in the class, a synchronized VCD recordings to further illustrate and help the experimental group visualize for more understanding of the lesson being presented by the teacher. The teacher also

taught the Control group the same lesson but devoid of synchronized VCD presentation. A combination or synchronization of the teacher's lesson with that of the VCD presentation at the same time on the same lesson provided the experimental group with a MM experience. The control group was denied this advantage. The performances of the two groups were compared with a view to determining the effect of the use of MM on student's academic performance in Biology.

Validity of Instrument

The instruments have been constructed to relate to the problems, research questions as well as hypotheses of the study. Questionnaire items were presented to two Educational Technology specialists from University of Port - Harcourt and two Biology specialists from Rivers State University of Education, Port – Harcourt. These specialists critically examined the instruments specifically for content validity, clarity of statements, competence of directions, and for suitability. BAT items were specified in the SSCE Biology syllabus.

Reliability of Instrument

The reliability of questionnaire was determined through test-retest approach. About ten percent of the questionnaire was administered to biology students of similar public schools outside the sampled areas within an interval of one month. The scores of all the first and second sets were summed up and correlated using Pearson Product Moment Correlation [PPMC] statistics to determine the reliability co-efficient. The computed reliability co-efficient (r) was 0.90 which means that MMQ was reliable

Administration of Instrument

Questionnaires were administered and by a research assistant who also retrieved the completed questionnaires from the sampled schools. The researchers' made instruments was administered by the teacher with the assistance of an Educational Technologist [ET] specialist. In order words, the Biology teacher was given the lesson plan to do the teaching while the ET specialist supported the teaching by presenting some synchronized illustrations for students to visualize, using VCD. Generator, television set and VCD machine were provided in the school where the study was carried out.

Method of Data Analysis

Statistical mean was used in analyzing the research questions. A 4-point Likert scale of measurement was used: Strongly Agreed 4 point, Agreed 3 point, Disagree 2 point and Strongly Disagree 1 point. A mean score of 2.5 was used as a criterion for acceptance or rejection of an item. Mean score of each item on the questionnaire above the cut-off point is accepted (i.e. Agreed) while mean score below the cut-off point is rejected (i.e. Disagreed).

To test the null hypothesis involving motivation of Biology students and use of synchronized MM, PPMC statistic was used, while t-test was used to test the null hypothesis on the difference between the mean score of Biology students taught with synchronized MM and those taught without MM. The alpha level of 0.05 was used as the acceptable significant level for rejecting or upholding all the assumptions.

RESULTS

The results of survey and quasi-experimental study of the use of MM are presented in tables below, according to the research questions/hypothesis:

HO₁: There will be no significant relationship between motivation of Biology students and use of MM. The above hypothesis was analyzed using the positive responses of items 1- 5 and the negative responses of items 6 – 10 of the MMMQ . The mean scores are shown in tables 1(a) while PPMC is in (b) below:

Table 1(a):Mean Distribution of Students’ Responses on the Extent to which MM Motivates Interest of students in Studying the Biology

S/n.	Item	Mean	Remark
1	VCD, if used in teaching, can motivate your interest in learning Biology	3.32	Agreed
2	Considering individual differences in learners, teachers’ use of MM instructional devices or combination of varieties of instructional media can cater for students learning styles during lesson	3.04	Agreed
3	When teachers use the old traditional teaching method (i.e. use of chalk-talk), it hardly motivate your interest to learn biology	3.13	Agreed
4	When teachers use two or more different types of media during lesson presentation, it helps to facilitate your understanding of the lesson	3.46	Agreed
5	The use of multimedia device like VCD or the combination of two or more types of media can aid recall and retention in students	2.9	Agreed
6	Using VCD in teaching biology cannot support and motivate students interest to learning the subject	2.01	Disagree
7	Combination of two or more media in teaching biology cannot enhance students understanding of biology	1.67	Disagree
8	You feel motivated to learn whenever the English teacher does not combine or use different types of instructional media	1.84	Disagree
9	When your biology teacher do not use reward and combination of different instructional media in teaching, you feel motivated to learn	1.74	Disagree
10	You prefer your teacher using VCD or computer power point to the old traditional chalk-talk method of teaching, when presenting lessons on biology	1.71	Disagree

Table 1a shows that responses to items 1 – 5 were positive (mean scores > 2.5) while the responses to items 6 – 10 were negative (with means < 2.5). Students with positive means or responses were of the opinion that the use of MM in instruction can motivate students’ interests in learning biology, while students with negative responses means or responses were of the opinion that the use of MM materials in instructional delivery do not motivate their interest in learning biology

PPMC statistics (r) used to correlate the relationship of the positive and negative opinions to determine possible significant difference is shown in table (1) b.

Table 1 (b): PPMC Statistical Analysis of Students’ Responses on the Use of MM in Motivating Interests’ in Biology

Total Responses

S/No.	Positive	Negative
1	664	402
2	607	334
3	625	367
4	629	348
5	579	342
r	0.84*	
r ^t	1.39	
Critical t	3.182	

NS* =Not Significant

With 0.05 level of significance and degree of freedom of 3, the computed r value of 0.84 and r^t value of 1.37 is less than critical t value (3.182). The r value (0.84) is not significant hence the Null hypothesis of no significant relationship between motivation of Biology students and use of MM is upheld.

H_{O_2} : There will be no significant difference between the mean score of Biology students taught with synchronized MM and the mean score of students taught without it.

To analyze the hypothesis above, two sets of scores obtained from the BAT administered on the experimental and control groups were used. Result of t-test of significant difference in biology achievement is shown in table 2 below:

Table 2: t- test Analysis of the Effect of the Use of Synchronized MM on the Academic Performance of biology Students

	Control Group	Experimental Group
Mean	22.82	51.12
Variance	137.72	333.16
Observations	100	100
Hypothesized Mean Difference	0	
Degree of freedom	169	
t Stat	13.04158516*	
P(T<=t) two-tail	2.40028E-27	
t Critical two-tail	1.974100409	

* Significant at $P < 0.05$

Since calculated t value (13.04) is greater than the critical t value (1.96), the null hypothesis is therefore rejected, which means that the alternate hypothesis is accepted. This is, that there is significant difference in the academic performance of the experimental and control groups. In other words, the experimental group performed academically better than the control group.

DISCUSSION OF FINDINGS

The use of MM in instructional delivery is said to motivate students' interest in learning as shown in table one. Motivation is a key variable in education. This view is in consonance with Okoroma's (2000) who affirms that motivation is an important variable that arouses learners' interest and reinforces learning. Morris (2004) and Aggarwal (2007) also affirmed that when visual, audio and synchronized MM are used for teaching, it stimulates several senses thus making the learner more involved in the learning process. Students feel excited and desire to put in their best in leaning effort once they are motivated. Staylor (2002) equally shares the views above but noted that for MM materials to be able to arouse and sustain students' interest; such materials should be designed or packaged in line with MM design principles.

Table 2 shows that MM material like VCD and television that were used to synchronize a lesson presentation to the experimental group in Biology, produced greater academic performance in the experimental group than in the control group. This finding is consistent with those of Ijhedo (1995), Maurice (2000); Brashears, Akers and Smith (2005), Wickens (2008) and Nkweke (2010). Effective and efficient use of MM in teaching and learning offers both audio and visual messages or information and these appeals to sense of sight and hearing, simultaneously. Students feel a sense of reality in what they learn. This is further supported by (Onyegegbu (2006) and Hoska (2009)).A lot of frustrating situations can be saved our children if our teachers use relevant synchronized MM during instructional development, among other realist efforts

CONCLUSION AND RECOMMENDATIONS

MM equipment, when used in instructional delivery process, motivates student's interest to learn and have positive effects on their academic performance. Based on the finding and conclusion of the study, the following recommendations are hereby offered:

- 1** Government should procure MM devices and distribute to secondary schools **2.**
- 2** The Biology teachers should de-emphasize the use of chalk-talk method of instructional delivery since that method is obsolete and bearing in mind that we are now in information technology
- 3** Biology teachers should frequently use MM during instructional development, especially when it is inevitable
- 4** Government should provide secondary schools with electrical power supply or stand-by generators to aid the use of MM equipment
- 5** Biology teachers should be innovative and use modern MM equipment during instructional delivery in order to motivate students interest in learning, support and reinforce learning, accommodate individual learner's peculiarities, increase students access to learning, provide students with multiple channels of communication, encourage mastery learning and so on
- 6** Occasionally, the School authorities should invite specialists (educational technologists, instructional material technicians, computer experts, etc.) to assist the Biology teachers with their MM packages that are relevant to the subject.
- 7** Age where teachers are expected to explore the use of modern teaching approaches or information communication technology materials in instruction.

- 8 The Biology teachers should organize fieldtrips for students to visit places where MM equipment are available so they can learn from such devices.

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E-LEARNING AND TEACHER PREPARATION IN SCIENCE AND MATHEMATICS : THE PARADIGM FOR UTILIZATION OF INTERACTIVE PACKAGES

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Abstract

The issue of utilization of e-learning packages in the teaching and learning of science and mathematics is examined in this paper, in the light of the efficacy of commercially available e-learning and teacher made packages and their limitations. The paradigm for the use of interactive e-learning packages and the curricula subject matter for teacher preparation that will yield an enduring, effective and rewarding e-learning application in educational system is also proffer.

Keywords: E-Learning, Teacher-Preparation, Paradigm, Utilization, Interactive, Packages.

INTRODUCTION

The teaching of mathematics to obtain the desired objective has always been a contentious issue in education. The situation is so lamentable that Wetzel(2009) blame it on the wrong approach to teaching used by mathematics teachers. The bane is that the teachers might not have been well groomed and grounded to be able to handle the job with the required dexterity. This prompts the need to incorporate e-learning programme into mathematics teachers preparation. The main question is ‘what is e-learning?’.

The concept e-learning simply means electronic learning. It is multifaceted. It embraces all forms of electronic devices that are employed in teaching and learning situations to make learning easy. Examples of the devices include computers and other audio-visual facilities. The most popularly used e-learning device is the computer. Computers can be used in teaching and learning in CAL and CAI. CAL implies Computer Assisted Learning while CAI means Computer Assisted Instruction.

The CAL and CAI are of different types and cover different subjects and topics. There are the commercially available packages which are produced by experts in computer programming, which are made to cover a wide range of subjects at the different levels of education. Another form of CAL and CAI which are used in teaching and learning is the teacher-made packages or improvised instructional packages. Both the commercially available packages and improvised instructional are good and useful in teaching and learning mathematics and Science subjects but the effectiveness, adaptability, malleability and versatility depends on how well the teacher has been prepared to handle it.

For CAL and CAI packages that are available in the market, teachers require certain skills to be able to use them. Even the learners, they need to be inculcated the prerequisite entry behavior that can enable them handle or be taught with CAL and CAI. Huffaker(2003) lamented the lack of proper integration of e-learning into the classroom situation in the traditional conventional learning scenarios, advocating for the need to tap all the advantages of e-learning by entrenching into the school system as part of the curricular practice. Hassana and Woodcock(2010) critically examined the uses of e-learning in U.K and Saudi Arabia and discovered some similarities and differences which are culture oriented. They pinpoint that lack

of proper staff development and teacher preparation as some of the factors that hinders effective use of e-learning educational system in Saudi Arabia.

E-learning has defined in varieties of ways by different persons. Stockley (2006) defined e-learning as the delivery of learning, training or educational programmes via electronic means using computer or other electronic devices to provide training, educational or learning materials. He mentioned that it can be by the use of internet or intranet, CD-ROM or DVD to provide learning materials. Wikipedia(2010) further elaborated on e-learning as all forms of electronically supported learning and teaching using information and communication system which may or may not be networked, comprising of computer and network-enabled transfer of skills and knowledge, which may be web-based, computer-based, virtual classroom and digital collaboration, delivered through internet, intranet/extranet, audio or video tapes, satellite TV, and CD-ROM, which can be self-paced or teacher-led embedded with media text, images, animation, streaming video and audio and associated with acronym such as CBT(computer-based training), IBT(internet based training) and WBT(web-based training).

The use of e-learning in pedagogical spheres date back to 1993 when Graziadei(1993) demonstrated online computer-delivered lecture, tutorials and assessment project using, VAX notes conferencing and assorted software which allowed teaching and learning to take place in a virtual setting. It is from here the development of e-learning grew to other levels, including diverse use of e-learning in the teaching and learning of sciences and mathematics.

USE OF E-LEARNING IN THE TEACHING AND LEARNING OF SCIENCES AND MATHEMATICS

The use of e-learning in science and mathematics classes very essential. It will not only help to make the teaching and learning of science and mathematics to share in educational revolution (Liverpool, Ndam and Oti, 2010) which e-learning brings into educational system but also to tap the benefits of a more effective method of teaching and learning offers (Yaakub & Finch,2010). The efficacy of e-learning in science and mathematics education was questioned by Borba and Bartolini(2010) and replied stating that e-learning may not be different from other technological innovative strides that have been present in science and mathematics education for long but failed to produce significant impact in the teaching and learning of the subjects. If close scrutiny is carried out (Kidwell, Ackerberg & Robert, 2008) it would be discovered that much is still needed to be done to ensure that advantage of e-learning technology is optimally exploited.

There is also the question of how effective e-learning has solve the problem learning mathematics. Dhariwal(2010)comparatively x-ray the traditional method and e-learning approach to teaching mathematics and science subjects and averred that e-learning make room for individualized learning whereby learners progress at their own pace which is absent in traditional method of instruction. The e-learning method obviously personalize the instruction, avail the gist and gem of various learning styles of each learner, boost the confident level of learners, brings about constructive modification in the roles of teachers and learners as wells fosters desirable student teacher relationship(Dhariwal, 2010).

Kajetanowtcz & Wierzejewski (2010) pinpointed that e-learning has no rival when it comes to generation of intrinsic motivation and initiation of organized active learning in mathematics and science education. They equally see e-learning as an efficient means of promoting self-study cum frequent testing in the form of formative evaluation which engender proper monitoring of educational progress and periodical achievement. Overall research report shows that e-learning provide positive effect on learners achievement in mathematics.

CONTENT OF E-LEARNING MATERIAL FOR SCIENCE AND MATHEMATICS TEACHER PREPARATION

The major handicap for the use of e-learning in science and mathematics education is lack of knowledge of Information and Communication Technology (ICT). Hassana & Woodcock (2010) found out that one of the commonest weaknesses of effective e-learning practice in schools is teacher lack of knowledge of ICT. In comparative study of schools in U.K. and Saudi Arabia, they discovered that teachers who have little or no knowledge of ICT find it difficult to use the e-learning packages and not to talk of producing one. Based on this the following are suggested as the content of e-learning material for science and mathematics teacher preparation.

Table 1: E-learning Material for Science and Mathematics Teacher Preparation

S/N	Topic	Content Materials	Mode Implementation
1.	Computer Appreciation	Introduction to computer studies, computer operation, word processing, preparation of presentation packages (power point presentation)	Theory and Practical
2.	Presentations	Introduction to multimedia presentations, preparation of slides, presentation word processing packages, formatting of presentation packages, validation of presentation packages.	Theory and Practical
3.	Computer programming	Introduction to programming languages, BASIC, Logo, C+, C++, Java, etc. Preparation simple instructional packages in any chosen programming Language,	Theory and Practical
4.	Administration of e-learning packages	Implementation of commercially available packages, validation and evaluation of commercially available packages, production teacher-centered packages, validation and evaluation of teacher-centered packages	Theory and Practical

The above table presents a prototype of the content of e-learning materials for science and mathematics teacher preparation which can be enriched and used during the duration of study in the teacher preparation programme. The various institutions that are involved in teacher preparation programme can adopt the above content and modify to suite their curricula and use it for teacher education programme of study. An enrichment of the above curricula content materials will essentially enhance sound teacher education product. The issue inadequate knowledge of ICT which hampers utilization of e-learning in the teaching of science and mathematics could be taken care of through proper implementation of the e-learning content material of the teacher preparation curriculum.

APPRAISAL OF COMMERCIALY AVAILABLE AND TEACHER MADE INTERACTIVE PACKAGES

The two types of interactive packages in use are the commercially available and the teacher-made interactive package. The commercially available interactive packages are produced by persons who are not practicing teachers and end users of the products and do not take learners needs into consideration. Sood & Jitendra (2007), stated research finding has proved that commercially available packages focus on instructional designs while it takes no cognizance of teachers professional knowledge and experiences. Hassana & Woodcock (2010) equally complained that the absent of end users in the designing of commercially available packages is the reason for the packages not being able to meet the teachers and learners need.

It is also of note to mention that one of the disadvantages of commercially available packages is lack of consistency with the curricula. Hassana & Woodcock (2010) equally complained that the absent of end users in the designing of commercially available packages is the reason for the packages not being able to meet the teachers and learners need. This clearly, shows commercially available packages are not ideal for teaching and learning purposes unless they are modified to suit learners need by the end users.

Obviously, there no gainsaying that teacher- made package are the ultimate for teaching and learning of science but they should possess the following qualities:

- a) Adaptability to learners need
- b) Be motivational
- c) Must curricula and learners centered
- d) Should versatile, flexible and malleable
- e) Should be very valid and reliable
- f) Should satisfy curricula and lesson objectives and
- g) Do not undermine the philosophy of Science and Mathematics education.

CONCLUSION

It is obvious that e-learning will provide a means of resolving learning difficulties in science and mathematics, but it should be designed to cater for learners need and satisfy curriculum objectives. The commercially available packages notwithstanding that they not provide for all the essential elements of good instruction, it clear that they can serve as model for teachers to adopt in production of their own learners centered packages. The teacher made packages should qualitative enough to suit into diverse learning needs and situation and possess acceptable life span.

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E-ACTIVITY AND TECHNOLOGY IN A CHANGING ENVIRONMENT

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INTRODUCTION

The second half of the last century will go down in the history of higher education as the period of its most spectacular expansion: an over sixfold increase in student enrolments worldwide, from 13 million in 1960 to 82 million in 1995. But it is also the period which has seen the gap between industrially developed, the developing countries and in particular the least developed countries with regard to access and resources for higher learning and research, already enormous, becoming even wider. Berchtold provides estimates that by 2050 the worldwide student number will increase to 185 million. This changing higher education environment requires e-activity and technology to cope with the provision of education on a global scale.

Globality is an unavoidable challenge of contemporary life. The process comprises, as Saavedra Hidalgo and Berchtold outline, all aspects of contemporary social life, where the economy, politics, culture, reflected in social consciousness, the way people think about the world, both its local world as well as the whole world is undergoing considerable change. Regarding the effects of globalisation on education, two phenomena are manifested contrasting: On the one hand, the education sector itself is characterized by strong inertia. On the other hand the transformation of the sectors of finance, transport, production, trade essentially because of the (stock) markets produces effects in the sectors of education in the poorest countries.

Don F. Westerheijden states that the widest possible context for any phenomenon in higher education, and a buzzword at the same time, is provided by 'globalisation'. What meanings can be given to it is a question leading to an almost endless academic debate, which he cut short by focusing on one practical element of it, namely the policy developments around the World Trade Organisation, focusing on the negotiations around the General Agreement on Trade in Services. These are bound to have an impact on the way higher education will be behaving around the world in a few years from now—or sooner. The relevant question from our point of view then becomes: Is education a service? The answer that should be given to this question is of the 'Yes, but...' type—the 'but' being that it is debated whether education, and especially higher education, is a public good that should be exempted from trade perspectives.

Friedman postulates the world has become flat, arguing that globalised trade, outsourcing, supply-chaining, and political forces have changed the world permanently, for both better and worse. He also argues that the pace of globalisation is quickening and will continue to have a growing impact on business organization and practice. "Because it is flattening and shrinking the world, "Globalization 3.0" is going to be more and more driven by not only individuals but also by a much more diverse – non-Western, non-white – group of individuals. Individuals from every corner of the flat world are being empowered." Croucher perceives the globalisation process as a combination of economic, technological, sociocultural and political forces. The founder of the World Economic Forum, Klaus Schwab sees the world growing together at high speed, globalisation is driven by technological and scientific innovation, "we can move data-capital around the world in seconds". As John Daniel, a former UNESCO Assistant Director put it: "But having said that it is vital to recognise that, while higher education may be traded in a marketplace, it is a quite different proposition from cars or bananas. The challenge is to come up with an appropriate way of maximising the benefits and minimising the dangers now that higher education is a global phenomenon."

According to Bhagwati globalisation is often used to refer to economic globalisation, that is, integration of national economies into the international economy through trade, foreign direct investment, capital flows, migration, and the spread of technology. For Noam Chomsky the word globalisation is also used, in a doctrinal sense, to describe the neoliberal form of economic globalisation. Chomsky asks, how after the victory of globalised capitalism the society of the future may look like and whose demands it shall serve: those of the transnational corporations, or those who have been driven aside more and more by the victory of a neo-liberal economic order? Will it be possible to develop an international society, comparable in its basics with the Third World, with islands of power and wealth in a sea of misery, and with totalitarian control-mechanisms behind an increasingly facial democracy? Or will the resistance of the populations, needing to become international as well, be successful enough in order to remove these structures of power and rule? Regarding the current state of globalisation, Diamond suggests reasons both for pessimism and for optimism about our ability to solve our current environmental problems, or, for the first time in history, we face the risk of a global decline. His remaining cause for hope is another consequence of the globalised modern world's interconnectedness, because we have the media and opportunity to learn from the mistakes of distant peoples and past peoples.

Two driving forces - technology and globalisation - have changed the environment of universities worldwide. Technology means information technology development, the internet, e-learning, virtual classrooms, altogether new challenges for traditional classroom-based higher education settings. In principle, open and distance higher education in virtual classrooms can serve an unlimited number of students. Globalisation means both, global competition as global outreach or campus-extension, and global access to a virtual university from every corner of the world with an internet-connection.

Transnational higher education has developed from correspondence learning, via Radio- and TV-courses, towards a new age of virtual and e-learning environments, combining advanced open and distance learning tools and didactic methods with state-of-the-art information technology offering new opportunities for universities and higher education providers to go online with their degree programmes and become virtual universities and transnational players. Mega universities have developed. The biggest players globally are the Chinese Radio and TV university, the Turkish Anatolian distance university, the Indian Indira Gandhi National Open university, the UK Open university, the Spanish National university of distance education, the Catalan Open university, the Portugese Open university, the University of Phoenix online, the University of Liverpool, besides British style validation schemes (e.g. University of Wales) to name but a few. Additionally, networks of universities, consortia, and alliances, internet platforms, have developed, taking advantage of cluster solutions and numerous joint marketing websites and click-link-lead ads on the internet. Those are quite common among the leading US distance university study offers, as well as in the Spanish speaking countries, e.g. FUNIBER. New, for-profit providers are increasing their market share of the TNE market, e.g. Kaplan universities in the U.S.A. The biggest exporters of TNE globally are the USA, the UK, and Australia.

Based on previous findings and new personal research this paper explores the changing environment, missions and objectives of universities, looks into the phenomenon of transnational education TNE and virtual universities, describes the settings of open and distance learning ODL.

This conference paper demonstrates that the traditional line drawn in Economics between goods versus services is outdated due to the appearance of "conservable human services" (e.g. filmed lectures) and by e-learning-tools through the application of standardised and repeatable (goods characteristics) automated services (e.g. an e-learning platform offering lectures, assignment and multiple-choice tests), services no longer provided by a human tutor rather than provided by a machine (virtual server) on the internet from anywhere at anytime.

From this perspective we need to define the term “Service-Good” for describing the elements of e-activity and technology in a changing learning environment.

INTERNATIONAL CONTEXT

On December 10, 1948 the General Assembly of the United Nations adopted and proclaimed the Universal Declaration of Human Rights calling upon all Member countries to publicise the text of the Declaration and "to cause it to be disseminated, displayed, read and expounded principally in schools and other educational institutions, without distinction based on the political status of countries or territories." Article 26.(1) declares: Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.

The Governments of the States Parties to the UNESCO Constitution on behalf of their peoples declare that ignorance of each other's ways and lives has been a common cause, throughout the history of mankind, of that suspicion and mistrust between the peoples of the world through which their differences have all too often broken into war. To realize this purpose the Organization will collaborate in the work of advancing the mutual knowledge and understanding of peoples, through all means of mass communication and to that end recommend such international agreements as may be necessary to promote the free flow of ideas by word and image; Give fresh impulse to popular education and to the spread of culture; by instituting collaboration among the nations to advance the ideal of equality of educational opportunity without regard to race, sex or any distinctions, economic or social.

The World Declaration on Higher Education shapes a new vision of higher education: Equity of access: In keeping with Article 26.1 of the Universal Declaration of Human Rights, admission to higher education should be based on the merit, capacity, efforts, perseverance and devotion, showed by those seeking access to it, and can take place in a lifelong scheme, at any time, with due recognition of previously acquired skills. As a consequence, no discrimination can be accepted in granting access to higher education on grounds of race, gender, language or religion, or economic, cultural or social distinctions, or physical disabilities. Enhancing participation and promoting the role of women. Advancing knowledge through research in science, the arts and humanities and the dissemination of its results.

The advancement of knowledge through research is an essential function of all systems of higher education, which should promote postgraduate studies. Innovation, interdisciplinarity and transdisciplinarity should be promoted and reinforced in programmes with long-term orientations on social and cultural aims and needs. An appropriate balance should be established between basic and target-oriented research. Long-term orientation based on relevance: Relevance in higher education should be assessed in terms of the fit between what society expects of institutions and what they do. This requires ethical standards, political impartiality, critical capacities and, at the same time, a better articulation with the problems of society and the world of work, basing long-term orientations on societal aims and needs, including respect for cultures and environmental protection. The concern is to provide access to both broad general education and targeted, career-specific education, often interdisciplinary, focusing on skills and aptitudes, both of which equip individuals to live in a variety of changing settings, and to be able to change occupations. Higher education should reinforce its role of service to society, especially its activities aimed at eliminating poverty, intolerance, violence, illiteracy, hunger, environmental degradation and disease, mainly through an interdisciplinary and transdisciplinary approach in the analysis of problems and issues. Higher education should enhance its contribution to the development of the whole education system, notably through improved teacher education, curriculum development and educational research. Ultimately, higher education should aim at the creation of a new society - non-violent and non-exploitative -

consisting of highly cultivated, motivated and integrated individuals, inspired by love for humanity and guided by wisdom.

Strengthening co-operation with the world of work and analysing and anticipating societal needs: In economies characterized by changes and the emergence of new production paradigms based on knowledge and its application, and on the handling of information, the links between higher education, the world of work and other parts of society should be strengthened and renewed. Links with the world of work can be strengthened. As a lifelong source of professional training, updating and recycling, institutions of higher education should systematically take into account trends in the world of work and in the scientific, technological and economic sectors. Developing entrepreneurial skills and initiative should become major concerns of higher education, in order to facilitate employability of graduates who will increasingly be called upon to be not only job seekers but also and above all to become job creators.

Diversification for enhanced equity of opportunity. Diversifying higher education models and recruitment methods and criteria is essential both to meet increasing international demand and to provide access to various delivery modes and to extend access to an ever-wider public, in a lifelong perspective, based on flexible entry and exit points to and from the system of higher education. More diversified systems of higher education are characterized by new types of tertiary institutions: public, private and non-profit institutions, amongst others. Institutions should be able to offer a wide variety of education and training opportunities: traditional degrees, short courses, part-time study, flexible schedules, modularized courses, supported learning at a distance, etc.

UNESCO's policy on open and distance learning is based on its overall priority to foster access to lifelong education for all. While the use of distance education was given early support by the Organization, new developments in information and communication technologies have radically increased the demand for lifelong education but also provided new means to meet the demand. Facing the educational challenges of the 21st century, UNESCO continues, through open and distance learning, to contribute to the creation of a unique learning society in a lifelong learning context.

The UNESCO Recommendation on the Recognition of Studies and Qualifications in Higher Education stated that the great diversity of the cultures and higher education systems existing in the world constitutes an exceptional resource that must be preserved, promoted and fostered, that higher education increasingly has an international dimension, owing to the rapid expansion and internationalization of knowledge and to the links and solidarity established within the scientific and university community, and that wider access to educational resources worldwide through greater mobility for students, researchers, teachers and specialists is essential to this international dimension, the need for mutual recognition of studies and qualifications in higher education by all competent authorities and institutions as a means of increasing mobility of persons and the exchange of ideas, knowledge and scientific and technological experience, and in order ultimately to promote improvements everywhere in the quality of higher education, recognition will also promote an overall increase in the number of people able to benefit from higher education, the best possible use by all countries of the means available for education and training, and the development of human resources, greater mobility and a reduction in the difficulties encountered by persons who have been trained or educated abroad and who wish to study or practise a profession, a rapprochement and better understanding between cultures and peoples, with mutual respect for their diversity.

According to Lachenmann lifelong learning in knowledge societies needs social spaces and institutional arrangements to be created in society and in the political system, securing access and flexibility, and including institutional learning. Thereby, a mutual relationship is created with societal transformation. Knowledge is the relevant resource for socio-economic change and innovations, starting from the every day knowledge and local knowledge). Western

knowledge, partly leading to concepts of appropriate technology, partly to what could be called mystification of traditional knowledge. Nederveen Pieterse (1995, p. 45) uses the idea of 'globalisations in the plural' which follows ideas of different 'modernities' overcoming the ever present Western centrality. All institutions in society must be such as to make lifelong learning possible. Organisational development should be geared to encourage flexibility and learning. Organisations, including enterprises, should be learning organisations themselves.

All around the world, the growth and liberalization of international trade is changing the way we live and work.¹¹ Trade flows and the rules that govern them are a massive force for economic, environmental and social change. International trade is becoming an increasingly important driver of economic development, as it has been expanding at almost twice the pace of total global economic activity for the past 15 years (*note:1985-2000*). A growing number of developing countries look to trade and investment as a central part of their strategies for development, and trade considerations are increasingly important in shaping economic policy in all developed countries, too.

UNESCO (1997) identifies challenges and opportunities: The last two decades have seen considerable growth in education and training. But the world still suffers from intolerable inequalities at the international level and sometimes within nations. At the root is often the problem of financing adequate provision of education and training. The rapid development of information and communication technologies and the move towards a more knowledge-intensive, interdependent society create new challenges and opportunities for the design and delivery of education. For the student/learner open and distance learning means increased access and flexibility, as well as the combination of work and education. It may also mean a more learner-centred approach, enrichment, higher quality and new ways of interaction. For employers it offers high quality and often cost-effective professional development in the workplace. It allows upgrading of skills, increased productivity and development of a new learning culture. In addition, it means sharing of costs, of training time, and increased portability of training. For governments the main potential is to increase the capacity of education and training systems, to reach target groups with limited access to conventional education and training, to support and enhance the quality and relevance of existing educational structures, to achieve more cost effective education and training, and to promote innovation and opportunities for lifelong learning.

Bittner takes a focus on lifelong learning, pursuing the question of how different areas of education need to change in order to contribute to the implementation of this internationally recognized principle. In the modern knowledge and information society, knowledge becomes more and more important. Knowledge becomes increasingly important for the individual as much as for our society. Future life chances depend to a great extent on whether individuals are successful in acquiring knowledge. Therefore education plays a key role with respect to future changes and development, not only for personal development but also for participation and democratic citizenship, and for employability of the individual and the competitiveness of our economy. It is by reorganizing teaching and learning that we will be able to impart and acquire the knowledge that we will need tomorrow. The traditional occupation principle, that is, lifelong employment in an occupation for which one has been trained, has long since become outdated. Increasingly, work organization is based less on hierarchical structures, combines work and learning, and is characterized by team work and greater individual responsibility as well as by the ability to organize change. Social and economic progress and future competitiveness will largely depend on motivation for lifelong learning. An aging society is also a factor here. Growing qualification requirements must not lead to social exclusion. Enabling less qualified adults to engage in lifelong learning is of particular importance.

My Von Euler and David Berg report the most common level of education offered by the different institutions represented in their survey is tertiary education. Continuing education, education offered to those who seek educational opportunities after the 'traditional' school age, for example to increase job or career opportunities, is also provided by a large group of programmes. In considering distance education and open learning opportunities in the world, the actual learning process is of greatest interest to educators.

UNIVERSITIES GOING VIRTUAL

Across the world there are differing standards for the legal definition of the term "university" and formal accreditation of institutions. There is no nationally standardized definition of the term in the United States, although the term is primarily used to designate research institutions and is often reserved for doctorate-granting institutions.

Dr. Carlos Tünnermann defines a university: "La institución cultural y científica por excelencia creada por el hombre". "The cultural and scientific institution for excellence created for man".

According to Wikipedia, the free encyclopedia, a university is an institution of higher education and research, which grants academic degrees in a variety of subjects. A university provides both undergraduate education and postgraduate education. The word *university* is derived from the Latin *universitas magistrorum et scholarium*, roughly meaning "community of teachers and scholars."

The Encarta Dictionary defines the university as the complex entity of university instruction and research, buildings and housing, and people (students and faculty): a university is an undergraduate and postgraduate educational institution for higher learning typically including an undergraduate college and graduate schools in various disciplines, as well as medical and law schools and sometimes other professional schools.

The original Latin word "universitas" referred to places of learning in Europe using Latin. The Latin word "academia" related to a number of educational institutions of non-Western antiquity. The University of Constantinople, founded as an institution of higher learning in 425 AD and reorganized as a corporation of students in 849 is considered by some to be the earliest institution of higher learning with some of the characteristics we associate today with a university (research and teaching, auto-administration, academic independence). If a university is defined as "an institution of higher learning" then it is preceded by several others, including the Academy that it was founded to compete with and eventually replaced. If the original meaning of the word is considered "a corporation of students" then this could be the first example of such an institution.

If the definition of a university is assumed to mean an institution of higher education and research which issues academic degrees at all levels (bachelor, master and doctorate) like in the modern sense of the word, then the medieval Madrasahs known as *Jami'ah* ("university" in Arabic) founded in the 9th century would be the first examples of such an institution.

The earliest universities in Western Europe were developed under the aegis of the Catholic Church, usually as cathedral schools or by papal bull as *Studia Generali* or municipal administrations. The end of the medieval period marked the beginning of the transformation of universities that would eventually result in the modern research university. Many external influences, such as eras of Humanism, Enlightenment, Reformation, and revolution, shaped research universities during their development. By the 18th century, universities published their own research journals, and by the 19th century, the German and the French university models had arisen. The German, or Humboldtian model, liberal ideas pertaining to the importance of freedom, seminars, and laboratories in universities. The French university model involved strict discipline and control over every aspect of the university. Until the 19th century, religion played a significant role in university curriculum; however, the role of religion in research universities

decreased in the 19th century, and by the end of the 19th century, the German university model had spread around the world. Universities concentrated on science in the 19th and 20th centuries and become increasingly accessible to the masses. In Britain the move from industrial revolution to modernity saw the arrival of new civic universities with an emphasis on science and engineering. The British also established universities worldwide, and higher education became available to the masses not only in Europe. In a general sense, the basic structure and aims of universities have remained constant over the years. Although each institution is differently organized, most universities have a board of trustees; president, chancellor, or rector; vice president(s), vice-chancellor(s), or vice-rector(s); and deans of various divisions. Universities are generally divided into a number of academic departments, schools or faculties. Public university systems are ruled over by government-run higher education boards. However, many public universities in the world have a considerable degree of financial, research and pedagogical autonomy. Private universities are privately funded and generally have a broader independence from state policies.

The Framework for Priority Action for Change and Development of Higher Education demands that as priority actions at the levels of systems and institutions, that each higher education institution should define its mission according to the present and future needs of society and base it on an awareness of the fact that higher education is essential for any country or region to reach the necessary level of sustainable and environmentally sound economic and social development, cultural creativity nourished by better knowledge and understanding of the cultural heritage, higher living standards, and internal and international harmony and peace, based on human rights, democracy, tolerance and mutual respect. These missions should incorporate the concept of academic freedom set out in the Recommendation concerning the Status of Higher-Education Teaching Personnel approved by the General Conference of UNESCO in November 1997.

Higher education has given ample proof of its viability over the centuries and of its ability to change and to induce change and progress in society. Owing to the scope and pace of change, society has become increasingly knowledge-based so that higher learning and research now act as essential components of cultural, socio-economic and environmentally sustainable development of individuals, communities and nations. Higher education itself is confronted therefore with formidable challenges and must proceed to the most radical change and renewal it has ever been required to undertake, so that our society, which is currently undergoing a profound crisis of values, can transcend mere economic considerations and incorporate deeper dimensions of morality and spirituality. It is with the aim of providing solutions to these challenges and of setting in motion a process of in-depth reform in higher education worldwide that UNESCO has convened a World Conference on Higher Education in the Twenty-First Century: Vision and Action.

According to the paper, 'Open and Distance Learning: Prospects and Policy Consideration', prepared by UNESCO as a contribution to the on-going discussion on the ever wider role that open and distance learning is expected to assume in the educational landscape of tomorrow, the increasing international interest in open and distance learning and the subsequent expansion of the respective institutions and programmes is a most remarkable development in the field of education and training of recent years. There seems to be no doubt that open and distance learning is in a process of establishing itself as an integral part of educational delivery systems; to contribute to national reflections on the use of open and distance learning, including its policies and priorities, and to inspire cooperation at the national, regional and sub-regional levels that will help strengthen the chances of providing lifelong education for all.

The UNESCO Recommendation on the Recognition of Studies and Qualifications in Higher Education provides the following definitions:

- (a) 'higher education' means all types of studies, training or training for research at the post-secondary level, provided by universities or other educational establishments, that are approved as institutions of higher education by the competent State authorities;
- (b) 'qualification in higher education' means any diploma, degree or other qualifying certificate that is awarded by an institution of higher education, or another appropriate authority, that establishes that the holder has successfully completed a course of study and qualifies him or her either to continue to a further stage of study or to practise a profession not requiring further special preparation;
- (c) 'partial studies' means any homogeneous fraction of a course at the first stage or at more advanced stages of higher studies that has been evaluated and authenticated and, while not a complete course in itself, can be equated with a significant acquisition of knowledge or skill;
- (d) 'secondary education' means studies of any kind that follow primary, elementary or basic education and are a prerequisite for admission to higher education;
- (e) 'recognition' of a foreign qualification in higher education means its acceptance by the competent authorities of the State concerned (whether they be governmental or non-governmental) as entitling its holder to be considered under the same conditions as those holding a comparable qualification awarded in that State and deemed comparable, for the purposes of access to or further pursuit of higher education studies, participation in research, the practice of a profession if this does not require the passing of examinations or further special preparation, or all the foregoing, according to the scope of the recognition;
- (f) 'recognition' of a foreign certificate of secondary education for the purpose of undertaking studies at the higher level means its acceptance by the competent authorities of the State concerned as entitling its holder to be considered for admission to its higher education institutions under the same conditions as the holder of a comparable qualification or certificate awarded in that State;
- (g) 'recognition' of a foreign qualification or of a foreign certificate of partial studies of higher education means acceptance by the competent authorities of the State concerned that the holder is entitled to be considered for further studies at its higher education and research institutions under the same conditions as those pertaining to the holder of a comparable qualification or certificate awarded in that State;
- (h) 'recognition' of a foreign qualification in higher education with a view to the practice of a profession means acceptance by the competent authorities of the professional preparation of the holder for the practice of the profession concerned, without prejudice, however, to the legal and professional rules or procedures in force in the States concerned and provided the holder would be entitled to practise the same profession in the State in which the professional preparation and qualification had been obtained; such recognition does not exempt the holder of the foreign qualification from complying with any other conditions for the practice of the profession concerned that may be laid down by the competent governmental or professional authorities in the States concerned.

Recognition of a qualification or certificate may not give a greater right to consideration in another State than in the State in which it was conferred. For the purposes of the Lisbon Convention, the following terms shall have the following meaning:

Access (to higher education) The right of qualified candidates to apply and to be considered for admission to higher education.

Admission (to higher education institutions and programmes): The act of, or system for, allowing qualified applicants to pursue studies in higher education at a given institution and/or a given programme.

Assessment (of institutions or programmes): The process for establishing the educational quality of a higher education institution or programme.

Assessment (of individual qualifications): The written appraisal or evaluation of an individual's foreign qualifications by a competent body.

Competent recognition authority: A body officially charged with making binding decisions on the recognition of foreign qualifications.

Higher education: All types of courses of study, or sets of courses of study, training or training for research at the post secondary level which are recognized by the relevant authorities of a Party as belonging to its higher education system.

Higher education institution: An establishment providing higher education and recognized by the competent authority of a Party as belonging to its system of higher education.

Higher education programme: A course of study recognized by the competent authority of a Party as belonging to its system of higher education, and the completion of which provides the student with a higher education qualification.

Period of study: Any component of a higher education programme which has been evaluated and documented and, while not a complete programme of study in itself, represents a significant acquisition of knowledge or skill.

Qualification

A. Higher education qualification: Any degree, diploma or other certificate issued by a competent authority attesting the successful completion of a higher education programme.

B. Qualification giving access to higher education: Any diploma or other certificate issued by a competent authority attesting the successful completion of an education programme and giving the holder of the qualification the right to be considered for admission to higher education (cf. the definition of access).

Recognition: A formal acknowledgement by a competent authority of the value of a foreign educational qualification with a view to access to educational and/or employment activities.

Requirement

A. General requirements: Conditions that must in all cases be fulfilled for access to higher education, or to a given level thereof, or for the award of a higher education qualification at a given level.

B. Specific requirements: Conditions that must be fulfilled, in addition to the general requirements, in order to gain admission to a particular higher education programme, or for the award of a specific higher education qualification in a particular field of study.

The World Declaration on Higher Education proclaims the following missions and functions of higher education: Mission to educate, to train and to undertake research, affirming that the core missions and values of higher education, in particular the mission to contribute to the sustainable development and improvement of society as a whole, should be preserved, reinforced and further expanded, namely, to: (a) educate highly qualified graduates and responsible citizens able to meet the needs of all sectors of human activity, by offering relevant qualifications, including professional training, which combine high-level knowledge and skills, using courses and content continually tailored to the present and future needs of society; (b) provide opportunities (*espace ouvert*) for higher learning and for learning throughout life, giving to learners an optimal range of choice and a flexibility of entry and exit points within the system, as well as an opportunity for individual development and social mobility in order to educate for citizenship and for active participation in society, with a worldwide vision, for endogenous capacity-building, and for the consolidation of human rights, sustainable development, democracy and peace, in a context of justice; (c) advance, create and disseminate knowledge through research and provide, as part of its service to the community, relevant expertise to assist societies in cultural, social and economic development, promoting and developing scientific and technological research as well as research in the social sciences, the humanities and the creative arts; (d) help understand, interpret, preserve, enhance, promote and disseminate national and regional, international and historic cultures, in a context of cultural pluralism and diversity; (e) help protect and enhance societal values by training young people in the values which form the basis of democratic citizenship and by providing critical and detached perspectives to assist in the discussion of strategic options and the reinforcement of humanistic perspectives; (f)

contribute to the development and improvement of education at all levels, including through the training of teachers.

Ethical role, autonomy, responsibility and anticipatory function: In accordance with the Recommendation concerning the Status of Higher-Education Teaching Personnel¹², higher education institutions and their personnel and students should: (a) preserve and develop their crucial functions, through the exercise of ethics and scientific and intellectual rigour in their various activities; (b) be able to speak out on ethical, cultural and social problems completely independently and in full awareness of their responsibilities, exercising a kind of intellectual authority that society needs to help it to reflect, understand and act; (c) enhance their critical and forward-looking functions, through continuing analysis of emerging social, economic, cultural and political trends, providing a focus for forecasting, warning and prevention; (d) exercise their intellectual capacity and their moral prestige to defend and actively disseminate universally accepted values, including peace, justice, freedom, equality and solidarity, as enshrined in UNESCO's Constitution; (e) enjoy full academic autonomy and freedom, conceived as a set of rights and duties, while being fully responsible and accountable to society; (f) play a role in helping identify and address issues that affect the well-being of communities, nations and global society.

There is already a variety of technologies available at different levels of sophistication, which may fit most educational requirements reasonably well. There is great potential for new, advanced technologies achieved in an increasingly integrated way and at decreasing costs. The challenge will be to utilize this potential in accordance with clear educational and instructional strategies, and to integrate the cultural and intellectual developments caused by the new technologies in the global information society. Interactivity is a key element in most of the new services that are foreseen. The technologies are particularly adaptable to the communication needs of dispersed users, but on the other hand need reliable networks. There is no simple answer to the question of what models and structures open and distance learning institutions will adopt in the future. There is an increasing tendency to use open and distance learning in traditional universities, and this will almost certainly be extended to all levels and all sectors. On the other hand, there will also be room for other types of institutions, both public and private. New markets and technologies will impose changes in all existing institutions, and new types of services and institutions will emerge. Nevertheless, there will be a continuous need for dedicated distance learning institutions (open universities) or departments with a capacity for serving very large target groups. All institutions will need to develop new partnerships and alliances in order to meet the needs of society in more effective ways than most of them do today. The wealth of experience and competence in open and distance learning institutions must be capitalized on in future structures.

The World Declaration on Higher Education for the Twenty-first Century: Vision and Action and Framework for Priority Action for Change and Development in Higher Education postulates that there is an unprecedented demand for and a great diversification in higher education, as well as an increased awareness of its vital importance for socio-cultural and economic development, and for building the future, for which the younger generations will need to be equipped with new skills, knowledge and ideals. Higher education includes 'all types of studies, training or training for research at the post-secondary level, provided by universities or other educational establishments that are approved as institutions of higher education by the competent State authorities'. Everywhere higher education is faced with great challenges and difficulties related to financing, equity of conditions at access into and during the course of studies, improved staff development, skills-based training, enhancement and preservation of quality in teaching, research and services, relevance of programmes, employability of graduates,

establishment of efficient co-operation agreements and equitable access to the benefits of international co-operation.

At the same time, higher education is being challenged by new opportunities relating to technologies that are improving the ways in which knowledge can be produced, managed, disseminated, accessed and controlled. Equitable access to these technologies should be ensured at all levels of education systems. The second half of the last century will go down in the history of higher education as the period of its most spectacular expansion: an over six-fold increase in student enrolments worldwide, from 13 million in 1960 to 82 million in 1995. But it is also the period which has seen the gap between industrially developed, the developing countries and in particular the least developed countries with regard to access and resources for higher learning and research, already enormous, becoming even wider. It has also been a period of increased socio-economic stratification and greater difference in educational opportunity within countries, including in some of the most developed and wealthiest nations.

Without adequate higher education and research institutions providing a critical mass of skilled and educated people, no country can ensure genuine endogenous and sustainable development and, in particular, developing countries and least developed countries cannot reduce the gap separating them from the industrially developed ones. Sharing knowledge, international co-operation and new technologies can offer new opportunities to reduce this gap. Convinced that education is a fundamental pillar of human rights, democracy, sustainable development and peace, and shall therefore become accessible to all throughout life and that measures are required to ensure co-ordination and co-operation across and between the various sectors, particularly between general, technical and professional secondary and post-secondary education as well as between universities, colleges and technical institutions. Believing that, in this context, the solution of the problems faced on the eve of the twenty-first century will be determined by the vision of the future society and by the role that is assigned to education in general and to higher education in particular, aware that on the threshold of a new millennium it is the duty of higher education to ensure that the values and ideals of a culture of peace prevail and that the intellectual community should be mobilized to that end, considering that a substantial change and development of higher education, the enhancement of its quality and relevance, and the solution to the major challenges it faces, require the strong involvement not only of governments and of higher education institutions, but also of all stakeholders, emphasizing that higher education systems should enhance their capacity to live with uncertainty, to change and bring about change, and to address social needs and to promote solidarity and equity; should preserve and exercise scientific rigour and originality, in a spirit of impartiality, as a basic prerequisite for attaining and sustaining an indispensable level of quality; and should place students at the centre of their concerns, within a lifelong perspective, so as to allow their full integration into the global knowledge society of the coming century, also believing that international co-operation and exchange are major avenues for advancing higher education throughout the world.

Wagner suggests a scenario for the future role of universities: Open universities, distance teaching organizations as well as traditional universities or colleges are facing more or less the same changes in the modern "electronic information world". So their challenges are similar ones. What is different are their histories, their clients, their modes and cultures of teaching and learning - thus their platforms for action and their options and conditions for change and development. Wagner does not focus on future scenarios for universities in much detail, rather than trying to outline some of the most important aspects and impacts on the prospective roles of universities and their possible strategies for "virtualization". For him there is no doubt that external and internal conditions for universities will change in a way that urges these organizations to redefine their tasks and their methods. Situated between a rich and committing history and tradition on one side and rapid change and innovation in economic, social, political, cultural and organizational areas universities will have to find (to invent) their

adequate shape of the "campus" in the future. It will not only be the matter to put a lecture "on the net" and produce some CD-ROMs and multi-media courses. Universities and colleges will have to answer on fundamental issues like a new character of knowledge itself, the tentative loss of tradition, an overwhelming need for collaboration and networking.

However, Wagner sees a requirement for change-management within a framework for cooperative development: Who ever wants to start the development of a "virtual" university in a traditional environment will have to invent a rather complex plan, strategy and methodology for the change management. There will be no success if there won't be found a suitable framework for collaborative development. Collaboration is needed within a university including faculty, library, computing-, media- and distance-education-centres - as well as administration and management. Most often collaboration will be needed with resource- and competence-centres from outside one single university. Legal aspects will have to be resolved in the political and administrative area. In general collaboration with enterprises, social organizations and broadcasting / publishing / media companies will be crucial. Not many universities are used to this on an organizational level even if there may be well established networks on a personal or expert level.

Some mega universities such as Anadolu University in Turkey and China Central Radio and TV University in China and IGNOU in India have over 500,000 active students. Considering the high level of student enrolment, the mega universities are becoming "very important for the future of higher education (HE) all over the world, including HE as part of lifelong learning.

In parallel with the development of mega universities, cross-border DE has grown. For example, universities in Australia, UK, USA, and Canada have actively exported their DE programmes to other parts of the world. China, Hong Kong (China), India, Malaysia and Singapore in the Asia-Pacific region have been among major importers of those programmes. However, among those importers, Hong Kong (China), India and Malaysia have also exported their programmes to other countries such as Bangladesh, China, Indonesia and Sri Lanka (Jung, 2004a).

Moreover, many conventional DE institutions have begun to introduce information and communication technology (ICT) mainly as supplementary modes of instruction. Some institutions including a few mega universities have created e-learning programmes. Examples include the e-MBA programme of the Anadolu University in Turkey, the online Lifelong Education Graduate School at the Korea National Open University in Korea, the online MBA of the Athabasca University in Canada. Besides these institutions, for-profit e-learning providers have appeared in the DE market. In the Asia-Pacific region, main providers of e-learning include Thomson Learning, Apollo International and UNext.

These trends challenge the existing quality assurance (QA) frameworks of DE, which have focused more on widening access than on assuring quality, and often do not address for-profit and cross-border education. Especially in the context of growing globalisation in distance education, there has been an urgent need for international initiatives to review quality assurance mechanisms of DE for higher education at the national and institutional level, discuss new challenges of a changing DE environment, and build a capacity for QA to enhance the quality provision in a globalised higher education market.

TRANSNATIONAL HIGHER EDUCATION – OPEN AND DISTANCE EDUCATION

But having said that it is vital to recognise that, while higher education may be traded in a marketplace, it is a quite different proposition from cars or bananas. The challenge is to come up with an appropriate way of maximising the benefits and minimising the dangers now that higher education is a global phenomenon.

The role of open and distance learning in educational innovation, according to UNESCO is summarised: As increasing acceptance within conventional education institutions and among educational planners is gained, open and distance learning has the potential to generate new patterns of teaching and learning that may influence the way education in general is provided. By reaching new target groups distance education makes the actual needs of education in society more visible. Distance education and open learning are part of the economic and educational response to popular demand and to economic and political objectives concerning the provision of appropriate learning opportunities from the perspective of lifelong learning. It may therefore enhance a more student and consumer-oriented approach and more extensive contact between educational institutions on the one hand and community-based organizations, business and industry on the other.

By developing and producing high quality learning materials open and distance learning systems often make new and better learning resources available. This may have a particular influence when teachers and professors of conventional institutions become involved in the Open and distance learning development or use of these materials, for instance on contract with a distance teaching institution. The introduction of a distance programme at a conventional university may also lead to curriculum reform and new learning materials for resident students in the same subjects. In some projects distance learning is used systematically to support conventional systems at basic and secondary levels. The potential of distance learning to increase innovation and creativity in conventional education depends on the degree of interaction between distance learning systems and conventional systems. In this connection one should not forget the role of dedicated and specialized institutions in the development of knowledge and practice. Ideally, there ought to be effective links between such institutions and the conventional system, in order that they may serve as national resource centres.

The need for education for the entire population, in both developing and developed countries, generates a significant interest in the application of more technology-based educational programmes. Open and distance learning is closely linked to the development of information and communication technologies, to the emergence of new learning needs and new patterns of information access and application in the information society. The development of open and distance learning often provides a propitious environment for the introduction of and experimentation with technologies in education, and will therefore influence mainstream education. It generates new insights and knowledge about learning conditions and processes, and may even have effects beyond the realm of education itself, affecting the individual and society both economically and culturally.

Daniel suggests: In finding a way forward we should start from where we are. The regional conventions for the recognition of qualifications, (...) represent one place where we are. These conventions have a respectable history. A concerted attempt to update them and bring them together globally could be one way forward. We are also at the end of a decade during which our understanding of quality assurance and assessment in higher education has become much more sophisticated. This, too, provides a way forward. (...) to develop that sophisticated understanding of quality, which trade in higher education requires more than trade in bananas or cars. The (...) quality rankings (...) shows how quality assessment can help to reassure people that new approaches can actually enhance quality.

McIntosh postulates that those engaged in making policies relating to distance higher education and the use of ICTs are constantly having to strike a balance between universalising tendencies (globalisation, student mobility, the need for international standards and norms etc.) and the demands of different nations, cultures, population groups and constituencies.

Sharing knowledge and know-how across borders and continents . The principle of solidarity and true partnership amongst higher education institutions worldwide is crucial for education

and training in all fields that encourage an understanding of global issues, the role of democratic governance and skilled human resources in their resolution, and the need for living together with different cultures and values. The practice of multilingualism, faculty and student exchange programmes and institutional linkage to promote intellectual and scientific co-operation should be an integral part of all higher education systems. The principles of international co-operation based on solidarity, recognition and mutual support, true partnership that equitably serves the interests of the partners and the value of sharing knowledge and know-how across borders should govern relationships among higher education institutions in both developed and developing countries and should benefit the least developed countries in particular.

Daniel postulates that new need not be bad: One basic principle is that new need not be bad. One of the benefits of globalisation is that it promotes competition, and competition creates diversity. The idea that globalisation means homogenisation flies in the face of all the evidence. Globalisation is certainly creating diversity in higher education. However, higher education is a conservative enterprise. What is new is regarded with suspicion. It has to prove itself, which is absolutely right. But we must guard against the mindless rejection of new approaches even when they have proved themselves.

Wagner summarises his analysis of how to create a Virtual University: Universities almost everywhere in the world as well as political bodies, organizations and networks in the academic area have started to "go virtual". What does this mean? "Virtual" is a new expression in this context. Mostly it stands for organizing and delivering study programmes via telematic networks (usually the Internet). Often there is a vision of a university without buildings, without lots of teaching staff and with no students present at the same time and the same place with any lecturer. What is the attraction or need of a vision like this for a traditional university which - sometimes for hundreds of years - have done really the opposite: they worked hard to create an adequate environment for teaching and learning within the walls of the "university". To build a campus as a dedicated area for research and learning for quite some time was the benchmark.

Wagner explains the term Virtual University: "Virtual University": What is the meaning of "virtual"? Recently many universities have started projects, written papers and organized meetings and workshops dealing with the development of "virtual university". Analyzing what is really done or meant with this you may find the following activities: Courses and study programmes are put on the Internet so that students from all around the world will have access to these courses or programmes. Sometimes there is tuition on the net (newsgroups, chat, email), sometimes it is not. Lectures are sent from one university to another one to offer these at the same time to students at different places. Several universities offer selected courses for continuous education on the net for free choice and combination. All university services and functions (as administration, library, social life, meetings with staff and lecturers, cafes and so on) are simulated on the Internet so that no physical interaction will be needed any more to complete a study programme.

A central institution offers combinations of study programmes or courses from different universities to create one's own curriculum (broker institution). These are some examples. They do not describe everything in this field. What does "virtual" mean in this global and rapid development? First it indicates the aspect of introducing a telematic network into the process and interaction of teaching and learning. Electronic media do play an important role between lecturers and students as well as between the students themselves. Second it is highlighted that most or even all the communications on a campus may be replaced by electronic networks. Third the characteristic "virtual" incorporates a vision that no real campus as a separate organization will be needed at all but that a university may be created as a virtual network of elements and contributions of different universities or other bodies. Fourth there is a focus on the independency of time and place and a virtual university thus is identified with open and/or distance learning frameworks. Summing up one can easily see that "virtual" does not really define something very specific but describes a bundle of more or less different concepts as

a metaphor to point out a trend in the change of the organization of academic teaching and learning. "Virtual" may be a transitory concept, until there will be reached more precise concepts, data and experiences.

The ways in which societies, individuals, groups and communities develop uses of the Internet will fashion how and what this complexity produces. Wagner explains why (traditional) universities are going "virtual": It may not at all be a surprise that institutions in the area of open and distance learning are heading towards a virtual university approach as described above. But why do traditional universities start planning, project work and resource development via (at least some) elements of a "virtual campus"? Regarding the descriptions of what universities and colleges do in the field, some of the reasons seem obvious: Outside the academic area multi-media and electronic networks are rapidly gaining an increasing impact on a great many services (also in the training departments of enterprises and other organizations). Students to a huge extent enter university education with a solid and sometimes very elaborated knowledge about computers and the benefit of Internet: they are accustomed to take advantage of these technologies. So the academic sector has to keep pace with its clients. Some experts announce a strong competition between universities and private companies in the communication sector in the area of education, training and human-resource development in the near future. So strategic planning of universities has to take into account this challenge.

On a somewhat lower level you may just realize that there are funds spent especially for the development of multi-media and telematics aiming a vision of over-all modernization of the academic sector - and staff as well as administration reacts on that. Some universities or colleges intend to disseminate their courses and study programs on the international level. After some time of building subdivisions or study centres abroad the "virtual" university promises to be the much more rational choice. Going "virtual" shall open the door to the global market for training and education. Last but not least you may find some ingenious people which regard it a necessary or at least very useful technology to improve the quality of teaching. Most often lecturers of this kind may be found in the science or the engineering departments. Traditional universities are developing schemes and strategies for "virtual" teaching and learning because they realize rapid and severe changes in relevant environments of their systems. This is stated for the cases when a university or college does something like organizational development. Often one will not find a clear analysis of the trends and changes and so consequently the strategic decisions do not seem to be very clear and well founded. Sometimes going "virtual" just seems to be something fancy or modern. Saying this I do not state that these changes are fancy or only something modern.

What I want to point out is that many universities are lacking a clear strategic planning and management in this respect. Universities which are going to develop multi-media- and telematics-based courses and study-programs are faced to a challenge comparable with the development of distance education twenty years ago. Until now not many universities have successfully adopted modes of production, dissemination and tuition from the distance education sector. One of the reasons for this (besides cultural, pedagogical, reputation and other aspects) may be that it really means to introduce some kind of "industrialized" approaches into the academic sphere (O.Peters). To some extent this must cause frictions in the academic culture as it happened with open distance learning projects / programs within the environment of a traditional university. Even if the "virtual university" does not only mean the prolongation of distance teaching at the end of the 20th century it will lead to similar conflicts, misunderstandings and rejections.

Regarding e-learning Berchtold defines a hybrid phenomenon, contradicting the traditional differentiation between "goods" and "services". Given the example of recorded and filmed lectures – in fact materialised and storable and replicable services – as used in virtual and e-learning, and given the example of *Computer Marked Assignments* via an e-learning platform, Berchtold bridged the conventional definition gap as follows:

“Service-Goods are – by utilising audiovisual and/or automated recording and replay-techniques – storable, replicable and standardisable services as products of materialised and in advance provided human work without requiring the renewed rendering of the original core-service by human work, whereby these service-goods can be distributed in unlimited reproduction numbers. Service-Goods differentiate from software in the aspect, that they are not targeting the non-physical functional components of microprocessors and computers as firm-, system- or application-software. Service-goods differentiate from goods and products regarding the property, that their tangible and material features are not the subject of the service, but the mere carrier-medium for its storage and deliberate reproduction.”

Innovative educational approaches require critical thinking and creativity. In a world undergoing rapid changes, there is a perceived need for a new vision and paradigm of higher education, which should be student-oriented, calling in most countries for in-depth reforms and an open access policy so as to cater for ever more diversified categories of people, and of its contents, methods, practices and means of delivery, based on new types of links and partnerships with the community and with the broadest sectors of society. Higher education institutions should educate students to become well informed and deeply motivated citizens, who can think critically, analyse problems of society, look for solutions to the problems of society, apply them and accept social responsibilities. To achieve these goals, it may be necessary to recast curricula, using new and appropriate methods, so as to go beyond cognitive mastery of disciplines. New pedagogical and didactical approaches should be accessible and promoted in order to facilitate the acquisition of skills, competences and abilities for communication, creative and critical analysis, independent thinking and team work in multicultural contexts, where creativity also involves combining traditional or local knowledge and know-how with advanced science and technology. These recast curricula should take into account the gender dimension and the specific cultural, historic and economic context of each country. The teaching of human rights standards and education on the needs of communities in all parts of the world should be reflected in the curricula of all disciplines, particularly those preparing for entrepreneurship. Academic personnel should play a significant role in determining the curriculum. New methods of education will also imply new types of teaching-learning materials. These have to be coupled with new methods of testing that will promote not only powers of memory but also powers of comprehension, skills for practical work and creativity.

Youngs discusses the role of information and communication technologies (ICTs) in changing the learning environments within which an increasing number of people around the world are operating. The main purpose is to reflect on ways in which ICTs may be considered to transform perspectives on learning in ways that can challenge, for example, existing hierarchies of: knowledge; control and distribution of information; knowledge communities. It argues that ICTs deepen possibilities in both individual and collective contexts and facilitate new learning strategies, some of which are integral to the building of new linkages across political, societal and cultural boundaries.

EUROPEAN DIMENSION

EQUIS suggests a higher education provider should have a clearly articulated strategy and policies for internationalisation. It should demonstrate its commitment to educating and preparing students and participants for management in an international environment. This should be underpinned by active collaboration with international partner institutions in fields such as student exchanges, joint programmes, research activity and corporate connections. The provider should be able to attract students and faculty from other countries. It should carry out research of international relevance and scope.

In Europe distance education is a well-established form of education, although the status and tradition varies considerably within the region. In Western Europe there is a strong

private sector in distance education serving the adult population. The UK Open University has set the standards for a particular type of university institution, the open universities. Similar institutions have been established in four other European countries (Spain, Germany, The Netherlands and Portugal). In other countries the dual mode type of universities is the dominant model, and in recent years various consortia models have been introduced. In Central and Eastern Europe and the former USSR the political and economic transformation has important implications for education, and has already led to fundamental reforms and restructuring of national education systems. In most of the countries distance education based on correspondence studies combined with face-to-face 'consultations' was developed and served large populations. The UK Open University is now enrolling considerable numbers of students, particularly within business education from all over Europe, including the former USSR. The European Union has for many years been promoting distance education, particularly with a European dimension and in cooperation between institutions in the member states. Open and distance learning features strongly in policy documents from the Commission of the European Communities. Diversity and fragmentation in Europe goes beyond the structure and traditions of the education system.

However, according to Marleen Vanderpoorten¹³, legislation is one thing, shaping a true European space of higher education in practice is still another challenge. It is the richness of the Bologna Process that it is not only a matter of national legislation, but increasingly also about developing shared ideas and concepts, exchanging viewpoints and gradually building convergence. Vanderpoorten postulates, things have changed dramatically and the pace of change still will increase in the coming years. When she looks at universities themselves, she sees many signs that they increasingly consider themselves to be operating on an international scale, especially in research but increasingly also in teaching and learning activities. The professional world is internationalising also at a very fast pace.

According to Don F. Westerheijden the two main *rationales* for the Bologna Declaration (van Vught et al., 2002; van der Wende, 2000) are: To increase 'the international competitiveness of the European system of higher education' (*Bologna Declaration*, 1999) in the world market, we are losing the leading position to the United States and seeing e.g. Australia and the United Kingdom becoming main higher education exporters as well; and to promote mobility within Europe 'by overcoming obstacles' both for the graduate labour market and for students during their studies.

Marlies Leegwater and Noël Vercruyssen reflect on "Working on the European Dimension of Quality" summarising the Bologna Process: In 1999, 31 ministers of Education or their representatives, speaking for 29 European countries, signed the Bologna Declaration. It aimed at promoting a structure of higher education based on two cycles, in order to create transparency for mobility and employability. Since then, throughout Europe, countries with various traditions of higher education have been transforming their system actively into a transparent two-cycle ('bachelor-master') structure. In each country, the transformation is laid down in laws and regulations. On the one hand, legislation is very much a national process, connected with national education systems and legal and political environments. On the other hand, transparency concerning the quality of the various bachelor and master programmes requires international cooperation regarding criteria for quality. It resulted in attention for the issue of the quality of higher education at the ministerial meeting in Prague, May 2001, which focussed on the follow-up of the Bologna declaration. The Prague communiqué (2001) called upon various actors: to co-operate in quality assurance; to design scenarios for mutual acceptance of evaluation and accreditation/certification mechanisms; to collaborate in establishing a common framework of reference; to disseminate best practice. As announced

during the ministerial meeting in Prague, the conference to focus on the internationalisation of quality assurance as part of the Bologna process was organised in Amsterdam, March 2002. The aim of the conference was to present various developments in quality assurance of higher education and its internationalisation in Europe, also in perspective of developments beyond the European higher education area. At the conference various actors gave an overview of a variety of activities at various levels.

According to Jung quality culture can be defined as an institutional culture that promotes the introduction of an internal QA system, values the capacity building for implementing QA arrangements, stresses the link between the internal QA system and accountability to the public at the national and international levels, and focuses on learning rather than teaching. The survey results show that a quality culture has been emerging, if not fully integrated, in the mega universities investigated. All the mega universities have developed and implemented QA standards and procedures in key areas of distance education activities and at least four mega universities surveyed have institutionalised a central QA unit and thus sought the development of a more systematic and coherent quality culture. Another indicator for the emergence of a quality culture is capacity building efforts made by the institutions. At least half of the mega universities have provided continuous staff development opportunities to their academic and administrative staff in pursuit of quality improvement. It is found that international organisations such as UNESCO, COL, OECD and World Bank have provided useful QA guidelines and resources for distance educators. Moreover, most of the institutions have shown an aspiration of obtaining national recognition as a high quality DE provider. Some have gone beyond national level accreditation and recognition and pursued international recognition such as ISO certification for their services.

The Jung survey also shows that there exists a variety of QA systems of distance education even though the globalisation and competitiveness of higher education and the development of technology have brought distance teaching universities closer together in terms of developing a common quality culture. The level of QA policy integration in an overall university policy framework varies across the mega universities. Some mega universities apply a set of standards and criteria that are predetermined by the institution or by the national quality assurance agency to evaluate and monitor key areas of distance education, whereas other institutions provide only general guidelines for QA and leave room for the internal and external review teams or individual units to make QA judgments. Some mechanisms for assuring quality of distance education adopt rigorous internal QA measures, whereas in systems where the accountability concern does not dominate, the QA system is less centralised and the primary objective is self-improvement of institutions. Even though core areas – such as course and programme development and delivery – for QA are similar in most mega universities, some QA areas draw more attention than others. In some institutions, assessment of staff performance and tutoring services is emphasised, whereas in other institutions, learner assessment or monitoring of e-learning courses gets more attention.

Andrée Sursock reflects from the Higher Education Institutions' Point of View on *Accreditation and Quality Culture*, postulating "If We All Think Alike, We Are Not Thinking". Our students today come from a variety of backgrounds and have a variety of learning needs. They differ in terms of social class, educational attainment, age and goals for their education. This diversity needs to be embraced by institutions, across the whole of national systems and the European higher education area. Teachers need to be sensitive to the intellectual starting point of their students and build from there. We need a variety of teaching methods and teaching materials. We need to match the variety of learners with a corresponding variety of teachers. This diversity has been recognised by national quality assurance agencies in Europe that have adopted, by and large, a fitness for purpose approach. Increased Europeanisation and internationalisation, however, could lead, if we are not careful, to standardisation in the name of transparency. I shall return to the challenge of Europeanisation and internationalisation later on. For now, I would

like to stress that if we want a democratic system of higher education that ensures access for the greatest numbers, then whatever quality assurance system we develop for the future will need to be flexible and embrace this diversity.

Susock quotes Professor Martin Trow, who has devoted his long and distinguished academic life to studying higher education policies and demonstrated the difficulties in assessing teaching and learning in higher education. He concluded that: 'The real and substantial effects of the experience of higher education extend over the whole lifetime of graduates, and are inextricably entwined with other forces and experiences beyond the walls and the reach of universities' (Trow, 1996). Trow suggests that we focus instead on the capacity for institutions to change: 'How an institution responds to change points to deep-seated qualities of the unit which must also show up in its research and teaching.'

Julia Gonzalez Ferreras and Robert Wagenaar postulate: As is understood by many nowadays, university authorities, university policy makers, teaching staff but above all students, higher education has developed from a local, regional and national issue to a European and a global issue. Young people are travelling all over the world to participate in education that fits best their abilities and objectives. They demand reliable and objective information about qualification programmes on offer. This information is not only of relevance for (future) students but also for (future) employers. Both groups of stakeholders demand certainty about what a qualification, a degree, stands for in practice. The European economic area also requires an integrated European higher education area. Politics has taken its responsibility by initiating the Sorbonne-Bologna-Prague-Berlin process. A group of universities has taken up the challenge by initiating the project *Tuning Educational Structures in Europe*.

Some of the emerging issues in European distance education are summarized as follows ¹⁴: The problem of matching open learning and distance education provision to the needs of human resource development at national and sub-regional levels and of integrating future development with human resource and education politics and strategies; the challenge of mobilizing conventional institutions of education in the implementation of open and distance learning strategies, and at the same time capitalizing on the experience and resources of the many specialized distance teaching institutions; the need for innovation by both conventional and distance teaching institutions concerning the effective use of new information and communication technologies for education and training purposes, based on sound educational strategies and research; the need for appropriate balance and synergy between national and European development concerning policies, infrastructure, quality standards and equivalence, joint development projects and delivery and support systems; the challenge of assisting the development of distance education programmes and infrastructure in sub-regions where it is not sufficiently developed.

The World Declaration on Higher Education sees the potential and the challenge of technology. The rapid breakthroughs in new information and communication technologies will further change the way knowledge is developed, acquired and delivered. It is also important to note that the new technologies offer opportunities to innovate on course content and teaching methods and to widen access to higher learning. However, it should be borne in mind that new information technology does not reduce the need for teachers but changes their role in relation to the learning process and that the continuous dialogue that converts information into knowledge and understanding becomes fundamental. Higher education institutions should lead in drawing on the advantages and potential of new information and communication technologies, ensuring quality and maintaining high standards for education practices and outcomes in a spirit of openness, equity and international cooperation by: engaging in networks, technology transfer, capacity-building, developing teaching materials and sharing experience of

their application in teaching, training and research, making knowledge accessible to all; creating new learning environments, ranging from distance education facilities to complete virtual higher education institutions and systems, capable of bridging distances and developing high-quality systems of education, thus serving social and economic advancement and democratization as well as other relevant priorities of society, while ensuring that these virtual education facilities, based on regional, continental or global networks, function in a way that respects cultural and social identities; noting that, in making full use of information and communication technology (ICT) for educational purposes, particular attention should be paid to removing the grave inequalities which exist among and also within the countries of the world with regard to access to new information and communication technologies and to the production of the corresponding resources; adapting ICT to national, regional and local needs and securing technical, educational, management and institutional systems to sustain it; facilitating, through international co-operation, the identification of the objectives and interests of all countries, particularly the developing countries, equitable access and the strengthening of infrastructures in this field and the dissemination of such technology throughout society; closely following the evolution of the 'knowledge society' in order to ensure high quality and equitable regulations for access to prevail; taking the new possibilities created by the use of ICTs into account, while realizing that it is, above all, institutions of higher education that are using ICTs in order to modernize their work, and not ICTs transforming institutions of higher education from real to virtual institutions.

OPEN AND DISTANCE EDUCATION

The UNESCO paper on open and distance education suggests the strategies for the development of open and distance learning to ideally form part of any national strategy for education and training, including the harmonization of goals, an integrated and intersectoral approach is thus very important. National policy and planning should take into account possibilities for regional and international collaboration and coordination.

The International University of Panama provides a brief history of distance education: In 1728 The Boston Gazette provided material for auto-instruction by mail. In 1840 Isaac Pitman introduced courses by mail in England. In 1860 the Mining Herald in Pennsylvania provided mining education by mail. The promoter Tomas Foster created ICS International Correspondence Schools. At the end of the journey, in the global world, it has expanded rapidly. In the decade between 1960 and 1970 the use of radio and television has been implemented, during the 1980 decade new technologies have entered the university studies, in the 1990 decade the new technologies of information and communication (ICT) have been introduced.

The terms open learning and distance education represent approaches that focus on opening access to education and training provision, freeing learners from the constraints of time and place, and offering flexible learning opportunities to individuals and groups of learners. Open and distance learning is one of the most rapidly growing fields of education, and its potential impact on all education delivery systems has been greatly accentuated through new developments in information and communication technologies. The objective of this paper is to review open and distance learning in the context of present challenges and opportunities, examine relevant concepts and contributions, outline current global and regional trends, suggest policy and strategy considerations, and identify UNESCO's policies on open and distance learning, including its role in capacity-building and international co-operation. It is addressed to a wide range of potential partners, governments, intergovernmental and non-governmental organizations, specialized institutions, associations, industrial corporations, telecommunication companies, and others interested in this field, to seek their cooperation in meeting today's urgent education and training needs, through open and distance learning.

Regarding concept and contributions the paper on Open and Distance Learning suggests that Open and distance learning systems can usually be described as made up of a range of components such as: the mission or goal of a particular system, programmes and curricula, teaching/learning strategies and techniques, learning material and resources, communication and interaction, support and delivery systems, students, tutors, staff and other experts evaluation procedures, management, housing and equipment. There are both success stories and failures in open and distance learning, and many systems are struggling with problems and barriers to effective implementation. Some of the more common problems are: inadequate technological infrastructure, planning and programme deficiencies, lack of human capacity and expertise, inadequate financial resources: and lack of recognition of educational equivalence. Sometimes open and distance learning is used for school-age children and youth who are unable to attend ordinary schools. In developing countries, distance education for school equivalency is an important way of expanding educational opportunities to the adult population. In developed countries, there is still a need for these types of programmes for those who dropped out of the conventional system. Teacher training is an important area where open and distance learning has made a major contribution. Non-formal education and community development represent other sectors where open and distance learning is used.

Distance education at the tertiary level shows a two-fold development pattern. On the one hand, numerous single mode open universities have emerged to absorb large numbers of new learners, while, on the other hand, increasing numbers of traditional universities have begun to offer their programmes also through distance education. This tends to diminish the earlier distinction between the two types of universities. Open and distance learning has the potential to generate new patterns of teaching and learning. Linked as it is with developments in information and communication technologies, it is close to the development of new learning needs and new patterns of information access and application. There is evidence that it can lead to innovation in mainstream education, and may even have effects beyond the realm of education itself. Open and distance learning will therefore play an especially decisive role in the creation of the global information society.

Present trends in open and distance learning: Obviously, open and distance learning will be an important element of future education and training systems. It is approaching acceptance within mainstream education and training in such a way that it will make up part of the repertoire of most educational institutions in the future. This will also mean that the present distinction between 'conventional' education and open and distance learning will become less meaningful. One of the technological trends is the emergence of new forms of distance learning based on more interactive telecommunication technologies, with pedagogical, economic and organizational implications. Furthermore, there is a significant trend towards internationalization. The regional overview shows great differences between all regions of the world, although there are also a number of similarities.

Open and distance learning has existed for about one hundred years in the more developed regions and for one or two generations in the developing regions. In industrialized countries present trends are linked both to structural problems of education in modern society, and to technological development. The need to extend learning opportunities over the whole life span and the changing demands concerning mass education and the need for new skills represent challenges, which are not easily met by conventional structures and institutions. Information and communication technologies have great potential impact on education, and may help in creating new patterns of education and training. Governments, industry and educational institutions are eager to develop effective applications of new technologies and at the same time meet the needs of learners. National policy documents on education and training should include statements on the role of open and distance learning. A successful national launch or reform of open and distance learning requires visible and strong leadership and high-level government backing. Careful planning is essential. A cost effective operation is one that makes good use of all

available resources -it is not necessarily low cost. A distance teaching institution needs sufficient resources to be able to react promptly to new demands and situations.

In developing countries there are some common barriers to the effective implementation of open and distance learning. Lack of funding, problems of allocation of resources and sustained support; lack of human resources with sufficient competence and motivation; technological infrastructure, which prevents the effective use of appropriate technologies. Capacity building is important, including increased professionalism in planning and management of open and distance learning systems.

The UNESCO paper ¹⁵ provides a comprehensive summary of the concept of open and distance learning: Open learning is a term with no universally agreed definition. To some 'open' will indicate open entry and access to learning opportunities, and the focus will be on the removal of barriers to learning opportunities. To others it may include aspects of methods and organization, with the consequence that 'open learning' may sometimes be substituted by flexible learning. Jeffries et al (1990) define open learning as: "Any form of learning in which the provider (e.g. an institution or organization running a training scheme) enables individual learners to exercise choice over any one or more of a number of aspects of learning. Typically this involves helping learners take responsibility for aspects such as what they learn, how they learn, where they learn, how quickly they learn, who to turn to for help and whether, when and where to have their learning assessed."

Distance education in most cases shares the concern for openness and flexibility, but definitions tend to focus on the possibility of communication between participants in the learning process across time and/or space, particularly as brought about by new (and some old) technologies. Perraton (1993a) describes distance education as "an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner". This definition covers most of the traditional approaches to distance teaching, although it does not reflect the fact that the learners are also usually dispersed in space and/or time. This may be quite important in view of the evolving variation of learning environments and patterns of communication. Distance education may involve the use of a range of media, such as print, written correspondence, audio, video and computer based media and networks as well as multimedia, both for presentation of information and for communication between participants. Open and distance learning is often used when one wants to address a whole range of related forms of teaching and learning, without concentrating too much on exact delineation and definition. It stresses at the same time openness concerning access, organization and methods, flexibility in delivery and communication patterns, and the use of various technologies in support of learning. Open and distance learning is usually contrasted with 'conventional' or 'face-to-face' education, which may be described as the form of education which takes place in a classroom or an auditorium. However, both 'distance' and 'face-to-face' education are labels covering a wide range of variations and methods. Face-to-face education in its pure form may vary along a continuum from one-to-one tutorials, group activities, seminars and classroom teaching to lectures for large audiences. In each case different educational approaches and methods may be used. A range of media may also support face-to-face education, and it is usually combined with periods of independent study, with more or less direction from the teacher and dependence on specific learning materials.

In a similar way, distance education has a variety of forms, according to the choice of media, methods and organizational approaches. The original, and still most widespread form is correspondence education. Print is used as the dominant learning material, with the usual medium of communication being by correspondence. Other forms are radio schools, educational television, telephone teaching, audio and video teleconferences, and computer-mediated

communication, Very often the media bridging the distance are combined with face-to-face interaction in working groups, seminars or lectures. This means that although there is a clear distinction in theory between distance education and conventional or face-to-face education, the distinction in practice is far from clear. This is also underlined by the fact that an increasing number of educational institutions use both conventional and distance types of methods when designing education programmes -either as alternative forms (cf. the term 'dual mode' institution) or in a mix of the two types within the same programme (sometimes called 'hybrid' forms). So far, various forms of distance education have been described mainly as a function of different media.

However, media represent only one aspect of distance learning systems and there is considerable variation between them concerning other aspects. The most common distinction is perhaps between 'single mode' and 'dual mode' institutions. Single mode institutions are established and organized with the single purpose of offering distance education, while dual mode institutions offer both distance education and conventional forms of education within the same institution. In many cases distance learning is provided in partnership between several institutions of the same kind or by different types of institutions with different roles. The private sector is also active, often in competition with traditional educational institutions. The focus of each system will lead to significant differences as to how the various components and sub-systems are designed, organized and managed. This is not the place to consider the structures of different systems, but it is important to be aware of the main components common to the majority of actual systems.

According to the UNESCO paper on open and distance learning The mission of a distance learning system defines the role of the system within the specific context of education policy. It may be directed towards particular purposes, target groups, regions, sectors or levels of education and training, and led by particular values and philosophies of learning and education. Programmes and curricula make up important components, which define the profile of a system or an institution. Teaching and learning strategies and techniques depend partly on the type of programme and the needs they are designed to meet. But they also depend on the educational philosophy and values of the particular system, and the educational characteristics and potential of the technologies used. Learning materials and resources make up necessary components in all distance-learning systems. Comprehensive, well-developed materials may greatly stimulate self-learning and influence the quality of the system as a whole.

Development and production of materials is often considered as a subsystem in distance teaching organizations. Existing materials, textbooks, software etc. may be used. Communication between teachers and learners is seen as a necessary component in distance education, as in all other forms of education. Thus, self-study without any communication and support is not usually considered to fall within the concept of distance education. Open learning systems on the other hand are often heavily based on self-study. Another crucial component is the interaction between learners. Support delivered locally is a common component. The delivery system may comprise both distribution of pre-packaged material, transmission of programmes, lectures etc., and systems of communication/interaction and local support. The student and tutor sub-system is often distinguished from the course materials subsystem. Staff and other experts in a distance learning system need a range of different competencies. Tutors have already been mentioned. A range of other experts with different qualifications is also needed, either as full-time staff or as external consultants: planners, instructional designers, developers and producers, researchers, media experts, marketing experts and administrative staff.

Effective management and administration needs not only competent staff, but also well designed, efficient administrative systems and routines, planning and monitoring systems, budgetary and accounting systems etc. Many of these will be quite different from the corresponding systems needed in the management of other forms of education. The requirements of housing and equipment may be very different from conventional education

institutions. A single mode distance learning system has no residential students, and thus there is no need for classrooms, lecture theatres etc. at the central location. Such facilities may be needed locally, and are often provided in cooperation with local institutions. At the central location there will be need for production facilities and storage capacity, although some decentralized production is also possible. Finally, evaluation should be a component, in order to provide information relevant to the adjustment of the roles and operation of system components, and in order to secure their optimal contribution and development.

OPEN UNIVERSITY

Distance education is widely used at the tertiary level within the framework of open and distance-teaching universities which provide programmes and degrees equivalent to conventional university and college education. Traditional universities often use the same curricula for distance and residential students, and the students are often but not always subject to the same entrance requirements and examinations. Single mode open universities generally have their own degrees and curricula, but they are often similar to the curricula and degrees of a conventional university. Degree studies in distance teaching universities thus increase the capacity of higher education systems, mainly catering for the adult population. The similarity of curricula and degree structures may be seen as a demonstration of equal quality, and makes the recognition of distance education at the tertiary level easier. The expansion of single mode open universities, many of which have developed to 'megauniversities' with more than 100,000 students (ICDL, 1995) on one hand, and the transformation of traditional universities to dual mode universities on the other, are important contributions to the diversification and development of higher education systems. The increasing tendency of traditional universities to deliver their programmes also through distance education appears to diminish the earlier distinction between the two types of universities.

According to Jung Mega universities (i.e. those with over 100,000 students) are among the most important providers of distance education worldwide and are increasingly using ICT-based learning. Until recently they placed more emphasis on widening access than assuring quality, but now they recognise quality assurance as a key issue that needs to be addressed not only within individual universities but also jointly and in the global context. Over the past few decades, there has been a noticeable growth in distance education (DE) around the world. More than 10 mega universities have been developed to meet the increasing educational needs of adults and lifelong learners.¹ A mega university is defined as "a distance teaching institution with over 100,000 active students in degreelevel courses" (Daniel, 1996: 29). In parallel with the development of mega universities, cross-border DE has grown. Moreover, many conventional DE institutions have begun to introduce information and communication technology (ICT) mainly as supplementary modes of instruction. Some institutions including a few mega universities have created e-learning programmes. These trends challenge the existing quality assurance (QA) frameworks of DE, which have focused more on widening access than on assuring quality, and often do not address for-profit and cross-border education. Especially in the context of growing globalisation in distance education, there has been an urgent need for international initiatives to review quality assurance mechanisms of DE for higher education at the national and institutional level, discuss new challenges of a changing DE environment, and build a capacity for QA to enhance the quality provision in a globalised higher education market. QA in mega universities is considered to be especially important since those mega universities provide higher education to millions of students around the world with collaboration or in competition with for-profit or cross-border providers. QA policies and regulations have been set in all the institutions surveyed.

However, the degree of elaboration in those policies and regulations and the level of integration with the general university policy framework and the national QA framework vary

across the institutions. A variety of QA methods are observed in the mega universities. The popular methods of QA include providing a wide range of opportunities for training workshops, conducting evaluation research, introducing internal review processes, and inviting external audits and assessments. The mega universities surveyed have developed QA criteria for key areas of distance education. Detailed QA criteria are provided for several of the mega universities surveyed. It appears that the quality assurance of the cross-border operations and e-learning practices is still in the initial stages of development in most of the mega universities. However, the institutions seem to recognise the need for special attention to QA systems for those new challenges.

The challenge is to provide for sustainable globalisation of transnational higher education TNHE. Berchtold defines “Sustainable Globalisation as a system of global trade of goods and services, including financial services and transactions, and the free travel of people, exchange of cultures and the flow of information and knowledge (data-capital) around the world, including the internet, and the development of a cosmopolitan culture that meets the needs of the global requirements for the functioning of that worldwide system, without endangering and compromising the current and future needs and generic and indigenous infrastructures, cultures, societies and communities at local, regional and national level.”

Development is conceived by Spooner “generally to include all modern planning and project implementation which is designed to increase productivity, to modernize traditional systems, and to raise living standards. Bode demands that a just globalisation policy must integrate fighting poverty, security policy and environmental policy. According to US-President Obama “the challenges of the 21st century cannot be met without collective action. (...) I've spoken often, at home, about a new era of responsibility. I believe strongly that this era must not end at our borders. In a world that is more and more inter-connected, we have a responsibility to work together to solve common challenges.” “The fundamental facts that brought about cooperation, society, and civilization and transformed the animal man into a human being are the facts that work performed under the division of labour is more productive than isolated work and that man's reason is capable of recognizing this truth. The principle of the division of labour is one of the great basic principles of cosmic becoming and evolutionary change.” “When social cooperation is intensified by enlarging the field in which there is division of labour or when legal protection and the safeguarding of peace are strengthened, the incentive is the desire of all those concerned to improve their own conditions. In striving after his own—rightly understood—interests the individual works toward an intensification of social cooperation and peaceful intercourse.

Society is a product of human action, i.e., the human urge to remove uneasiness as far as possible.” “Society always involves men acting in cooperation with other men in order to let all participants attain their own ends.” James Martin provides *a vital blueprint for ensuring our future*, calling it humanity's grandest challenge that a vital task for the 21st century is to cope with the avalanche we have started, and its consequences for today's young people living at a time of extraordinary opportunities and immense problems – his main theme to be taught and talked about everywhere: that the 21st century is unique in human history in that it will produce a great transition that enables humanity to survive. Edgar Morin draws the two great ethical-political objectives of the new millenium: to establish a relationship of mutual control between the society and the individuals by means of democracy; and to complete the planetary community. In continuation of anthropoethics the planetary community of fate can create common awareness and joint consciousness of mankind in solidarity of the human species. Mankind is no longer just a biological term without roots, but with a home – earth, being endangered – and mankind is a reality as a collective community of fate, aware that we are all global citizens.

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THE EMERGING MYTHS AND REALITIES OF HUMAN RESOURCES AND CAPITAL DEVELOPMENT IN NIGERIA

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Abstract

Human resources and capital formation has long been identified as one of the most crucial allies of national development. The paper x-rayed the meaning of human and capital formation, its importance, empirical evidence and myths and realities of human capital formation among other concepts. Based on the findings that low income, imbalance in income distribution and lack of economic capital militates against capital formation in Nigeria. The paper concludes that human capital formation is the ultimate basis of wealth creation and that a key to the development of underdeveloped countries. The researchers recommend that the income difference between the traditional and modern sectors should be reduced, which in effect lowers the benefits according to the educational attainment. The education requirement for particular jobs should not be exaggerated. The community should be taught on the need to save and invest for future purposes and the general up-liftment of the community, in that when there are investments from saving. It will create employment opportunities. Resources should be geared towards capital formation.

INTRODUCTION

Human capital formation can be traced back from decades ago when men and women saved money in order to use it for things, which will be yielding projects for them, and people were motivated to invest their money. The financial problem of people were how to acquire resources for investment from income recipient themselves. However, capital may be a substitute for national resources, labour, and human capital formation and it can lead to more output, by providing a surplus for further increase in output although labour may be abundant, the output of an underdeveloped country remains limited by shortage of capital.

It is widely recognized that the under-developed country's make additional effort to mobilize and achieve effective use of their internal resources. The mobilization of external resources requires innovative policies are capable of facilitating human capital formation. This paper will be based on human capital formation, its sources and importance's, channel of investment and process of human capital formation in sustenance of growth and Development.

THE CONCEPT OF HUMAN CAPITAL FORMATION

There are many interlands inspite of this litany definitions from eminent scholars, the meaning of human capital formation socio-education/development concept still remain fluid, for example, Wagle (1996) opined that "capital formation has always been a sort or prime mover in the process of material growth and its rate has been a principal variable in setting the overall base of economic development" In the words of Nurkse (2000) capital formation is that society does not apply the whole of its current productive activity to the needs and desires of immediate consumption, but direct a part of it to the making of capital goods, tools and instruments, machines and transport. Facilities, plant and equipment all the various form of real capital that can so greatly increase the efficacy of productive effort. The essence of the process, then, is the diversion of a part of society's currently available resources to the purpose of increasing the stock of capital goods so as to make possible expansion of consumable output in

futures” it implies that if there is diversion, its stock of capital goods at the end of the year is superior to those of the year before will also be affected. The present discounted value of the additional productivity, over and above the product of unskilled labours, of people with skills and acquired through explicit training, or on-the job experience. Like physical capital, it is liable to obsolescence through changes in technology or tastes. Unlike physical capital, it cannot be sold in a society without slavery; it implies that human capital formation cannot be used as collateral for loans. It is pertinent to note that such training needs to be periodical if the training needed to create human capital has to be paid for. Training for firm-specific human capital which does not improve workers earning ability outside the firm, can be provided by employers. The general or vocational human capital, which can be used by other employers, will increase workers outside earning power, so employers are in several reluctant to provide this type of training. The cost of creating human capital thus mostly falls individuals or their families, charitable institutions or state.

Furthermore, capital formation is that part of the current produce, instead of being used for immediate consumption is directed to the making of goods which facilitates production viz tools, machines, means of transport and communication, bridges dam etc. it is worthy to note that human capital formation is sacrifice-oriented in nature because it involves a sacrifice of immediate consumption for obtaining of Longer flow of consumer goods in the future. Capital formation in non-monetary terms means that, flow of total output is so consuetude that the stock of capital goods increases year after year.

IMPORTANCE OF HUMAN CAPITAL FORMATION

Human resources are working elements and they are capable of arranging, acquiring, developing and directing other organizational resources. In short, humans manage the other resources in any organization. Then Government should realize that the crux of economic development lies squarely not only in building capital equipment on sufficient scale to increase productivity activities in important areas like Agriculture, mining, plantation and industry. Though capital, are heavily required to construct schools, hospitals, roads and railways etc, but in human formation. Human resources capital formations have many importances in country like Nigeria as an under-developed nation, because it accelerate growth and development. The following are some of the importance of human capital formation.

1. **Balance of payment:** Nigeria as an under-developed nation, export her primary products like raw materials and agricultural products and imports all types of manufactured, semi manufactured and capital goods. This problem can only be ameliorated through capital formation.
2. **To boost the economic welfare:** Human capital formation is the panacea if any economy wants to meet with all the requirement needed to increase their income. It is so because capital formation will always lead to the proper exploitation of national resources and establishment of different types of industries.
3. **It increase production and employment:** Large-scale production can only be achieved when there is technical progress and technical progress cannot work. Without capital formation. That is there is an increase in production and employment only when workers specialized in a particular field and this will contribute to the ever-growing labour forces.
4. **Market expansion:** The various circle of poverty can be eliminated only when there is more creation of economic and social overhead- capital and then market imperfection, when be things or the post.
5. **Self- sufficient:** The burden of foreign debt can be reduce drastically when there is capital formation and the idea of borrowing for a long periods will also reduce and freedom from foreign aid will emerge

The Sources of Capital Formation

Factually there are three basic steps involved in capital formation, viz;

1. Increase in the volume of real savings.
2. Mobilization of saving through financial and credit institutions.
3. Investments of savings

Factors Responsible for Low Capital Formation in Nigeria

1. Imbalance in income distribution
2. Low income earners
3. Lack of efficient labour and technological knowledge
4. Lack of financial institutions
5. Lack of economic capital

All these short listed factors stand in the way of increasing income in any given society/economy.

CONCEPT OF HUMAN CAPITAL THEORY

The economic prosperity and functioning of a nation depend on its physical and human capital stock. Whereas the former has traditionally been the focus of economic research, factors affecting the enhancement of human skills and talent area increasingly figuring in the research of social and behavioural sciences. In general terms, human capital represents the investment people make themselves that enhance their economic productivity. The theoretical framework most be responsible for the wholesome adoption of education and development policies has come to be known as human capital theory. Based upon the work of Schultz (1971), Sakamota and Powers (1995), Psacharopoulos and Woodhall (1997), human capital theory rests on the assumption that formal education is highly instrumental and even necessary to improve the production capacity of a population. In short, the human capital theories argue that an educated population is a productive population.

Human capital theory emphasizes how education increases the productivity and efficiency of workers by increasing the level of cognitive stock of economically productive human capability which is a product of innate abilities and investment in human beings. The provision of formal education is seen as a productive investment in human capital, which the proponents of the theory have considered as equally or even more equally worthwhile than that of physical capital.

According to Babalola (2003), the rationality behind investment in human capital is based on three arguments.

- i. That the new generation must be given the appropriate parts of the knowledge which has already been accumulated by previous generations;
- ii. That new generation should be taught how existing knowledge should be used to develop new products, to introduce new processes and production methods and social services; and
- iii. That people must be encouraged to develop entirely new ideas, products, processes and methods through creative approaches.

According to Fagerlind and Saha, (1997) human capital theory provides a basic justification for large public expenditure on education both in developing and undeveloped nations. The theory was consistent with the ideologies of democracy and liberal progression found in most Western societies. Its appeal was based upon the presumed economic return of investment in education both at the macro and micro levels. Efforts to promote investment in human capital were seen to result in rapid economic growth for society. For individuals, such investment was seen to roved returns in form of individual's economic success and achievement.

Most economists agreed that it is human resources of nation, not its capital nor its material resources that ultimately determine the character and pace of its economic and social development. Pascharopoulos and Woodhall (1997) asserts that:

Human resources constitute the ultimate basis of wealth of nation. Capital and natural resources are passive factors of production, human beings are the active agencies who accumulate capital, exploit natural resources, build social, economic and political organization, and carry forward national development p.102

Empirical Evidence of Human Capital Model

The importance of education and human capital has been brought out in many studies of economic growth and development. Robert (1991) developed a human capital model which shows that education and the creation of human capital was responsible for both the differences in labour productivity and the differences in overall levels of technology that observe in the world. More than anything else, it has been the spectacular growth in East Asia that has given education human capital their current popularity in the field of economic growth and development. Countries such as Hong Kong, Korea, Singapore, and Taiwan have achieved unprecedented rates of economic growth while making large investments in education. In the statistical analysis that accompanied his study, the World Bank (1993).

Implications of Human Capital Theory for Educational Development

The central difference in the policy implications of the human capital model and the alternative models relates to the desirable level of public expenditure on education. The basic implication of the human capital model is that allocation of resources on education should be expanded to the point where the present value of the streams of returns to marginal investment is equal or greater than the marginal costs.

The Myths and Realities of Human Capital Formation

Nigeria is confronted by most of the problems that could limit the capacity of expansion in education to stimulate growth and development such as under-employment, low absorptive capacity, shortage of professionals, regional imbalances and brain-drain. The persistence of many of the problems in spite of the various policy formulation and responses point to the need for a more focused responsive, functional and qualitative educational system. Many of the developing nations have thus realized that the principal mechanism for developing human knowledge is the education system. Thus, they invest huge sum of money on education not only as an attempt to impart knowledge and skills to individuals but also to impact values, ideas, attitudes and aspirations which may be in the nation's best developmental interest.

In addition to manpower planning needs, parents strongly feel that in an era of scarce skilled manpower, the better the education their children can get, the better are their chances of getting well-paid jobs. The poor often look at their children's education as the means of escaping poverty. The concept of human resources has provided a useful bridge between the theoretical concerns of students of the developmental process and the practical requirements of assistance to planners. Irrespective of the explanation given for global educational expansion, the consequences of this expansion for social system can be problematic. The tensions and strains of educational expansion can impede economic, social and political development. For example, the accelerated costs of expanding educational system complete with other sectors of the respective societies for finite resource. As mass primary education is attained, expansion shifts to the secondary and tertiary levels as these too are gradually transformed into mass system. At the same time, the increase in costs is not arithmetic but geometric. These pressures ultimately create

dilemma for government who must realistically assess and determine spending priorities for scarce economic resources.

Adopting a position based on the assumptions of the human capital and modernization theorists, Fagerlind and Saha (1997) argue that in developing countries at least, educational demand must be tempered in order to bring cost and benefits to more realistic levels. It is also worth noting that the causal relationship between education and earnings has important implications for public policy. If human capital theorists are correct in arguing that education is the primary cause of higher earnings, then it obviously makes sense to provide more education to low-income groups of society to reduce poverty and the degree of income inequality.

This analysis suggests that the primary focus of subsidies to education should be on ensuring that all those who can benefit from, have access to appropriate opportunities, rather than on reducing costs incurred by those who would undertake higher education in any case. Nigeria is confronted by most of the problems that could limit the capacity of expansion in education to stimulate growth and development such as under-employment, low absorptive capacity, shortage of professionals, regional imbalances and brain-drain. The persistence of many of the problems in spite of the various policy formulation and responses point to the need for a more focused responsive, functional and qualitative educational system.

Education a Tool for Human Formation

There are several ways of modeling how the huge expansion of education accelerated economic growth and development. The first is to view education as an investment in human capital. A different view of the role of education in the economic success is that education has positive externalities. "Education part of the community and the whole of it benefit".

The idea that education generates positive externalities is by no means new. Many of the classical economists argued strongly for government's active support of education on the grounds of the positive externalities that society would gain from a more educated labour force and populace. (Van-Den-Berg 2001). Smith (1976) reflects such progressive contemporary through when he wrote that by educating its people, a society.

*Derives no inconsiderable advantage from their instruction.
The more they are instructed, the less liable they are to the
delusions of enthusiasm and superstition, which, among
ignorant nations, frequently occasion the most dreadful
disorders. An instructed and intelligent people besides, are
always more decent orderly than an ignorant and stupid ones.
9, 86.*

Smith views the externalities to education as important to the proper functioning not only of the economy but of a democratic society.

Another way of modeling the role of education in the growth and development process is to view human capital as a critical input innovations, research and development activities. From this perspective, education is seen as an intentional effort to increase the resources needed for creating new ideas, and thus, any increase in education will directly accelerate technological progress. This modeling approach usually adopts the Schumpeter (1973) assumptions of imperfectly competitive product markets and competitive innovation, which permit the process of generating technological progress. Education is seen as an input into the intentional and entrepreneurial efforts to create new technology and new products. Proponents of this view of education point out the close correlation between new product development and levels of education. The countries that are at the forefront of technology also have the most educated population (Van-Den-Berg 2001).

The review of empirical test of the theory by Garba (2002) shows that cross-country regressions have shown positive correlation between educational attainment and economic growth and development. Odekunle (2001) affirms that investment in human capital has positive effects on the supply of entrepreneurial activity and technological innovation. Ayeni (2003) asserts that education as an investment has future benefits of creation of status, job security and other benefits in cash and in kind.

Application of Human Capital Formation to Educational System

Babalola (2003) asserts that the contribution of education to economic growth and development occurs through its ability to increase the productivity of an existing labour force in various ways. However, economic evaluation of educational investment project should take into account certain criteria according to Psacharopoulos and Woodhall (1997) which are:

- Direct economic returns to investment, in terms of the balance between the opportunity costs of resources and the expected futures benefits;
- Indirect economic returns, in terms of external benefits affecting other members of society;

Human Capital Theory: Implications for Educational Development

- The private demand for education and other factors determining individuals demand for education;
- The geographical and social distribution of educational opportunities;
- The distribution of financial benefits and burdens of education.

Education plays a great and significant role in the economy of a nation, thus educational expenditures are found to constitute a form of investment. This augments individual's human capital and leads to greater output for society and enhanced earnings for the individual worker. It increases their chances of employment in the labour market, and allows them to reap pecuniary and non-pecuniary returns and gives them opportunities for job mobility.

Education is a source of economic growth and development only if it is anti-traditional to the extent that it liberate, stimulate and informs the individual and teaches him how and why to make demands upon himself. Accordingly, a proper educational strategy would manifest itself in four major development-producing capacities. According to Brochi (2003) the first is the development of general trends favourable to economic progress. The reference is to social mobility, a general increase in literacy necessary to improved communication.

The second capacity emphasizes the development of complementary resources for factors which are relatively plenty and substitutes for relatively scare factors. That is, educated people would be more adaptable to varying production needs. The third capital underscores the durability of the most forms of non-human reproductive capital, which implies that a given investment in education tends to be more productive, other things beings equal, than some outlay on non-human capital. Finally, education is an alternative to consumption, for it transfers to round-about production the resources that would otherwise be consumed now.

The main problem associated with the belief that education is good for economic growth and development according to Babalola (2003) concerns how to maintain an equilibrium position. That is, where there will be no evidence of either shortages or surplus supply of educated people. A shortage of educated people might limit growth, while excess supply of it might create unemployment and thus limit economic growth and development.

Though, it has been criticized on several grounds. At the individual level, it has become controversial whether or to what extent education or other forms of human investments are directly related to improvement in occupation and income. Bronchus (2003) asserts that raising the level of education in a society can under certain instances increases the inequalities in income distribution.

Fagerlind and Saha (1997) assert that while government may adopt educational plans consistent with specific development goals and strategies, they can only be partially certain that outcomes of these will correspond to original intentions; the more political the goals of

education, the more problematic the outcomes. In light of this, to view education as a panacea for the attainment of development objectives is risky. Thus, education in general and schooling in particular, cannot on its own achieve the desired societal goal without structural reforms.

Another major problem in the application of the theory is its to account for a growing gap between people's increasing learning effort and knowledge base and the diminishing number of commensurate jobs to apply their increasing knowledge investment, especially in developing nations. To this, some advocates of the theory (Bronchi,2003, Castronova 2002,Crepaz and Moser 2004) assert that these great increase in learning efforts have not led to commensurate economic gains because of the declining quality of education, lopsided and political motivated system of education.

CONCLUSION

Gary Becker (2000), human capital 2nd edition Columbia New York, he emphasized much on human capital formation. That the key to the development formation efforts in poor countries is the formation of human capital not only physical capital. Economic optimization required that these investments must be carried to the point where marginal benefits, further expenditures are just off set by their marginal cost.

In addition, some (perhaps) forms of investment in human capital carry with them an element of consumption. The person who reaps the benefits from such investments is not always those who must bear the cost. Education can be considered on investment in producers' capacity and in consumption capacity as well as in consumption in itself. Participants in formal education derived some consumption values from the act while improving their future level of productivity. Meanwhile, investment in human capital, as already noted, can take a variety of forms and they entails:

Formal School ranges forms literacy training all the way to university work in science, engineering and other expensive subject. It is easy to understand why universities in underdeveloped countries train more lawyers and teachers than they train engineers or economists. On the job training consists of gaining skills in the work situation. This can be accomplished through formalized apprenticeship programs.

Highly structured ways of showing new workers, the skills necessary for industrial work prevail in most poor countries. Becker has distinguished between two types of training; general and specific, general training can be used by a variety of employers. Trained workers offer higher productivity and hence greater market opportunities with all employers while, specific training result in a productivity increase that benefits only a simple (specific) employers. The costs of such training are split between the employer and the workers as they are in case of general training.

RECOMMENDATION

In the light of the finding in this study, the researcher is poised to make the following recommendations for effective human capital formation for economic development. Among the suggestions they made are that;

- The costs of education should be borne by beneficiary or recipient by means of family assistance or self-help scheme rather than solely the state.
- The income difference between the traditional and modern sectors should be reduced, which in effect lowers the benefits according to the educational attainments.
- The educational requirement for particular jobs should not be exaggerated
- The wage structure should be tied to occupational and requirements rather than educational attainments.
- The process of growth involves saving to create a surplus for community. Savings can be under taken by the government, and be forced on individuals, household and corporations by inflation.

- There should be a revision to the regulation of the structure of interest rate with a view to bringing it down to a rate that would achieve a high investment level.
- Profit gained from business should be adequately utilized and put back in business to increase the level of investment.
- The community should be taught on the need to save and invest for future purposes and the general up-liftment of the community, in that when there are investments from saving. It will create employment opportunities. Resources should be geared towards capital formation

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CONTRACTUAL SPECIFICATION OF COMPONENT USING VIRTUAL INTERFACE

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Abstract

This paper describes a method for providing a reliable reusable component using a virtual interface. Specification of interfaces between functionality entities, supporting dynamicity and variability of software, so that new functionalities can be learned and automatically be integrated in future applications. Therefore the virtual interface needs to be designed using method and techniques of self-composition of components on demand on the basis of essential criteria such as components specification, version, cost and availability.

Keywords: Contractual Specification, Software Reuse, Component, Virtual Interface

INTRODUCTION

To date computer science technology is based on standardized communication infrastructures that are used by different organizations. Idea and challenge beyond software reuse is developing component that can support interoperability and reusability through a framework called a contract. This contract can allow others developers to build her system by assembling reusable components. The contractual specification of component is a contract templates that specifies what an existing component will do if it is incorporated into a client application. This paper describes a method for providing a reliable reusable component using a virtual interface. Specification of interfaces between functionality entities, supporting dynamicity and variability of software, so that new functionalities can be learned and automatically be integrated in future applications. Therefore the virtual interface needs to be designed using method and techniques of self-composition of components on demand on the basis of essential criteria such as components specification, version, cost and availability.

FORMALISATION OF VIRTUAL INTERFACE

Contract vs Interface

Idea of contract is borrowed to those related to human activities where there are commonly two parties: a provider, which performs some task for the other a client. Contract's content is a protocol that specifies how much should be done by the provider and whether the client can accept or reject the contract. Thus applying to software, a *contract* leads the interaction between two modules or methods. In the other words, a module views as a "component is a black box entity with a set of required and provided services". Remark in that the notion of "black box and white box is introduced to specify the degree of reusability. The degree, to which, a software module or other work product can be used in more than one computing program or software system". The composition based on the contract enables communication between components to provide a service and to request a service. To be use and integrating in custom application, component must adhere to a binary form. The point of contact of custom application and the component is the run-time binary representation.

It comes that the contract "is a specification stating what the client application needs to use the interface. Vice-versa, it states what the provider application has to implement to meet the service promised by means of the interface. In the other words the interface specification is a contract

that specifies what an existing component (provider) will do if it is incorporated into a client application (request). Ideally, a contract should cover all essential functional and non-functional aspect”.

Furthermore, the interface specifies the externally visible operations or the limited part of the behaviour by which components interact, and has no implementation of its own. Ideally, the interface specification can contain the following pieces of information:

a. Operation semantics

It is a description of each operation using:

- informal text,
- pre/postcondition
- invariant

b. Interface protocol

It provides the constraints on the order in which operations may be called. Non-functional aspects and other functional aspects can be considered like the constraints.

c. Service level

It covers guarantees regarding the qualities or non-functional requirements such as:

- timing constraints, CPU budgets restrictions, memory restrictions, availability, mean time between, failures, mean time to repair, throughput, latency, data safety for persistent state, capacity, and so on.

Traditional Interface vs Virtual Interface

The *Virtual Interface (VI)* is an interface that allows the system so called contractor to know the needs of custom application before to provide the services and at composition time provides the plug-compatible component. With the virtual Interface, services are automatically adapted to the current component available particular:

- the component can provide two kinds of interface: Server interface and Virtual Interface,
- the specification of the server interface is a set of functionalities in traditional way,
- the specification of virtual interfaces is a machine-interpretable that dynamically learned the request of custom application and automatically integrate plug-compatible component. This is the self-assemble on demand on the basis of the contract generated by the Virtual Interface when exploring custom application. This is an intelligent service that helps service contractor in creating services for different contexts.

The VI is designed to collect information from different context sources (networks, servers, devices, platforms, ...). In order to have a better indication of the user needs. Assuming the VI can provide a solution for the software reuse problem by finding an appropriate component to be used by a specific client application. The client, in one hand, is initiated the processing as following:

- announce the task that needs to be performed,
- receive a contract to a suitable contractor,
- award a contract to a suitable contractor,
- receive and synthesize results.

In the other hand, the provider is reacting as following:

- receive task announcements,
- evaluate his capability to respond,
- respond (decline or bid),
- perform the task if his proposal is accepted,
- report the results.

It comes that the Virtual Interface as a contract contains the following information:

Contract:

A request-response protocol

Data-Field

Execution-Information
Message
Message-Client
Message-Provider
Context
Context-Data-Client
Context-Data-Provider
Results

The *Request-Response Protocol* is transactions divided into two parts, contracted and the contractor, one for requests and the other for responses. A Request-Response Protocol can be defined to facilitate easier testing and integration of components that is validating a VI. Transaction data fields are used for performing a transaction. Two kinds of data fields are considered the execution information that controls the execution of the transaction, and the fields that are sent messages form the contracted or the contractor.

The most types of message are query, reply, explanation, command, permission, refusal, offer, bid, proposal, confirmation, acceptance, agreement, retraction, denial.

The *context* can take in account the context data client and by the context data provider. The context permits to specify the components and their relationships in area of interest. The semantics methods enable the representation and manipulation of context information through machine-interpretable. The machine-interpretable can be based on two steps:

- Extraction of information,
- Verification and validation.

The core of the machine-interpretable as an algorithm is described as:

```

Rule (number)
  <domain> " Context"
    <Pattern> "Described the context"
      => <Condition> " semantic constraints on the matched pattern"
        <Action> "tell what to do if the condition is true"

```

The result reports the conclusion of transaction between the client and the provider.

CASE STUDY: A PRACTICAL EXAMPLE

The case bellow illustrates in pseudocode such as language Java and is an example of the business component “Movable Machine” that emphasizes the software reuse and evolution by:

- a simple component,
- a server interface,
- a versioning problem,
- a virtual interface,
- a simple client application.

Primary Approach

Provider - Component "Movable Machine"

The provider has to declare a component for a car that implement the interface movable machine as follow:

```
//Ver 1.00
```

```

Class CCar implements IMovable{
    boolean start() {
        //Body of code to do here
        ...
    }
    void stop{
        //Body of code to do here
        ...
    }
    boolean turn(int degrees) {
        //Body of code to do here
        ...
    }
    double fuelRemaining(double amount) {
        //Body of code to do here
        ...
    }
    boolean changeSpeed(double kmperhour) {
        //Body of code to do here
        ...
    }
}

```

With Interface

Consider typical operations used on machines than move. These operations are start machine, stop machine, turn machine, fuel remaining and change speed. IMovable as interface defines what all movables machines must be able to do. They may do more, but this is a minimum functions.

```

//Ver 1.00
Interface IMovable`{
    boolean start();
    //Do whatever is necessary to start
    //a machine and return true if it worked
    void stop;
    //Do whatever is necessary to stop a machine
    //It had better work
    boolean turn(int degrees);
    //Do whatever is necessary to turn a machine
    double fuelRemaining(double amount);
    //Return the amount of plane fuel remaining
    boolean changeSpeed(double kmperhour);
    //Accelerate or decelerate
}

```

Request - Client Application

The client application can reuse this component CCar through an interface IMovebale as follow:

```

module MovableClient {
    Interface IMovable {
        boolean start();
        void stop();
        boolean turn(int degrees);
        double fuelRemaining(double amount);
    }
}

```

```

        boolean change.Speed(double kmperhour);
    }; }

```

If a client want to use the component "Machine Movabe" specifically invokes an operation start() on the interface IMovable.

```

package client.*;
...
import class RemoteControl {
...
private IMovable machine;
RemoteControl(IMovable m) {
    machine = m;
}
public static void main(String args[]) {
...
    //Invoke the operation start()
    boolean okay=machine.start();
    if (!okay) displays ("No reponse on start");
    ...}}

```

Evolution - Versioning

The new component CCar is redefined as:

```

//Ver 1.1
class CCar implements IMovable
    boolean start() {
        //Body of code to do here
    ...
    }
    //Others olds operations to put here
    ...
    boolean change.Speed(double kmperhour) {
        //Body of code to do here
    ...
    }
    //New operation
    int fail(int statut) {
        //Body of code to do here
    ...
    }}

```

The new version of the inteface IMovable() defines new operations of component CCar. This is a traditional interface IMovable2() that inherits directly from IMovable.

The **new interface IMovable2** is defined as:

```

//Ver 1.1
interface IMovable2 extends IMovable {
    int fail(int statut); }

```

New Approach

Provider - Component "Movable Machine"

The provider has to declare a component for a car that implement the Virtual

Interface movable machine to handle the evolution as follow:

```
//Ver 1.00
Class CCar implements VIMovable{
    boolean start() {
        //Body of code to do here
        ...
    }
    void stop{
        //Body of code to do here
        ...
    }
    boolean turm(int degrees) {
        //Body of code to do here
        ...
    }
    double fuelRemaining(double amount) {
        //Body of code to do here
        ...
    }
    boolean changeSpeed(double kmperhour) {
        //Body of code to do here
        ...
    }
}
```

New Realise by Virtual Interface

When using a Virtual Interface, the interface is defined at the high level and can give possibility of different extension.

The Virtual Interface VIMovable is defined as:

```
//Ver 1.00 of the basic component
interface VIMovable {
    boolean result;
    struct requestResponseProtocol;
    {
    boolean executionInformation;
    string messageClient;
    string messageProvider;
    };
    struct Context;
    {
    boolean client
    boolean provider
    string contextClient
    string contextProvider
    };
    String MachineInterpretable(string interfaceSignature) {
        ...
        //Code for exploring the available interface based on context
        ...
    }
}
```

DISCUSSION

Component specification, in general, is the process of stating, as precisely and completely as possible, how a projected component product will behave. Component specifications form a kind of contract between the developer and the purchaser. So long as the delivered component meets its specifications, it is considered acceptable. In addition, the specifications form the groundwork on which the component is built. For these reasons (and for many others) the specification stage is vital to the overall success of a development effort. The contract provides a basis for reasoning about the properties of component assemblies and provides a basis for certification of component. This means that a component can be replaced at runtime with a component with the same functionality eventually from other vendor (upgrading). In many case, as long as the implementation respects its contracts, revisions pass unnoticed by clients. A new realise adhering to the original contract but changing performance can break client. Thus the Virtual Interface is used in order to notify dynamically and automatically the client application about the evolution of the component without to cause any break.

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EVALUATING THE IMPLEMENTATION OF NTI/NCE MATHEMATICS PROGRAMME BY DISTANCE LEARNING SYSTEM

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Abstract

The study evaluated the implementation of NTI/ NCE mathematics curriculum by distance learning system. The study was guided by three research questions and corresponding hypotheses. The population was made up of 322 NTI mathematics students and 15 course tutors while the sample was made up of 158 students and 7 courses in four NTI study Centers in Bayelsa state Nigeria. The instrument used for the study was NTI Mathematics Curriculum Evaluation Questionnaire (NMCEQ). The instrument was validated by experts and a coefficient reliability of 0.82 established using Crombach's alpha method. Pearson product Moment Correlation Coefficient was used in analyzing the data. Findings revealed a significant relationship between structural facilities, teacher's qualification and evaluation on the implementation of the NTI/NCE mathematics curriculum by distance learning system. The paper therefore suggested among others the provision of adequate facilities and the training and retraining of teachers for the effective implementation of the curriculum.

Keywords: Evaluation, Implementation, Mathematics Programme and Distance Learning.

INTRODUCTION

In the past decades, student's enrolment in schools has increased without a commensurate improvement in school facilities and manpower. This problem as noted above has called for the introduction of different forms of non- conventional education programmes in Nigeria and other parts of the developing world. Such non conventional programmes are often called different names such as correspondence education, home study, independent study, continuing education, part-time, studentship, sand which programmes and distance learning system. Danjuma (2004) noted that though these programmes are operated using different learning styles, and administrative system, a major feature about them is that the students and teachers do not have a direct contact as obtained in the more conventional education programmes.

The need for distance learning system according to Ezeni (2006) affects almost all sector of Nigeria society. The author stressed further that the house wife need distance education to effectively teach and monitor the academic progress of her children and ward at home, the farmer also need high degree of distance learning, inform of extension programme for improved crop and animal yield, the trader and artisan need a form of distance learning for improved productivity and better service delivery. In the education scene teachers need to improve their knowledge through in service programmes to enhance better teaching and learning and contribute maximally to community service.

This is sensitive to the Federal Government Commitment to teacher production and retention as noted in the FRN (2004). The policy document clearly stated that teacher education will continue to be given a major emphasis in all educational planning and that "no education system can rise above the quality of its teachers." To effectively implement this policy statement, FRN through the national policy on Education (2004) noted that the minimum qualification for teaching is the Nigeria Certificate in Education (NCE).

Such policy statement if strictly followed without certain adjustment in teacher education programme, will certainly throw many serving teachers out of the teaching profession thereby increasing the rate of unemployment in the country. In a survey carried out by Jubril (2005) 29.8% of Public primary school teacher in Kebbi State, Nigeria had qualifications lower than the NCE. This therefore means that such teachers need in-service training programme to safe guide their jobs. Relative to this, College of Education, Universities, National Open University and the National Teachers Institute (NTI), has instituted different distance learning programmes for teachers aimed at training and retraining of teachers to achieve set goals. Jegede (2003) noted that among these bodies, the NTI stands very strategic among others in producing middle level manpower at the NCE level in meeting the demands of teacher education in Nigeria.

The National Teachers Institute (NTI) was established in 1978 through decree 7. The Institute was originally set up to manage Teacher Grade II (TCII) examinations in the three core subjects (mathematics, English language, and General Paper). These were the three core subjects, which were Federally examined for the award of Teacher Grade Two Certificates, which was then almost the highest qualification needed for teaching at the Primary School level. Following the national policy directives of NCE as the minimum qualification for teaching, the scope of NTI was widened to include mounting of courses leading to the award of the Nigeria Certificate in Education (NCE Primary) in certain subject areas to qualify recipients to teach in primary school. At present, the institute, runs NCE programmes in subject areas such as Christian Religions Studies (CRS) Cultural and Creative Arts (CCA) English Language (Eng), Islamic Religions Studies (IRS), others are Physical and Health Education (PHE), Social studies (SOS) Primary Education Studies (PES), Education (EDU), Integrated Science (ITS) and Mathematics (MAT).

Any school programme need periodic evaluation. Such evaluation can be in part or whole. Jeremiah and Alamina (2006) noted that the evaluation can be carried out in almost all the stages of the curriculum development process, from the need assessment stage to quality control stage. Such report can provide comprehensive data which can be used as quality control mechanism which may call for subsequent innovations. Thus the fundamental problem of this study is to evaluate. The level of structural facilities for the implementation of NTI/NCE programme in mathematics by distance learning system in Bayelsa State Nigeria

STATEMENT OF THE PROBLEM

Teacher education in Nigeria has witnessed a lot of innovation in the past decades. These innovations were aimed at improving teaching and learning. The poor performance of school children in public examinations is an eloquent testimony that such innovation has not yielded an acceptable dividend. Of all the factors that could be responsible for this, the school environment, motivational variables, instructional strategies and media are often attacked by concerned citizens and the government. Little or no attention is paid to the fact that lack of periodic evaluation of school programme could cause damage in the system, there by making it impossible to achieve set goals and objectives. The researchers noted that some earlier studies on evaluation were carried out without matching them with the NCE mathematics progrmmme through distance learning system in Bayalsa state. This research is an attempt to fill that gap. It is therefore pertinent at this time when Nigeria is moving towards Scientific advancement to constantly monitor and evaluate our mathematics education programme as it determine the direction of our Scientific break through.

PURPOSE OF THE STUDY

The major concern of this study was to evaluate the implementation of the NTI/NCE mathematics programme of the Distance learning System. In this regards, the study was designed specifically to achieve the following objectives.

1. To determine the relationship between structural facilities and the implementation of NTI/NCE mathematics programme by distance learning system.
2. To determine the relationship between teachers qualification and the implementation of NTI/NCE mathematics programme by distance learning system.
3. To determine the relationship between evaluation strategies and the implementation of NTI/NCE mathematics programme by distance learning system.

Research Questions

To guide the study, the following research questions were posed

1. To what extent do structural facilities relate to the implementation of NTI/NCE mathematics programme by distance learning system?
2. To what extent do teachers qualification relate to the implementation of NTI/NCE mathematics programme by distance learning system
3. To what extent do evaluation strategies relate to implementation of NTI/NCE mathematics programme by distance learning system.

Research Hypotheses

To guide the study, the following research questions were transformed or converted into corresponding null hypotheses.

- (HO₁)* There is no significant relationship between structural facilities and the implementation of NTI/NCE mathematics programmes by distance learning system.
- (HO₂)* There is no significant relationship between teacher's qualification and the implementation of NTI/NCE mathematics programme by distance learning system.
- (HO₃)* There is no significant relationship between evaluation strategies and the implementation of NTI/NCE mathematics programme by distance learning system.

METHODOLOGY

The research design for this study was the descriptive survey. The population comprised 322 mathematics students and 15 course tutors in six NTI study centres during the 2009/2010 academic year. The sample was made up of 158 students and 7 course tutors, which was drawn from the population using the proportionate random sampling technique. The instrument used for the study was Mathematics Curriculum Evaluation Questionnaire (MCEQ) The instrument was validated by experts and coefficient reliability of 0.82 established using Crum Bach alpha technique. Data collected was analyzed using pearson product moment correlation coefficient.

Hypothesis Testing

(HO₁) There is no significant relationship between structural facilities and the implementation of NTI/NCE mathematics programme by distance learning system.

Table 1: Pearson Product Moment Correlation Coefficient Analysis of Relationship between Structural Facilities and Implementation of NTI/NCE Mathematics Programme.

Variable	Σx	Σx^2	Σxy	df	r.cal	r.crit	Decision	$p > .05$
		Σy	Σy^2					
Structural facilities	2147	2914	36713	164	0.199	0.195	*	
Implementation	2788	51040						

* = significant at 0.05 alpha level, $p < 0.05$ at $df = 164$

The data presented in table 1, indicated that the calculated r . value of 0.199 is greater than the critical r . value of 0.195, at 164 degree of freedom at 0.05 alpha levels. Hence, the null hypothesis which states that there is no significant relationship between structural facilities and the implementation NTI/NCE Mathematics programme by Distance Learning System is rejected. This implies that there is a significant relationship between structural facilities and implementation of NTI/NCE mathematics programme by distance learning system.

(H_{O_2}) There is no significant relationship between teacher qualification and the implementation of NTI/ NCE mathematics programme by distance learning system.

Table 2: Pearson Product Moment Correlation Coefficient analysis of Relationship between Teachers Qualification and Implementation of NTI/NCE Mathematics Programme by Distance Learning System.

Variable	Σx	Σx^2	Σxy	df	r.cal	r.crit	Decision at	$p > .05$
		Σy	Σy^2					
Teacher qualification	2002	25444	34350	164	0.245	0.195	*	
Implementation	2788	51040						

* = significant at 0.05 alpha level, $p < 0.05$ at $dt = 164$

It is established from table 2, that the calculated r . value at 0.245 is greater than the critical r . value at 0.195, at 164 degrees of freedom and at 0.05 alpha levels. Hence, the null hypothesis is rejected, which implies that there is a significant relationship between teachers qualification and the implementation of NTI/NCE mathematics programme by distance learning system.

(H_{O_3}) There is no significant relationship between evaluation strategies and the implementation NTI/NCE mathematics programme by distance learning system.

Table 3: Pearson Product Moment Correlation Coefficient Analysis of Relationship between Evaluation Strategies and the Implementation of NTI/NCE Mathematics Programme by Distance Learning System.

Variable	Σx	Σx^2	Σxy	df	r.cal	r.crit	Decision at	$p > .05$
		Σy	Σy^2					
Evaluation strategies	2152	29384	36819	164	0.201	0.195	*	
Implementation	2788	51040						

* = significant at 0.05 alpha level, $p < 0.05$ at $dt = 164$

From table 3 It is established that the calculated r . value of 0.201 is greater than the critical r . value of 0.195, at 164 degrees of freedom and at 0.05 alpha levels. This implies that the null hypothesis is rejected, therefore, its further indicates that there is a significant relationship between evaluation strategies and the implementation of NTI/NCE mathematics programme by distance learning system.

DISCUSSION OF FINDINGS

The major objective of this study was to evaluate the implementation of NTI/NCE mathematics programme by distance learning system. The result of the investigation indicated a significant difference between structural facilities and the implementation of NTI/NCE mathematics programme by distance learning system. The Pearson Product Moment Correlation Coefficient statistics was used to establish the degree of relationship. This might be as a result of the fact that instructional facilities plays a great role in the implementation of school curriculum and that distance learning systems need to have adequate facilities that will promote effective learning. Earlier studies such as Sidney and Ngozika (2005), Andrew (2006) and Alaka (2007) all collaborate with this study. In their various findings, they identified a significant relationship between school facilities and curriculum implementation.

The findings again revealed a significant relationship between teacher's qualification and the implementation of NTI (NCE) Mathematics curriculum by distance learning system. The Pearson product Moment Correlation coefficient was used in establishes the relationship. This might be associated with the fact that teachers play a significant role in any teaching learning process relative to the implementation stage of a school curriculum. Earlier studies such as Jeremiah (2004) and Alalibo (2010) where at variance with this findings. Studies such as Ali (2007), Elems (2008), Poploar (2008) all collaborate with the findings of this study.

The result of the investigation also revealed a significant relationship between evaluation strategies and the implementation of the NTI (NCE) Mathematics curriculum by distance learning system. The Pearson Product moment correlation coefficient was used to establish the relationship. This might be related to the fact that proper evaluation is an index of measuring the efficiency of a school programme in terms of meeting the demands of set goals and objectives. The result of other studies such as Ochilongua (2006), Eke (2009) tend to support the result of this finding. These studies all identify the cardinal role of evaluation in the effective implementation of a school curriculum.

CONCLUSION

Based on the findings of this work, the following conclusions are reached.

1. There is a significant relationship between structural facilities and the implementation of the NTI/NCE mathematics curriculum by distance learning system.
2. There is no significant relationship between teacher's qualification and the implementation of NTI/NCE mathematics curriculum by distance learning system.
3. There is no significant relationship between evaluation technique and the implementation of NTI/NCE mathematics curriculum by distance learning system.

RECOMMENDATIONS

Based on the findings the following recommendations are made:

1. Facilities should be adequately provided in NTI study centers to enhance the implementation of mathematics curriculum.
2. National Teachers Institute (NTI) course tutors or teachers should be encouraged to go for in service training, workshops, seminars and conferences to up date their knowledge on current trends and innovations in mathematics education curriculum.
3. National Teachers Institute and other relevant bodies should carry out periodic evaluation on the NTI programme. Such evaluation can serve as quality control mechanism which may call for subsequent innovation.

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ADMINISTRATIVE PROBLEMS OF OPEN DISTANCE EDUCATION IN NIGERIA. A CASE STUDY OF NATIONAL OPEN UNIVERSITY OF NIGERIA

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Abstract

The purpose of this study was to identify the administrative problems of open and distance education in Nigeria with particular reference to National Open University of Nigeria and to ascertain whether there is a significant difference between the administrative problems of National Open University in the two broad geo-political zones (Northern and Southern zone) of Nigeria. To guide the study, two research questions and one hypothesis were formulated. The study was carried out in all the study centres in the geo-political zones of Nigeria. The population of the study comprised of five administrative staff from each of the 26 study centres of National Open University of Nigeria, numbering 130, who also served as respondents. Questionnaire (NOUAPS) was used for data collection. The data generated were analysed with mean and t-test. It was found that there is no significant difference between the administrative problems identified in the study centres of National Open University in the Northern and Southern geo-political zones of Nigeria. The most serious problem identified is the administration of the study centres by people who lack sufficient experience in the field of educational administration to develop, maintain and manage exemplary programs. Recommendations were made based on the findings.

Keywords: Administrative Problems, Solutions, Open University

INTRODUCTION

A definition of open and distance education cannot be too precise. It would be as precise as the concept of distance itself is or as precise as the concept of education can be, both of which are within the province of subjectivity. In an attempt to define open education, Burge (1993) states that it is a situation in which the learner uses resources in a flexible way to achieve their goals. The resources here could be print, audio, computer based; used at home, at a study center, in the work place, with or without the guidance of a tutor or mentor. On the other hand, Mujibul (2008) sees distance education as situations in which learners are physically separated from the educational provider, and communicate in writing (using letters, e-mail, fax or computer conferencing) verbally (by telephone, audio, conferencing, videoconferencing), or in face to face tutorial sessions.

From the above definitions therefore, open and distance education is forms of education and training in which using learning resources rather than attending classroom sessions, is the central feature of leaning experience. It is a field of education that focuses on the pedagogy, technology and instructional system designs that aim to deliver education to students who are not physical “on site” in a traditional classroom or campus. It is a process used to create and provide access to learning when the source of information and the learners are separated by time and distance or both. In other words, distance education is the process of creating an education experience of equal quality for the learner to best suit their needs outside the classroom situation. It is worthy to note that there is a considerable overlap between the two terms, open and distance leaning and they are often used together to refer to the whole range of leaning approaches as described above. Open and distance education courses that require a physical on-

site presence for any reason, including taking examination is considered a hybrid or blended course of study and it is the most popular in Nigeria today. Since establishment of National Open University of Nigeria, thousands have embraced this mode of education having seen it as an approved one in the national policy on education.

STATEMENT OF THE PROBLEM

With the passing of the Open University bill into Law in Nigeria in 1983, and the test transmission on February 4, 1984 started on Federal Radio Corporation of Nigeria (FRCN), National Teachers Institute (NTI) in Kaduna, and the National Open University of Nigeria (NOUN) in Lagos are the official institutions that offer open and distance education through Distance Learning System (DLS). Since then the staff and students of National Open University in both undergraduate and post graduate levels complained bitterly about series of administrative problems they encounter in different study centres of the institution.

Unfortunately, the rate of turnover from the National Open University of Nigeria reveals that the rate is slow in meeting the demand of staff and students in her study centres as well as that of the society. This slow pace has been due to certain constraints. These constraints which will be called problems in this work seems to have a nucleus in the administrative aspect propelling teaching and learning in the entire study centres of National Open University of Nigeria. It is therefore the intention of the researchers to expose the administrative problems of open and distance Education in Nigerian with particular reference to that of National Open University of Nigeria.

The purpose of this research is to identify the administrative problems of Open and distance education in Nigerian with particular reference to National Open University of Nigeria and ways of solving them. The result of the study and recommendations if implemented would enable the National Open University of Nigeria administrators and planners to solve the administrative problems existing in all their study centres. A study of this nature is important for development and growth of the university.

Based on the stated problem and purpose, two research question and one hypothesis were formulated to guide the study.

Research question:-

- (1) What are the administrative problems of National Open University of Nigeria study centres in Nigeria?
- (2) What are the solutions to the administrative problems of National Open University study centres in Nigeria?

HYPOTHESIS

There is no significant difference between the administrative problems of National Open University study centres in the two broad geo-political zones (made up of North East, North West, North Central and South East, South West, South-South) of Nigeria.

METHODOLOGY

The survey approach of ex-post facto design was used for this study. This design was found fit because the opinions of administrative staff were sampled about the phenomena that had already occurred in the respective study centres in the geo political zones.

Population of this study consisted of all the administrative staff in the twenty-six study centers of National Open University of Nigeria numbering 130

Table 1: The Distribution of the Sample in terms of the Number of Administrative Staff in each Study Centre of National Open University in each Geo-political Zones in Nigeria.

Geo-political Zones	Study centres	Number sampled	Geo-political zones	Study centres	Number sampled
North East	1) Federal Polytechnic Bauchi	5	South East	14) Federal Polytechnic Nekede – Owerri	5
	2) Yola Study Centre	5		15) National Root Crop Institute Umudike	5
	3) Kashim Ibrahim College of Edu. Maiduguri	5		16) Enugu Study Centre	5
	4) Damaturu study centre	5		17) Anambra study Centre	5
North West	5) Kano Study Centre	5	South West	18) Ibadan Study Centre	5
	6) Kaduna Study Centre	5		19) South West Resource Centre, Abeokuta Ogun State	5
	7) Shehu Study Centre	5		20) Adeyemi College of Edu. Ondo	5
	8) Katsina Study Centre	5		21) Lagos Study Centre	5
North Central	9) Plateau State Polytechnic Jos	5		22) Oghogbo Study Centre	5
	10) State College of Education Ilorin	5		23) EDDI South-South Community Centre	5
	11) Abuja Study Centre	5		24) State College of Education Rumuolumeni P.H	5
	12) Minna Study Centre	5		25) Benin Study Centre	5
	13) Makurdi Study Centre	5		26) Yenagoa Study Centre	5

Source: National Open University of Nigeria students Hand Book (2006)

Sample and Sampling Technique

All the administrative staff in the twenty-six study centres of National Open University in the Six Geo-Political Zones of Nigeria was sampled as indicated in table 1. National Open University Administrative problems and solution questionnaire (NOUAPS) was the instrument used for collection of data for this research. The NOUAPS had two sections, A and B. Section A had 14 items and measured the administrative problems in the study centres of National Open University of Nigeria. Section B also with 5 items while measured the solution of problems contained in section A. These added up to 19 items, all measured in a four point likert-type scale of highly acceptable (4 points), acceptable (3 point), unacceptable (2 points) and highly unacceptable (1 point)

Face and content validities of NOUAPS were ascertained by experts in the field of measurement, evaluation and administration. Test-retest reliability coefficient of 0.78 was established for NOUAPS by administering the instrument twice within a two-week interval on 20 administrative officer of outreach centres of Nwafor-Orizu College of Education Nsugbe, Anambra State. The data from test and retest exercise was correlated using the Pearson product moment correlation coefficient, (r).

The researchers used face to face distribution technique in administering their questionnaire to respondents in the South East Geo-political Zone and electronic administrations by sending the questionnaire through e-mail of other respondents in the remaining geo-political zones. Mean and t-test were used to analysed the data collected.

DATA ANALYSIS AND RESULTS

This portion indicates the summary of data collected from the respondents and were analysed according to the research questions and hypothesis.

Research Question

(1) What are the administrative problems of National Open University of Nigeria study centres in Nigeria?

Table 2: Administrative Problems of NOUN Study Centres

S/No	Items	Respondents from N. East, N.W and N. central Geo-political							Respondent from B.East S.W and S.S Geo – Political Zone						
		H A	A	U A	H.U A	Total	X	Remarks	HA	A	UA	H.U A	Total	X	Remarks
1.	Appointment of Non-specialists in Educational Administration and planning as centre Director	30	35	-	-	225	3.41	A	30	30	5	-	220	3.38	A
2	Accommodation problem	20	35	10	-	205	3.15	A	28	32	-	5	213	3.27	A
3	Lack of facilitators in some courses	15	43	5	2	189	2.90	A	40	23	2	-	174	2.67	A
4.	Irregular payment and omission of some facilitators honorarium	40	25	-	-	235	3.61	A	50	15	-	-	245	3.76	A
5	Autocratic leadership style adopted by most centre directors	-	52	10	3	149	2.75	A	-	50	10	5	175	2.69	A
6	Inadequate funding	-	65	-	-	195	3.0	A	50	15	-	-	245	3.76	A
7	Lack of receptive to open and distance education by most Nigeria	30	35	-	-	225	3.46	A	32	33	-	-	227	3.49	A
8	Inability of the centre directors to identify and recruit committed facilitators	10	40	-	15	175	2.69	A	20	35	2	8	197	3	A
9.	High cost of technology to support to programme	15	50	-	-	210	3.23	A	18	47	-	-	203	3.12	A
10	Insufficient and unequal distribution of course materials	35	30	-	-	230	3.53	A	30	35	-	-	225	3.46	A
11	Staff disobedience	32	33	-	-	227	3.49	A	20	35	10	-	205	3.15	A
12	Course allocation conflicts	40	23	2	-	174	2.67	A	40	25	-	-	235	3.61	A
13	Inaccurate data for effective planning	50	15	-	-	245	3.76	A	15	50	-	-	210	3.23	A
14	Lack of supervisor	28	32	-	5	213	3.27	A	20	35	10	-	245	3.15	A

All the items in table 2 had their mean scores above to cut off point of 2.5 and are therefore the administrative problems of all study centres of National Open University in the six geo-political zones of Nigeria.

(2)What are the solutions of administrative problems of the study centres of National Open University in the six political zones in Nigeria?

Table 3: Solution of the Administrative Problems of NOUN Study Centres.

S/No	Items	Respondents from N. East, N.W and N. central Geo-political							Respondent from B.East S.W and S.S Geo –Political Zone						
		HA	A	UA	H.UA	Total	X	Remarks	HA	A	UA	H.UA	Total	X	Remarks
1.	Adequate accommodation should be provided in all study centre (permanent structures)	18	47	-	-	203	3.12	A	28	32	-	5	213	3.27	A
2.	The programme should be sufficiently funded	40	23	2	-	174	2.67	A	15	43	5	2	189	2.90	A
3.	Adequate and qualified facilitators	20	35	10	-	205	3.15	A	32	33	-	-	227	2.67	A
4.	Enough course materials should be provided in all study centres	20	35	2	8	197	3.0	A	10	40	5	10	130	2.76	A
5.	Specialist in educational administration and planning should be employed as centre directors	36	20	4	5	217	3.33	A	40	20	-	5	225	3.46	A

In table 3, all the items had their mean scores above the cut off point of 2.5. This indicates that they are the solutions to the administrative problem of the study centres of National Open University in all geo-political zones in Nigeria.

(H₀): There is no significant difference between the administrative problems of National Open University study centres in the two broad geo-political zones (made up of N.E, N.W, N. Central and South East, S.W, South-South) of Nigeria.

Table 4: Correlation Co-efficient Computation for Testing the above Hypothesis

Geo-political zones	N	X	SD	t-cal	Df	Alpha level	t-tab	Decision
N.E,N.W & N Central	14	3.21	0.35	0.22	26	0.05	0.37	Accepted
S.E, S.W & S.S	14	3.26	0.33					

From table 4 above, it can be observed that the t-calculated value is 0.22 which is less than the t-table value 0.37 for 26 degree of freedom at 0.05 level of significance. For this reason therefore, the null hypothesis is accepted, hence there is no significant difference between the administrative problems of National Open University study centres in the two broad geo-political zones of Nigeria.

DISCUSSION

The results obtained from the analysis of data in table 2 identified the following as administrative problems in all the study centres of National Open University of Nigeria:-

- Appointment of non education administrators as centre Directors in open and distance education centres. As center Directors and supervisors main duties are to get things done in a proper way from the workers, they are supposed to be experts in education administration, planning and supervision. Same should be applicable to the appointment of the Vice Chancellors in universities running open and distance education.

The above finding is in line with (Aguna 2006) which states that inadequate planning, recruitment of staff, late production as well as of course materials and non utilization of experts in the field of educational administration and planning are affecting the proper implementation of the programmes.

- Accommodation problem. All the center used for open and distance education whether established by public or private institution are operating in either hired structure or hosted by already established institution. Building provided for offices and lecture rooms are inadequate resulting to slow rate of work in the office as well as in teaching and leaning.

This is in consonance with Obayi (2007) which states that no effective work can be done in a congested environment. A situation where the chief executive of a study center and his administrative staff share one room apartment as their office make jest of administrative block of a campus in a higher institution of such cadre.

This situation belittles not only the chief executives and her staff but the institution herself. Owerri and Port Harcourt centers of the National Open University of Nigeria are experiencing the problem right now. In line with this Nwaga (2007) pointed out that lack of space in their office has affected students guidance and counseling services. She received with dismay series of students' complaints on lack of classroom for facilitation coupled with insults from students of Federal Polytechnic hosting them.

These problems exist in all National University (open and distance education) study centre thereby leading to delay in performance of office duties, facilitation and restlessness to the centre Directors who run around resolving conflicts between the host students and his/her students. Stressing on conducive work environment. Moore (2005) observed that in the environment where

human beings work, the interfaces between them and environment affect and determine the level of human performance and output (production) at the workplace. Irrespective of the type and level of technology employed at the congested environment existing in different learning centres; the problems related to these aspects cannot be eliminated completely as technology in use is being assessed continuously, and no two persons can work exactly in the same way on the same job because of difference in inherent capabilities and responses to work environment. The primary concern of management of open and distance education (National Open University of Nigeria) should be to provide a conducive accommodation (environment) for work, so as to achieve the best-possible performance from the staff and the students.

Irregular Payment and Omission of Some Facilitators Honorarium

In most cases facilitators from different study centres of National Open University of Nigerian have complained about irregular payment and omission of their names in the schedule for payment of their honorarium. When such happens no supplement voucher is raised to pay them before the next semester runs out. For instance the facilitators have not received their last two semesters honorarium up till now including those whose names were omitted before. This results to negative motivation of the affected facilitators. They become frustrated and their rate of work will be drastically reduced.

Leadership Style adopted by Centre Directors/Administrators

The success of National Open University of Nigeria (NOUN) is largely depended on the quality of its leadership. The leadership style adopted by most centre managers could be branded as “medieval instrument”.

They tend to be autocratic in the way they manage their permanent staff and facilitators. The human side of management is a thing that “belongs to the other side of the fence”. Communication style between management and employees whether on permanent or temporal basis is jaundiced”.

It is usually from top-down, not the other way round, workers are given rare opportunity to talk let alone defend their rights.

The administrators mainly are “they who must be obeyed”. Some of the centre Directors or co-ordinators have been found wanting or dismissed due to negligence of duty, abetting examination malpractices and being involved in one corrupt practice or another.

In view of this many Nigerians are still doubting the quality and acceptability of the products of open and distance education in the labour market. Further more, the academic system does little but accord National Open University poor recognition so that many potentially good leaders are reluctant to accept leadership opportunities in open and distance education programmes including the institution under study. This raises a member of problems such as:

Inadequate Funding and Lack of Receptive to Open and Distance Education

Most people who are used to the traditional system of tertiary education are not receptive to open and distance education/learning resulting to low enrolment in most centres of National Open University of Nigeria. Majority of them are in the upper house of the Nation (senate) which is the highest policy making body. They tend to disparage open and distance learning by allocating mega amount of money to it thereby in-capacitating the management of the programme. It is only when enough fund is released to the administrators that they can do a reasonable work.

Inability of the Administrators to Identify and Recruit Committed Facilitators

It is the responsibility of the personnel department of National Open University of Nigeria various institution to recruit their staff. Because of the perculiar nature of the programme

only very few qualified candidates apply for facilitating in the programme thereby making it difficult to recruit enough facilitators to cover all the courses in different centres. Commenting on this, Veduin and Clark (1991) state that teachers with enthusiasm for non-traditional course work are few and difficult to convince to be absorbed as facilitators in open and distance education programme. Therefore managers waste a lot of time, searching for qualified facilitators willing to handle core science courses.

High Cost of Technology to Support Open and Distance Education

Institutions offering open and distance education must consider the initial cost as well as the continuing cost of installing, maintaining, using and upgrading technology to support open and distance education service. Telecommunications and connectivity costs such as those needed to use the internet are ongoing costs. The administrators running National Open University did not anticipate connectivity costs and subsequent barriers in planning their programmes. This has led to continuous addition investments in toll-free lines and computers (Willis, 1993). Also, they did not plan to have many competent computers staff to support internet use or to develop the few available. Therefore, ongoing staff training costs must be considered and fund provided for it.

Insufficient and Unequal Distribution of Course Materials.

The centre directors' office in different centres are always invaded by student demanding their course materials which are insufficient in number and unequally distributed to their centres. Students are forced to download or photocopy course materials which they have already paid for. This problem has led to delay in facilitation and conflict between the centre Directors and the students.

Staff Disobedience

Some staff recruited by the personnel department of different National Open University of Nigeria and posted to their study centers are seen as threats by the center Directors because of the difference in academic qualifications and experience. In centers where many facilitators are more experienced and qualified academically, their center Directors feel inferior and find it difficult to control them. Most facilitators who find themselves in this situation tends to impose their decisions on the center directors, ill-advise other facilitators and students thereby making the center difficult to control by Directors.

Course Allocation Conflicts

Many things are usually done on "Man-Know-Man" basic by some center Directors. This is highly reflective of course allocation Lopsidedness which is skewed in favour of Lady-friends, relations and old boys. This practice creates conflict among facilitators, and between facilitators on tracing who has been handling the course and why it should be re-allocated. This ugly act has resulted to the transfer of reliable and efficient guidance councilor handling the job to other centers by the center Directors to enable him/her perpetuate the evil act.

Inaccurate Statistics

National Open University (Open and distance education) cannot succeed without statistics which is the basic ingredients for effective planning. Information is needed on the number of participants being planned for in order to project needs as correctly as possible. Unfortunately, most of the center Directors plan are not backed by valid information, a situation such as this makes their plans to rest on inaccurate projections and predictions. This matter is compounded by unimaginable increase in dropout rate, general lack of information gathering and storing facilities.

Furthermore, inadequate data on the personal characteristics of the learner affect effective planning. It is worthy to note that student motivation has a power effect on attrition and completion rates, regardless of institutional setting. Motivators for open and distance students are often different from the traditional students. Knowles (1980), in explaining the advantages of knowing the learner, believes that learner behaviour is influenced by a combination of the learner's needs plus the learner's situation and personal characteristics.

Knowing these personal characteristics is an important aspect of planning open and distance learning courseware and strategies. Since these students are not close to the Directors, how can they identify their needs, situation and personal character for their plans to be successful. In line with this, Ofole (2007) observed that after matriculation majority of the students may not have any other contact with the center Director or guidance counselor except in the examination hall. This situation makes planning difficult.

Lack of Supervisors

The supervisors should carry out their own personal supervision of the facilitators in every study center to enable them make personal observations of facilitators activities and efforts. The center Director and the supervisors are supposed to ensure that all tasks and activities are actually carried out on time and in a proper manner. Unfortunately, the absence of supervisors in the centers have compounded the problems of the center administrators since they cannot carry out both duties effectively.

SOLUTIONS

These problems cannot be allowed to continue. In view of this, the under listed solutions can remedy the situation

- (1) Adequate accommodation should be provided by institutions running open and distance education programmes. Therefore, for institutions owned by government like National Open University, permanent structures should be erected.
- (2) The programmes should be properly funded in order to achieve the objectives for establishing them
- (3) Adequate and qualified facilitators should be recruited. Those who are capable can be allowed to facilitate in not more than two centers.
- (4) Enough course materials should be produced and distributed to the students on registration to avoid delay in facilitation and encourage prompt completion of course content.
- (5) National Open University should employ specialists in Educational administrations and planning as centre Directors in all her study centres.

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DISTANCE EDUCATION IN NEPAL

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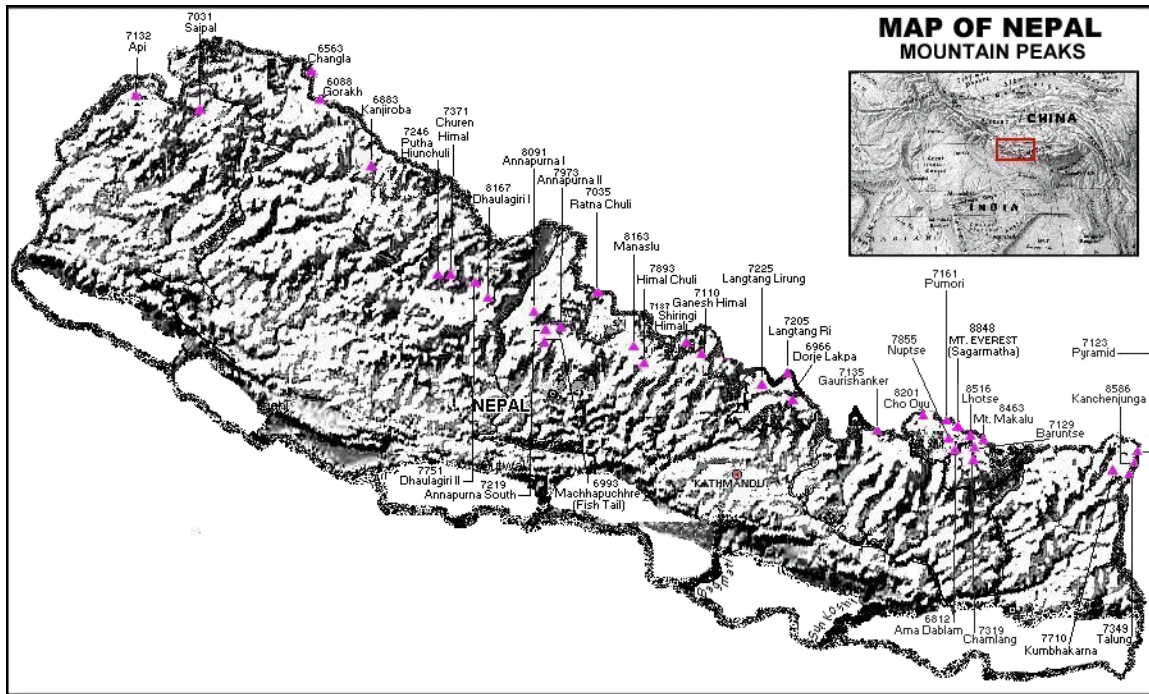
Abstract

Distance education is a method of imparting education in which there is no face-to-face interactions. Now face-to face interaction is becoming popular in this mode of education. Distance education delivery methods assist the modes of delivery of the courses depending on the nature and demands of the subjects. The tutor is a facilitator of face-to-face interaction and tutor counselor is the locally available resource person for providing continuing support to the students. Distance education in Nepal was started in Nepal when College of Education in 1957 launched Radio Education Program for teacher training and promoting adult education. This program was mainly to upgrade the quality of SLC teachers serving in primary schools. Radio Nepal, FM radios, TV are playing major role in providing distance education. This mode of education is intended to all kinds of people for many purposes of any country developed or developing. The 10 month in-service training course for primary teachers is a kind of distance education.

Keywords: Tutor, Tutor-counsellor, Face to Face Interaction, Resource Center

INTRODUCTION

Nepal is a country of multiple dimensions in terms of race/caste, ethnicity, language, religion, society and culture. These diversities have helped Nepal to recognize distinctly a plural society and as a country of cultures of more than one hundred three distinct ethnic and caste groups. Such diversities demand pluralistic approaches and calls for a multi-paradigm approach in developing education plan, strategies, policies and programs. On the part of distance learning difficult landscape, remoteness, under development and poverty are some of the hindrances that limit all people to have equal access to education in Nepal. Modern technology has developed many soft ware and hard ware equipments tools for distance mode of education and they are very helpful. Distance education must have developed on the concept of 'Reading hand written letters from abroad by relatives or friends'.



In earlier days, distance education was a method of imparting education in which there was no face to face contact between the learner and the teacher. The face to face interaction was not envisaged between the learner and teacher but also among the learners. The students to study at home at their own pace. The students were given access to learning materials but there was no face to face communication. Now face to face interaction is becoming popular even in distance mode. In distance mode there is physical separation of the learners from the institution which is responsible for teaching. However some contact sessions can be made with the use of technology. Different kinds of activities are organized by the provider to support students to learn under distance learning. The development of different technologies has contributed further development of distance education. The development of postal system and the printed materials allowed the students to get the learning materials in the mail and return the assignments in mail again. This system has become popular even in rich and developed countries like UK, India, Japan, Australia, USA, Canada, Korea etc.

OBJECTIVES

The objectives of distance education are:

- To provide quality higher education
- To provide learning opportunities for private students who are deprived of higher education under the regular programs.
- To serve the mass through the distance mode.
- To utilize modern technology in education.
- To provide education to women who cannot leave home for further education.
- To provide education to people wishing for life long education.
- To provide foundation for establishing the Open University in Nepal

Modes and Methods of Distance Education

Distance learning delivery methods assist the modes of delivery of the courses depending on the nature and demand of the subjects. The different methods are:

- Study materials in print, electronic, videos, audio cassette.
- TV programmes
- Contact sessions
- Part-time tutorial sessions
- Telephone tutoring: enquiry reception, support and counseling
- Assignment marking: special attention is given to the evaluation of assignment responses. During assignment marking, comments are made, questions are asked and answers required with their justifications.
- Special seminars on a certain subject in a course with special focus on more difficult subjects.
- Study centers with the facility of libraries and laboratories

The Resource Center Tutor and Tutor Counselor

The resource center teacher (tutor) is a facilitator of face-to face interaction with the students. The resource centre tutor requires two things: the ability on the part of the contact session tutor to convey through his contents advice for further study and the ability to perceive his student's present state of knowledge and conceptual framework and also providing regular advice to the learners through the use of electronic media, email or web page services.

Tutor-counselor is seen as the locally available resources for providing continuing support to the students. They are physically present at the study center to do the predefined task. The tutor-counsellor is an academic person who is assisted by the chief administrative staff of the center. This type of academic counsellor is managed at every contact centre for necessary tutorial and counseling services.

Medium of Instruction

Medium of instruction is bi-lingual or Nepali or English. Gradually, other local languages such as Newari, Maithili is used as a medium of instruction depending upon the need and demand of the learners

DISTANCE EDUCATION IN NEPAL

Distance education in Nepal was started in Nepal when College of Education in 1957 launched Radio Education Program for teacher training and promoting adult education. The implementation of New Education System Plan 1971(NESP) made training mandatory for teachers to have a permanent tenure. College of Education was not able to train all the teachers. It was after National Education System Plan (NESP) it was realized that the conventional approach to teacher training through face to face alone would not be enough to cater for the needs for trained teachers in the country. So the government had to look for an alternative means to train more teachers. For that the then Institute of Education (IOE) initiated a new program called Teacher Training through distance learning in 1976/77.This program was mainly to upgrade the qualifications of under SLC

teachers serving in primary schools and in-service training for primary school teachers of remote areas.

The then Institute of Education created Extension Division and developed a set of self learning materials based on the curriculum. This scheme had two contact sessions in order to help the teachers overcome their difficulties in understanding the materials. These contact sessions were organized during the vacations in their teaching jobs. During the contact sessions, the tutors assess students 'progress as a part of formative evaluation'. The tutors provide feedback to the learners with guidance for their remaining works to be completed within the stipulated time of academic session. This program was supported by UNICEF. The program discontinued after Radio Teacher Training (RETT) program was implemented by the Government of Nepal with the help of USAID in 1978. Tribhuvan University, Faculty of Education has been running B.Ed program through distance mode. Nine centres in TU constituent campuses were established for this purpose. The students followed the same curriculum and examinations as the regular students of TU. The percentage of pass rate of these students has been better than the average results of the regular students of TU.

In order to promote distance media education in Nepal, Radio Nepal, FM radios, Nepal Television and other TV channels are playing major role. Private radio station and TV channels are recently established and other media companies also have become active role in providing distance education. The ten-month in-service training course for primary teachers constitutes four packages of 2.5 months each. The second and third packages of the training are delivered in a distance mode through radio broadcasting by the distance education centre and the first and the fourth packages in a face to face by National Centre for Educational Development (NCED), through its nine Primary Teacher training Centres (PTTCs). Besides, the trainees are supplied with self-learning materials in order to support the radio lessons. The training is also followed by contact sessions every weekend, which are organized at the Resource Centre for providing the trainees an opportunity an opportunity to interact with the resource persons to avoid confusions encountered on the radio broadcasting and the self learning materials. Thus, the DEC and NCED are two institutes under MOES responsible for in-service training to primary school teachers jointly.

CONCLUSION

Distance education bridges the formal and non-formal sector. It is one of the most feasible modes of instruction in recent years. The open school system is an alternative route to formal school schooling with provision of school curriculum, external examination system and varying in learning materials in the form of print, audio-visual cassettes, broadcast telecast, audio-visual conferencing etc. through resource materials, face to face interactions and distance tutor. This mode of education is intended for all kinds of people for many purpose like young and adults, literacy, vocational, technical and scientific. This mode is most potential and dynamic for any country developed or developing nature. Due to advancement of technology, more effective equipments and learning materials are coming up which will enhance the quality and efficiency of distance learning.

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DETECTION AND DETERMINATION OF OXYTETRACYCLINE AND PENICILLIN G ANTIBIOTIC RESIDUE LEVELS IN BOVINE BULK MILK FROM DEBREZEIT AND NAZARETH DAIRY FARMS

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Abstract

A cross-sectional study was conducted between October 2007 and May 2008 to detect and determine oxytetracycline and penicillin G residue levels in bulk milk of cows in Debre Zeit dairy farms. A total of 400 bulk milk samples were randomly collected in the respective study dairy farms. A questionnaire survey was carried out by personal interviews with dairy farm owners in Delvotest positive farms (cases) and Delvotest negative farms (controls) to identify various risk factors and to determine associations among the occurrence of antibiotic residue in milk. All samples were qualitatively screened for antibiotic residues by Delvotest SP assay. Concentration of the positive samples was determined by high performance liquid chromatography. Concentrations were established using linear calibration reference curves. Out of 400 samples analyzed for antibiotic residue, 34 (8.5%) milk samples were positive for antibiotic residues. The mean residue level of oxytetracycline was 142.00µg/l that of penicillin G was 4.77µg/l. Oxytetracycline concentrations in all samples is ranged at a concentration between 27µg/l -251µg/l. The antibiotic residue positive samples which showed residues of oxytetracycline above the WTO/FAO/CAC established maximum residue limit of 100µg/l were 24 (70.58%). For penicillin G with maximum residue limit of 4µg/l, they were 7 (20.58%). Penicillin G was found in some milk samples of (58.8%) dairy farms. The result obtained confirmed that oxytetracycline and penicillin G were imprudently used in dairy farms.

Keywords: Oxytetracycline, Penicillin G, Residue, Milk, Debre Zeit, Delvotest SP, High Performance Liquid Chromatography.

INTRODUCTION

Antibiotics have been used in the dairy industry for more than five decades. They are used in dairy cattle production primarily to treat or prevent disease and to a lesser extent to increase milk production or improve feed efficiency. Antibiotics used as growth promoters are administered at low doses for extended periods. As prophylactics, antibiotics are used at low doses to prevent disease. Although the duration of antibiotic use differs for growth promotion and prophylaxis, the dosage for both is typically less than 200 g/ton, and is considered subtherapeutic (IOM, 1989).

The therapeutic regimen is dictated by label instructions by the manufacturer or in accordance with extra-label instructions by a veterinarian. Antibiotics are administered to animals through injections (e.g., intramuscular, intravenous, or subcutaneous), orally, topically, or via intramammary or intrauterine infusion. Several types of antibiotics are commonly used in food animals (Mitchell *et al.*, 1998).

The use of antibiotics therapy to treat and prevent udder infections in cows is a key component of mastitis control in many countries. Due to the widespread use of antibiotic for treatment of mastitis in dairy cows, much effort and concerns have been directed towards the proper

management and monitoring of antibiotics usage in treatments in order to prevent contamination of raw milk. However, widespread use of antibiotics has created potential residue problems in milk and milk products that are consumed by the general public. Because of the public health significance, milk and milk products contaminated with antibiotics beyond a given residue levels, are considered unfit for human consumption (Hillerton *et al.*, 1999).

Antibiotic residues are small amounts of drugs or their active metabolites which remain in milk after treating the cows (CAC, 1998). Problems associated with antibiotic residues in milk include the risk of allergic reactions after consumption by penicillin-sensitized persons, increased resistance of pathogens towards antibiotics, and inhibition of bacterial starter cultures used in dairy production. The concerns arise mainly from the possibility that antibiotic -resistant bacteria may be transferred from animals to humans, through contact, through the environment (e.g., water, manure) or through contaminated milk products (CAC, 1998). Residues are illegal and milk supplies containing detectable concentrations are not acceptable. It has been estimated that antibiotic contaminated milk costs the US dairy industry \$50 million annually (Rice *et al.*, 1984).

Levels of the drug and their metabolites may persist at unacceptable levels and consumers can be exposed to them. The presence of residues may result from failure to observe the mandatory withdrawal periods, illegal or extra-label use of drugs and incorrect dosage levels. Unauthorized antibiotic use may result in residues of these substances in milk and tissues (Ivona and Mate, 2002). Furthermore, many antibiotics used in animal agriculture are poorly absorbed in the animal gut. It is estimated that 25% to 75% of the antibiotics administered to feedlot animals could be excreted unaltered in feces (Elmund *et al.*, 1971, Feinman and Matheson, 1978) and can persist in soil after application on land (Donoho, 1978; Gavalchin and Katz, 1994). There is little information available concerning the fate of antibiotics in the environment and their link to the emergence of resistant genotypes found there. The annual production of livestock and poultry waste in the United States is nearly 180 million tons (dry weight basis) (Hagedorn *et al.*, 1999) and coupled with antibiotic usage, this waste is a potentially large source of both antibiotics and antibiotic-resistant bacteria released into the environment.

Antibacterial drugs such as oxytetracycline and penicillin G are routinely used in veterinary medicine for prevention and control of disease. Oxytetracycline is applied for the purpose of prevention or treatment of diseases such as bronchopneumonia, mastitis and metritis in cows. As a result, there is concern that residues of these compounds may be presented in the milk and milk products. The penicillins are widely used to treat or prevent local and systemic infections of farm animals. The use of penicillins as intramammary infusions or formulations to treat or prevent bovine mastitis is widespread (Haapapuro, 1997).

To detect antibiotic residues, different kinds of methods were developed. These consist of screening methods and chromatographic techniques to detect as many antibiotics as possible. The screening method is generally performed by microbiological, enzymatic and immunological methods. The screening methods are based on the various susceptibility of bacteria to different antibiotics. The antibiotic residue detection assays that are currently available use different methods and test microorganisms (Mitchell *et al.*, 1998). Microbiological assays for the detection of antibiotic residues utilize bacteria such as *Bacillus stearothermophilus* because of its high sensitivity to the majority of antibiotics. Both microbiological and chromatographic methods have been described for monitoring tetracyclines and penicillins in milk and animal tissues. Although the microbiological assay techniques have been recommended as official and conventional methods because of their simplicity, the bioassay methods lack specificity and provide only semi-quantitative measurements of residues detected and sometimes produce false positives (Kurittu, Lonnerberg, Virta and Karp 2000). Therefore, chromatographic techniques, such as TLC, and HPLC, and capillary electrophoresis (CE), have been developed to

replace microbiological assays (Chen and Gu, 1995; Cinquina *et al.*, 2003; Ding and Mou, 2000; Furasawa, 2003; Huang *et al.*, 1997; Petkovska *et al.*, 2006; Posyniak *et al.*, 2005;; Zhao *et al.*, 2004).

Residues of antibiotic agents may be of toxicological significance for the consumer and may influence the technological properties of milk used for manufacturing fermented products. To guarantee consumers safe and high quality dairy products, raw milk is regularly analyzed for the presence of antibiotic residues. If the milk from a single cow undergoing treatment accidentally enters the herd bulk milk, this may be sufficient to make the content of a tanker unsuitable for human consumption (McEwen *et al.*, 1991).

In order to safeguard human health, the World Health Organization (WHO) and the Food Agriculture Organization (FAO) have set standards for acceptable daily intake and maximum residue limits in foods (FAO and WHO, 1995). Regulatory limits for antibiotic residues have been imposed on the dairy industry in many countries (FDA, 1996; Folly and Machado, 2001). However, Ethiopia has not yet adapted international standards or established specifications for residue limits in the milk. The Ethiopian dairy industry has not adopted any control programs to ensure the safety of the milk. The drug residue limits, which apply to both the parent drug and its metabolites, need to be enforced at all levels in Ethiopia dairy industry in order to protect the health of consumers.

In Ethiopia, no studies have been conducted on oxytetracycline and penicillin G residue levels in milk and as such there are no data on the residual levels of these drugs in milk. Therefore the objectives of this work were to determine the prevalence of oxytetracycline and penicillin G residues in milk samples destined for consumption, quantitatively determine concentration of oxytetracycline and penicillin G residues in milk samples with qualitatively positive results and to assess the knowledge of the dairy farm owners about antibiotic residues in milk.

MATERIALS AND METHODS

Study Area

The study was conducted in Debre Zeit dairy farms between October 2007 and May 2008.

Debre Zeit

The town is located at 9 ° N and 40 ° E. It is 47 km South East of Addis Ababa, the capital of Ethiopia. The altitude is about 1850m above sea level. It experiences bimodal patterns of rainfall with the main rainy season extending from June to September with an average rainfall of about 800 mm. The mean annual minimum and maximum temperatures are 12.3 °C and 27.7 °C, respectively with an overall average of 18.7 °C (CSA, 2001). The mean relative humidity is 61.3%.

Study population

The study population consisted of milking cows found in Debre Zeit dairy farms.

Study design

A cross-sectional study was undertaken in. On each sampling day, usually once a week, about 20 ml of milk samples were randomly selected and sampled from each farm bulk tank. Sixty four dairy farms were visited after antibiotic residues were detected in samples of their bulk milk (case farms= 34) along with an equal number of residue free farms (control farms = 34). A questionnaire survey was conducted by personal interview of the dairy farm owners in case farms and equal number of control farms. It was administered to determine associations between the occurrence of antibiotic residue in milk and various risk factors like management practices, treatment factors, residue prevention methods and knowledge of the farm owners about the antibiotic residues. In management practices of the farm owners, the information collected were the use of feed additives, use of post-milking teat dips and training on dairy management.

Information on treatment factors included sources of antibiotics, type person who administers antibiotics to cows, route of antibiotic administration, record keeping, use of dry cow therapy and number of milking cows. Regarding residue prevention methods, the information gathered were marking of treated cows, milking of treated cows using separated equipment, use of antibiotic test kit and knowledge of withdrawal periods of antibiotics. Each milk sample was aseptically collected in separate containers and transported in ice-box packed to the AAU, Faculty of Veterinary Medicine (FVM) and Drug Administration and Control Authority (DACA) laboratory.

Sampling Procedure

Individual dairy farm owners to be sampled were selected using random sampling technique. About 20 ml milk samples were collected in each dairy farm from their bulk milk. Each sample was labeled legibly and accompanied by necessary identification information, which included date of sampling, type of samples, breed of cows from which the samples were obtained and identification code. All milk samples were transported under chilled conditions to the laboratory and stored at -20°C , until analysis.

Sample Size Determination

The sample size required for the study were determined on the expected occurrence (prevalence) of drug residue and desired absolute precision according to Thrusfield (2005) and the sample size was about 384, but it was raised to 400.

Methods for Oxytetracycline and Penicillin G residue Analysis

The type of antibiotics in milk samples was screened qualitatively by using Delvotest SP assay (microbial inhibitor tests with *Bacillus stearothermophilus* as test microorganism) and quantitatively by high performance liquid chromatography (HPLC).

Detection of Oxytetracycline and Penicillin G Residue in Milk using Delvotest SP Assay

The qualitative analysis of oxytetracycline and penicillin G residues in milk was done using Delvotest SP assay as described by Suhren and Beukers (1998). This method is based on the susceptibilities of bacteria to different antibiotics. Delvotest SP ampoules were supplied by DSM (DSM Food Specialties, Delft, and the Netherlands). The method was carried out according to the instructions by the manufacturer.

Determination of the Residue Levels of Oxytetracycline and Penicillin G Antibiotics with High Performance Liquid Chromatography (HPLC).

The qualitatively positive samples (section 3.5.1) were further quantitatively analyzed using HPLC as described by Ghidini *et al.* (2003) for oxytetracycline and penicillin G.

Data Management and Analysis




The data collected through questionnaire survey, Delvotest SP and HPLC were entered in to databases using Micro-Soft computer program Excel (Version 6. 0, 2000) and analyzed using SPSS (SPSS version 11. 05, 2000). Differences between proportions of groups with certain determinant factors were assessed by Chi-square (χ^2) test. Descriptive statistics were also used to describe the nature and the characteristics of the data.

RESULT

Qualitative Analysis of with Delvotest SP assay

In Debre Zeit dairy farm, out of 400 milk samples, 34 (8.5%) of them were positive for antibiotic residue. The colour reaction of the Delvotest kit with standards (positive and negative) and samples (negative, positive and doubtful) have been shown.

Fig1: Colour Reaction of Delvotest Kit with Controls (-/+)

	Positive control samples
	Yellow colored (-) samples
	

	Purple colored (+) samples
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Colour reaction of Delvotest kit with milk samples(-/+)

Response to Questionnaire Survey in the Dairy Farm

Proportions of the dairy farms which applied different management practices are summarized in Table 1. 18(26.47%) farmers reported using of part-time employers for the milking of cows. The farmers were asked if they participated in any training of dairy farm management. Around forty-six percent of the dairy producers said as they had participated. Use of medicated feed, post milking teat dips and branding of milking equipment were not recorded in this farm.

Table 1: Response to Questionnaire Survey on Farm Management Practices in Debre Zeit Dairy Farms

Farm management practices	(n=68)		
	Frequency	%	95% CI
Part time help	18	26.47	15.98-36.96
Feed additives	0	0	0
Training	31	45.59	33.75-57.43
Teat dips	0	0	0
Branding of milking equipment	0	0	0

n= number of samples; CI=Confidence Interval

Commonly observed disease conditions recorded in the dairy farms were 38.2% mastitis, 17.6 % metritis, 10.3 % enteritis and other types of diseases were recorded in 16.2% of farms. The other disease conditions (dystocoea, retained fetal membrane, metabolic problem and foot problem) recorded in dairy farms was 16.2% of the farms. 51.1%, 41.2 % and 14.7% of the farmers interviewed utilized oxytetracycline, pinstripe and multiject antibiotics respectively. Only 5.9% of the farmers were aware of dry cow therapy for controlling mastitis. On 70.8%, 16.7% and 12.5% of the dairy herds surveyed, veterinarians, assistants and owners themselves were used to administer antibiotics. Administration of antibiotics was accomplished using the routes of intramuscular, intramammary, intrauterine and perous on 52.9%, 30.9%, 8.8% and 14.7% of the farms respectively (Table 2).

Table 2: Percentage of the Treatment Factors in Debre Zeit Dairy Farms

Treatment factors	(n=68)		
	Frequency	Percent	95% CI
Drugs			
Oxytetracycline	35	51.4	39.59-63.35
Penistripe	28	41.2	29.48-52.88
Multiject	10	14.7	6.29-23.13
Other drugs	12	17.7	8.59-26.71
Route of administration			

Intramuscular	36	52.9	41.08-64.8
Intramammary	21	30.9	19.9-41.86
Intrauterine	6	8.8	2.08-15.56
Perous	10	14.7	6.29-23.13
Who administer			
Veterinarian	16	23.5	13.45-33.61
Assistant	46	67.7	56.53-78.77
Owner	6	8.8	2.08-15.56
Dry cow therapy	4	5.9	0.29-11.47

n=total sample number; CI=Confidence interval

The major antibiotic residues prevention methods used as per questionnaire survey are presented in Figure 3. The study noted that 52% of dairy farms marked as treated cows. 64.7% of dairy farms in reported withholding milk from all quarters of treated cows to prevent occurrence of antibiotic residue. Around 20 % of dairy farms used keeping records of antibiotic treatment. None of the farms used antibiotic test kit. Nearly (60%) respondents thought that antibiotic residues were of public health significance.

Table 3: The Summary of Descriptive Statistics of Herd Size and Number of Milking Cows in Debre Zeit Dairy Farms

Variable	n	Mean	Std. Deviation	95% CI for mean		Minimum	Maximum
				Lower limit	Upper limit		
Herd size	68	3.94	3.300	3.14	4.74	1	20
No of milking cows	68	3.34	2.601	2.71	3.97	1	16

n= number of samples; CI= Confidence interval

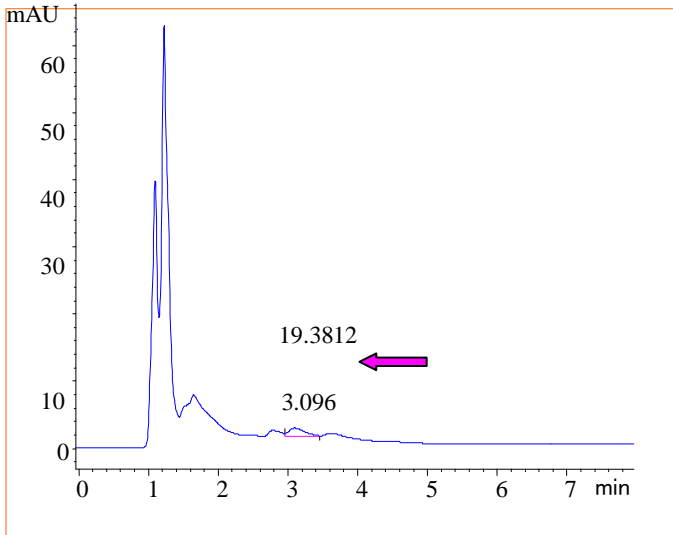
Table 3; Shows Descriptive Statistics of Herd Size and Number of Milking Cows. The Average Animals per Farm in were 3.94 Animals per Farm. The Mean Number of Milking Cows was 3.34.

Result of Quantitative Analysis by High Performance Liquid Chromatography

The samples positive for Delvotest SP assay were further analyzed by HPLC for quantification. A given sample was regarded as positive for oxytetracycline or penicillin G if its retention time and peak corresponded to that of the standard. Retention time was considered a reasonably unique identifying characteristic of a given analyte. The area inscribed by the peak is proportional to the amount of substance separated in the chromatographic system. To get the concentration of oxytetracycline or penicillin G, a reference standard of a known concentration had been injected in to the HPLC and concentration of the sample was extrapolated from the curve peak

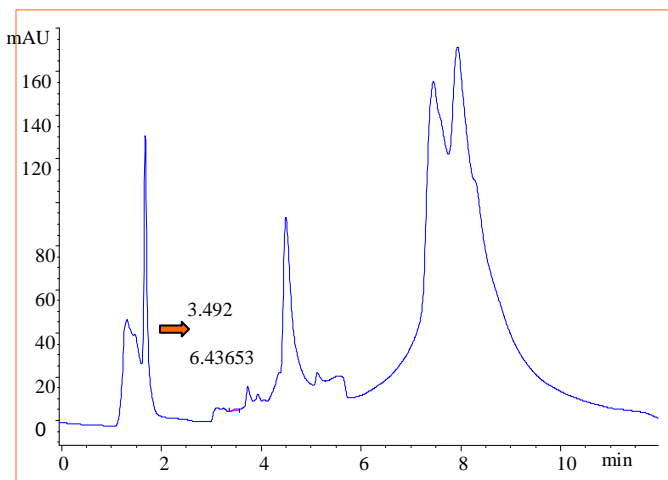
area. Chromatograms of reference standards, oxytetracycline HCl and penicillin G procaine salt and some samples those were positive for oxytetracycline and penicillin G from the dairy farms

Fig. 2 : Chromatogram of Reference Standards of Oxytetracycline HCl



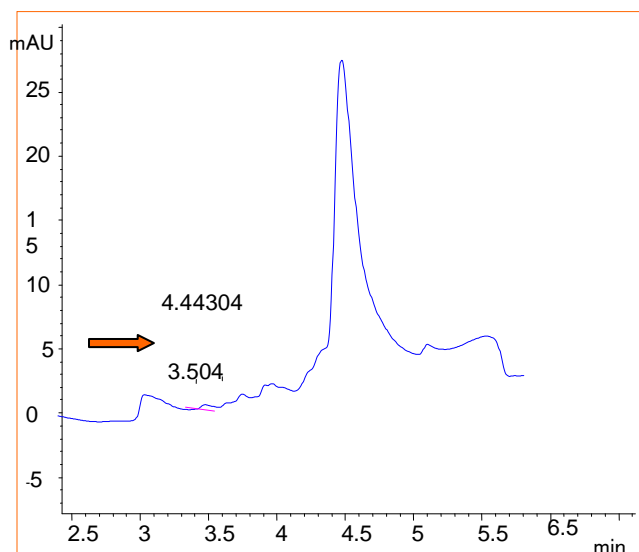
The arrows indicate the peak, peak area and its retention time.

Fig 3: Chromatograms of some Samples that were Positive for Oxytetracycline Residue



The arrows indicate the peak, peak area and its retention time

Fig 4: Chromatograms of Reference Standards of Penicillin G Procaine Salt



The range for oxytetracycline residue level was 0µg/l to 251µg/l. The range for penicillin G residue levels was 0µg/l to 47µg/l. The antibiotic residue positive samples which showed residues of oxytetracycline above MRLs were 24 (70.58%). The antibiotic residue positive samples which showed residues of penicillin G above MRLs were 7 (20.58%). The Descriptive statistics such mean, range and standard deviation of oxytetracycline and penicillin G residues are shown in Table 18. Oxytetracycline was found being present in all samples in a concentration range of 27-251µg/l.

But, no penicillin G was found in some milk samples in some dairy farms (58.8%). The concentration range of penicillin G was 0-47 µg/l.

Table 4: Summary of Descriptive Statistics of Oxytetracycline and Penicillin G Residues Concentration (µg/l) in Debre Zeit dairy farms

Antibiotics	n	Mean	Std. Deviation	95% CI for mean		Minimum	Maximum
				Lower limit	Upper limit		
Oxytetracycline	34	142.00	67.206	118.55	165.45	27	251
Penicillin G	34	4.77	10.787	1.01	8.53	0	47

n=total number of sample; CI= Confidence Interval

DISCUSSION

Out of the total 400 milk samples analyzed by Delvotest SP assay during the study period, 34(8.5%) had detectable levels of antibiotic residues. The proportion of positive samples was higher when compared to other reports elsewhere. A similar study carried out by Borges *et al.* (2000) in Brazil country reported that 4.3 % milk samples had detectable level of residue for antibiotic. The result of Rybinska *et al.* (1995) in Poland revealed that 13-22 % milk sample showed violative concentration of chemical residues. In the study undertaken by Sternesjo (1998) in Sweden, it was also indicated that 0.08-0.26% milk samples were positive for antibiotic residues which were much lower than the present study. Another study conducted by Sudershan and Bhat (1998) in India also indicated that 9% milk samples had residues of antibiotic which is comparable with the results of this study.

The occurrence of antibiotic residues may be attributed to absence of use of post milk teat dipping, milking by contract laborers and poor record keeping systems. The presence of minute amount of antibiotics in milk, as a result of therapeutic use in dairy cows, can cause a wide variety of dairy manufacturing problems, including; inadequate milk curdling or sub optimal ripening during cheese production, inadequate acidity and flavor attributes during the manufacture of butter milk, suboptimal starter culture growth, false results during quality control testing due to the presence of interfering drug metabolites (EEC, 1992).

Small dairy producers in Kenya were observed producing milk with beta-lactam residues exceeding the established maximum residue levels ([Shitandi, 2004](#)). The use of antibiotics in Sweden and Norway for mastitis treatment had been influenced by national policies and recommendations. In these countries, the preference for using beta-lactams (i.e., procaine and benzyl penicillin) was based on the withdrawal period. Dairy producers in Sweden use long-acting drug treatment for subclinical mastitis and dry cow therapy, whereas the same formulations are not accepted in Norway ([Grave *et al.*, 1999](#)). These examples indicate that antibiotic usage varies among and within countries and also between farms, depending on policies.

The questionnaire survey conducted during the study period included questions that were helpful to gain insights into farm management practices associated with antibiotic usage. In general, twenty six percent (26.09%) of the respondents used contract laborers or part-time employee for milking activities. Nearly 26.47 % of respondents reported use of part-time employee for milking activities. This finding was lower than the finding of Tesfaye (2007) at Nazareth who reported a proportion of (39.0%). However, in most cases, contract laborers were either not aware of giving much attention to the importance of hygienic conditions during milking, proper milking practices and the necessary precautionary majors while milking treated cows.

All the respondents indicated that they never practiced post milking teat dipping. Post milking teat dipping was carried out by 3.9% of the respondents in Addis Ababa dairy farms as reported by Mungube (2001). Those farms that practiced teat dipping used ammonium compounds (3.9%) and lugols iodine (5.9%). Nearly all respondents reported that they never used feed additives in their dairy farms. Branding of milking equipments was not also used.

The prevalence of mastitis at herd level was 38.2 % which is comparable with that of Workineh *et al.* (2000) who reported 25.1% in Addis Ababa. However, the present study was in higher proportion than that reported by Bishi (1998) and Munguba *et al.* (2001) who reported 5.35% and 6.6%, respectively in Addis Ababa dairy farms. In addition, the prevalence was much higher than Gizat (2004) who reported 3.9% in Bahardar. Mastitis is a complex disease and the difference in results could be due to difference in management systems among farms. The high prevalence of mastitis may be attributed to improper milking hygiene, lack of use of post milking teat dipping and practices of milking by contract laborers with different skills. Cases of metritis and enteritis in lactating cattle were 17.6% and 10.5% respectively. Cows with other types of diseases like dystocia, retained fetal membranes and various metabolic disorders are more likely to lead to metritis ([Lewis, 1997](#)).

Based on the findings of this survey, it can be inferred that antibiotics, particularly tetracyclines and penicillin G, are extensively used for prevention and treatment of diseases in dairy farms. Oxytetracycline was the first antibiotic used in most farms (46.74 %) second to penicillin (36.96 %) according to the respondents. The use of antibiotics continues to be a predominant in the treatment and control of mastitis ([Owens *et al.*, 1997](#)). Dry cow therapy was reported in 4.35% farms which was similar to that report by Mungube (2001) in Addis Ababa dairy farms. For dry cow therapy on farms, preferred drugs were cephalosporin, penicillin G procaine and cloxacillin. These antibiotics are effective in protecting against new intramammary infections ([Sol and Melenhorst, 1990](#); [Sanchez and Watts, 1999](#)).

Health services were given mostly by the practitioners coming to the farms or sometimes by taking the animals to veterinary clinics. Regular health programs by professionals were not practiced, but in general, it can be hypothesized that all farms had access to health services provided by professionals when needed. This might be due to the income they get from sale of milk that allows them to pay for the veterinary services. Twenty two percent of the farmers always sought veterinarian advice before administering antibiotics. Other than the veterinarian, antibiotics were administered primarily veterinary assistants and owner or herdsmen on 69% and 10% of farms, respectively. Only 9% of the dairy producers said that they always completed the course of antibiotic treatment by themselves. The tendency to rely on personal experience for antibiotic use, dosage, and withdrawal period was also observed in dairy producers surveyed by [Zwald *et al.* \(2004\)](#). This lapse could lead to improper antibiotic usage.

One important finding of this study was the observation that about 60% of respondents thought that antibiotic residues were of public health significance. Similarly, 78.4% of the respondents had knowledge on residue (Mungube, 2001) in Addis Ababa dairy farms. Only 20% of the farms surveyed kept records of antibiotic treatment that could be verified. [Kaneene and Ahl's \(1987\)](#) survey of dairy producers in Michigan USA indicated that insufficient record keeping and poor knowledge about drug withdrawal periods among producers were important factors leading to drug residues in milk. All respondents in all dairy farms indicated that they never used antibiotic test kit for detection of residues.

42% of respondents said that they used separate equipment for milking treated cows. Half (52%) of the respondents reported marking of separated cows. The average animals per farm was 3.94 which is in agreement with the existing reports by Devendra (2001) and Mekonnen *et al.* (2006) who reported average 4.56 animal per farm in Debre Zeit.

Milk samples that were Delvotest assay positive had detectable levels of oxytetracycline and penicillin G residues by HPLC analysis. In most countries, limits have been established for antimicrobial drug residues in food products such as milk; for instance, in the European Union (EU), the maximum residue limits (MRLs) have been set by the European Commission. FAO/WHO Expert Committee on Food Additives established MRLs for oxytetracycline and penicillin G in milk at 100 µg/l and 4 µg/l, respectively. The accurate detection of low levels of antimicrobial drug residues in milk is not only of great importance for governmental control, laboratories and the dairy industry but also for farmers to enable them to ensure that contaminated milk from individual cow is not consigned to the bulk tank (EEC, 1990).

This study revealed that out of 46 milk samples found positive for antibiotic residues, 34 (73.91%) had oxytetracycline residues and 8 (17.39%) penicillin G residues above the recommended MRLs. The mean concentration of oxytetracycline residue was 142 µg/l. For penicillin G residue, the mean concentration was equal to 4.77µg/l. Oxytetracycline was found in all milk samples collected with area-specific concentration range of 27-251µg/l. This finding was higher as compared to Zhao *et al.* (2004) who found oxytetracycline concentration within range of 13-106µg/l in USA. A study by Shitandi (2004) found out that penicillin G was the most commonly type of antibiotic residue in milk,

with levels often exceeding the maximum residue limit established in the European Union (4 µg/l). Penicillin G was not detected in 58.8 % of the milk dairy farms. The concentration range of penicillin G was 0-47 µg/l.

The presence of antibiotic residues in milk is strongly associated with several variables such as milk production at time of treatment, type and amount of antibiotic used, type of vehicle used in antibiotic formulations and the disease state of the animal (Mercer, *et al.*, 1970). Antimicrobials, anti-inflammatory and hormones are the pharmacologically active substances most used for these purposes, but an illegal or unsuitable use increases the risk of introducing harmful residues into the human food chain. Adverse effects to consumers are connected with the intrinsic toxicity of a drug and its metabolites. The use of antimicrobial agents in food animals has caused concern regarding the impact of them on human health.

The use of tetracyclines in the United States exceeds 5.6 million pounds annually (Mellon and Benbrook, 2001). The main applications of tetracyclines in animal husbandry are for prophylaxis of bacterial infections and increase in growth rates. Although the public health risks are difficult to define, it is accepted that antimicrobial drug residues may induce allergic reactions in sensitized individuals and may have negative effects on the composition of the human intestinal flora. In general, the excessive use of antimicrobials has led to the development of multi-drug resistance in animal and human pathogens (Sarmah, Meyer and Boxall, 2006). Furthermore, milk contaminated with even low concentrations of antimicrobial drug residues may also create problems in the production of fermented milk by products, because such compounds inhibit the growth of the starter cultures.

The study also showed that oxytetracycline and penicillin are imprudently used in those areas which are the basic means for treatment of many diseases. As a result, these drugs will be out of use in the near future due to treatment failures by creating resistance to many species of bacteria even to those species which are isolated for the first time in Ethiopia; for example, *S. Braenderup*, *S. Hall* (Becker *et al.*, 1996).

Suspicious carcinogenicity of growth-promoting agents has prompted the European Union (EU) to ban the use of these compounds and to forbid the importation of meat and milk products from countries that authorize their use for fattening purposes. Therefore, drug residues remain very significant from the prospective of international trade and consumer confidence, because it results in international trade barrier (Kanneene and Miller, 1997). To increase considerable foreign currency, milk and milk products need to be exported, the requirement by World Trade Organization (WTO) and Codex Alimentarius Commission (CAC) should be adhered. One of the requirements is that antimicrobial residues in food should be below MRLs. But, the indiscriminate use of veterinary drugs can hinder the country's interest to fulfill the need to export to those WTO member countries. Therefore, attempts should be made to reduce the magnitude of the problem at various levels through the prudent use of antimicrobials such as oxytetracycline and penicillin G. Awareness need to be created at different levels including controlling authorities, concerned organizations and the consumers.

CONCLUSION

This study showed higher prevalence and amount of oxytetracycline and penicillin G residues in Debre Zeit dairy farm and lack of proper management and awareness of the people were the major contributing factors. The antibiotic screening tests should be provided to be used by dairy producers, milk processors and veterinarians to ensure the production of antibiotic residue-free milk. And the use of effective enforcement of their standards is essential to fulfill the objective of consumer providing them with safe and wholesome milk and milk products.

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THE EFFECTIVENESS OF LEADERSHIP, PERFORMANCE AND EMPLOYEE INVOLVEMENT FOR PRODUCING COMPETITIVE ADVANTAGE WITH A TQM ORIENTATION: A CONCEPTUAL FRAMEWORK.

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Abstract

This paper endeavours at establishing the implication of TQM for achieving competitive advantage. The manuscript exemplifies the role played by three major facets with relation to TQM. These three foremost areas are effective leadership, employee involvement and performance management. TQM cannot be implemented suitably without the effective leadership provided by the top management. The top management is in charge for the strategic goal setting for the organization and to motivate the employees for implementing the goals. At the same time performance management is another vital area for TQM implementation as it manages and measures the performance of each employee relative to the corporate goals of the organization. Moreover without involving the employees in the decision making process TQM cannot be executed. Employees are the one who transform the written strategies into practical forms so involving them in the decision making will enhance their motivation and interest to perform the specific task. For successful TQM execution organizations need to focus on these three areas with respect of attaining competitive advantage in this dynamic business era and continuously evolving customer needs.

Keywords: Leadership, Employee Involvement, Performance Management, TQM, Competitive Advantage

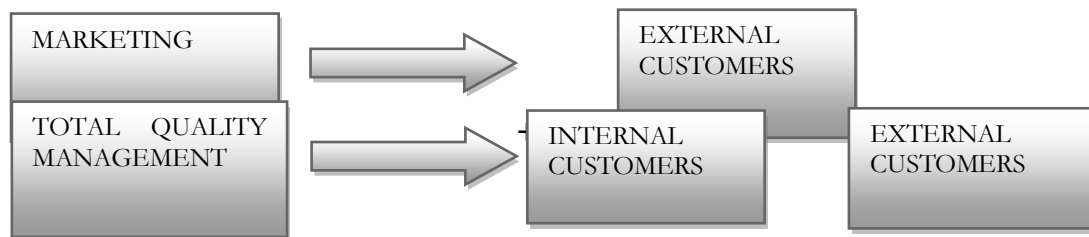
INTRODUCTION

The business era today is totally different as it was in the past. Now the customers are becoming more demanding and their views are changing and moving. With the changes in the technology the needs of the customers are also evolving. Now the new products are launched in the market at very quick rate. The companies need to provide superior quality to gain customer satisfaction and customer loyalty. Continuous improvement to gain quality is the regular concern of the employees of result oriented organizations not a reaction towards competition (El-Khawas, 2001; Miven, 2005). Initially only selling product was important but now companies are achieving excellence by selling a unique brand image and then retaining the customer by providing fine quality services to fulfil the changing needs of the customers. Hence the organizational development hinges upon the work and the interest of the employees, the leader's capability to mould the internal organization according to external environment and the performance of the employees influencing the overall performance of the organization.

The importance of quality cannot be denied as it improves the entire functions and operations of the organization leading towards superior performance which eventually provides customer satisfaction enhancing the competitive advantage. Quality management should be there in each functional area with a 360° evaluation to maintain and provide quality at each step of the process. Therefore quality should not only be limited to products and services but must be ensured throughout the whole network involved in fabricating the products and the services with the complete involvement of top, middle and lower management (Drăgulănescu, 2007). It depicts that

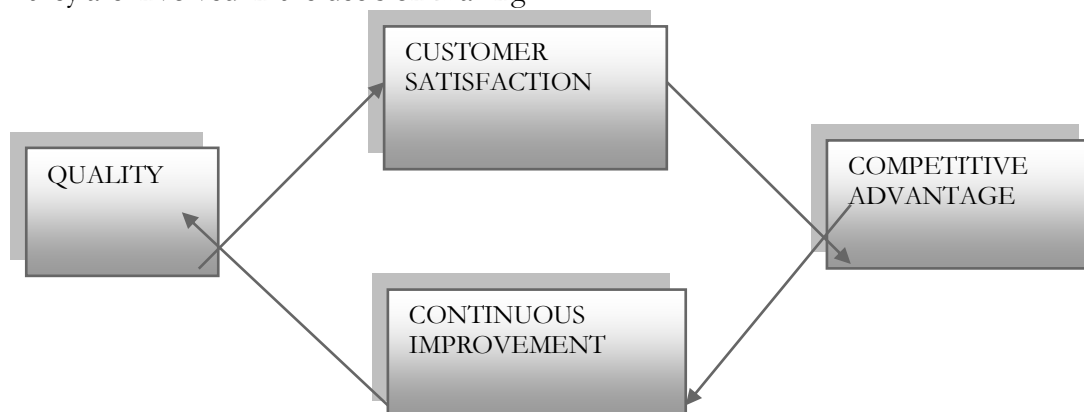
involvement of each department is mandatory in bringing into being the quality work, operations, services and products.

Process and performance improvement should be made on continuous bases and the fulfilment of performance expectations is quality. For this purpose performance should be managed and appraised. Performance evaluation provides many advantages (Cole, 2001; Evans and Lindsay, 2005) such as good team work, organizational development, risk mitigation and leads towards standardization of growth. The top management is responsible for decision making and providing leadership and guidance where as the middle and the lower management are responsible for implementing and performing the tasks given by the top management. The task performance of the employees depend upon their level of satisfaction and motivation therefore the needs and the demands of the employees i.e. the internal customers must be fulfilled for better and improved performance which will trigger up the quality of overall work performance. Companies should understand that quality cannot be achieved until both the internal and the external customers are satisfied.



Through excellent and strategic leadership organizations analyses its strengths, weaknesses, opportunities and threats. Effective leadership influences the quality and the growth of the organization by bringing in new techniques, structural reformation, training and workshops to provide timely knowledge, skills and to pinpoint and immediate rectification of errors, empowerment, customer care and minimizing the risks to gain competitive edge. This competitive advantage can only be retained by continuous quality management and continuous improvement to make the customers satisfied and loyal.

TQM implementation is not possible without employee involvement because it is the employee who makes up the organization not the land, capital or assets. An organization would be as good and effective as the people it has employed. Unless the employees buy the ideas, are motivated and convinced they cannot work well for the organization. Employee involvement should not be cosmetic. Performance of the employees and the task achievement also hinges upon the extent to which they are involved in the decision making.



Quality actually results in an amalgam of continuous improvement and customer satisfaction and both these elements results in competitive advantage. Manufacturer is no one to decide what quality is. He just has to search the customer's opinion to produce a product meeting the customer's demands. Quality is therefore a customer definition of what a product or service should or should not be. Innovation, effective planning, continuous improvement, employee involvement and motivation are fundamental for producing quality. Quality is not a one way passage but deals in every level of organization and is maintained and managed at every point.

LITERATURE REVIEW

Enormous range of literature is found on the significance of leadership, performance management and employee involvement in context of TQM for gaining the competitive benefit. Constant, clear and quality **leadership** is necessary for success (Everett, 2002; Buch & River, 2002). Therefore it is required that quality leadership should be deemed as a strategic aim of the organization (Feigenbaum 1991). Quality in today's era is the continuous improvement therefore needs change at continuous basis. Change cannot be carried out without effective leadership which provides steadfastness and persistence against the confrontation to the change inside an organization (Thompson, 1967). The importance of effective leaders is enhanced with the increasing trend of TQM as it is recognised by the quality awards, ISO and the quality gurus of the world. Quality gurus have different views regarding the leadership. Leader is the one who embeds leadership rather than just supervising in making over the business values (Deming, 1986), assume and drive in leadership in gaining quality and quality control (Ishikawa, 1985), personal grip, commitment and involvement in managing the quality (Juran, 1993; kano, 1993), who implants principles and ideas rather than controlling by swine forces (James, 1978), leadership can be learnt through experience and is learnable with a bulging outcome on quality (Crosby, 1997). Therefore leaders provide an encouraging atmosphere to perk up the performance and efficiency of the followers (Leiter & Maslach, 2002).

The most important way of recognising the real meaning of effective leadership is learning from the experience of successful organizations (Zairi, 1999a). Effective leadership requires five major characteristics described by Oakland (2000), mission statement, effective strategies, critical success factors, and apposite management structure and employee involvement. Therefore it is imperative for the organizations to maintain effective and visionary leadership to motivate its whole task force, promote and protect the organizational standards and reinforce the followers to attain the collective vision and goals.

Performance management of the employees impacts the whole performance and the efficiency of the organization. What is performance and what is performance management, this a basic question which should be responded by the performance managers. Performance is considered as being undertaking the job and about the results being accomplished after performing some work (Otley, 1999). If you are unable to define the performance, then you are unable to manage it (Armstrong and Baron, 1998).

Different authors have different understanding regarding the term performance management. Organizing the work to attain the best outcomes, with this simplest of notion performance management cannot be regarded as system or tool rather an entirety of all the routine and daily activities of the managers (Fowler, 1990). Performance management is an interlocking array of strategies and exercises that focus on the enhancing the accomplishment of the corporate aims through concentrating on the individual performances (Storey & Sission, 1993). A more organizational version of performance management was provided by Fletcher & Williams (1992), the performance management aims at creating a shared vision for achieving the organizational goals while making the employees understands their contribution and at the same time managing, evaluating and enhancing the performance of the employees as well as the organization.

Performance is referred to as the result of work as it presents a strapping linkage to the strategic goals, the customer satisfaction and the profitable offerings (Rogers, 1994). Performance management is actually an efficient, systematic and assimilated approach for improving the performance of the organization to attain the corporate goals and encouraging the organizational values (Edis, 1995). According to Rogers (1994), it is an integrated lay down of forecasting and re-examine the procedures cascading down throughout the organization to create a linkage among the individual goals and the overall corporate strategy. Performance management actually adds value to the organizational performance (Slater et al., 1998). Value addition is maximized through performance and quality management process as the primary expenditure surpasses the following benefits drawn after the deliverance (Horton and Farnham, 1999). Superior productivity that is a dimension of performance can only be gained through people (Handy, 1976). Therefore high performance should be rewarded and the employees should be motivated and poor performance should not be endured

PERFORMANCE MANAGEMENT APPROACH

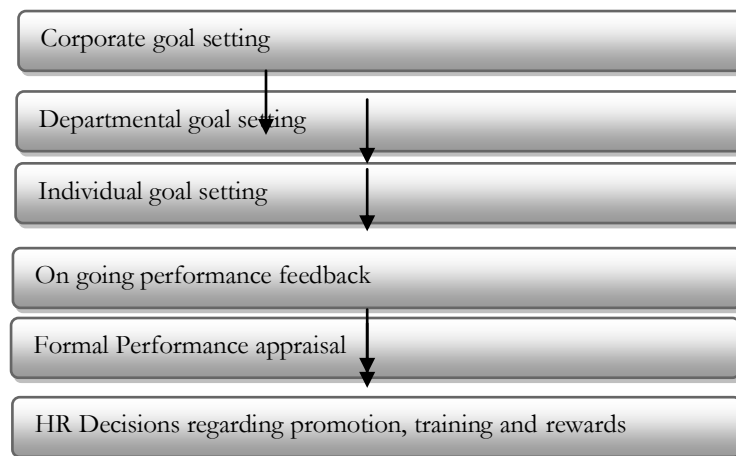


Fig. 1

Employee involvement should be considered while decisions making as the employees have to implement the decisions. Managers should create a participative climate by sharing the information and involving the employees in decision making (Tesluck et al., 1999; Wanous et al., 2000). Encouraging the employees to express their ideas relating to work concerns is the practice of information sharing (Cabrera et al., 2003).

Research suggests that perceptions of employees regarding a participative environment effect the job satisfaction and performance of the employee (Miller & Monge, 1986). When employees are involved in decision making process they recognize the underlying principle for them which results in high motivation and efforts (Wagner et al., 1997). Employee involvement results in superior quality decisions which produce encouraging organizational and personal outcomes (Parnell et al., 1992). Employee involvement in decision making focuses on fairness of authority in the workplace (Locke & Schweiger, 1979) and the perceptions of employees regarding fairness are enhanced by involvement in decision making (Korsgaard & Roberson, 1995), especially when the employees prefer to participate in decision making process (Tjosvold, 1985) when the decisions mainly have an impact on their respective positions (Gardell, 1977). This means that management must hand over some of its power regarding decision making giving the employees an opportunity to contribute and assist in determining the output (Strauss, 1998). Employee involvement depicts the belief of an employee considering his individuality or value in the work assembly (Bandura, 1982,

1986; Stryker, 1986). Employee involvement is described in process orientation but it can be referred to as a motivational system (Leonard et al., 1995) or a participative organization (Scarselletta, 1999).

According to Lawler (1986), employee involvement consists of four distinct processes i.e. knowledge, power, information and rewards. Rewards play a vital role when attached to the performance of the employee (Lawler, 1986; Vandenberg, 1996). Involvement appears to be an amalgam of diverse programmes such as total quality management (Bowen & Lawler, 1992).

According to European Foundation for Quality management (1999) the top management leadership, commitment, people management, policy and strategy, partnership, resource and process management are called the enablers of employee and customer satisfaction. Advancements in TQM concepts have been made by Saraph et al., (1989) whereas theoretical advancements on TQM and leadership are made by Waldman (1993). According to Sashkin & kiser (1991) TQM means that the culture of the organization should be defined by and support the customer satisfaction through integrated set of tools and techniques involving continuous improvement resulting in superior quality outputs. TQM implementation focuses on continuous improvement programmes and customer management systems without considering the organizational cultures which probably is not suitable for proper TQM implementation (Bushe, 1988; Garvin, 1986). TQM is an approach aiming at enhanced effort from every person in the organization to continually satisfy the customers (McAdam et al., 2002).

According to Stalk et al., (1992) TQM is related to the clarity of the quality objectives determining the efficacy of the organization whereas Kanji (1990) described TQM as to attain overall quality by engaging the commitment of every individual. According to Oakland (1993) TQM is an effort to perk up the entire organization's efficacy, competitiveness and structure. Dale (1999) believed that TQM is a joint collaboration of every person in the company and the related business activities for producing products and services meeting and exceeding the customer expectations. Successful TQM implementation is not possible without top management commitment Ramirez and Loney (1993)

According to Morgan and Murgatroyd (1997), the "total" component of TQM entails that each and every member of the organization is involved in quality improvement activities and practices. Moreover, Oakland (1989) points out that TQM is actually an approach or a way for organizing and involving the entire organization, each functional department, every process and activity and each individual working at any rank.

The relation between TQM and Competitive advantage cannot be denied as the companies successfully implementing the TQM approach are much likely to gain competitive advantage through customer satisfaction and are able to retain it through the process of continuous improvement. Woodruff (1997) suggested that companies should create a customer value hierarchy determined to line up their competencies with the looked-for worth the customer expect from the product or service. There are different causes of competitive advantage given in the literature. A firm can gain competitive advantage by having a good and healthy status (Hall, 1992), by describing commitment (Caves and Ghemawat, 1992; Ghemawat, 1991), by comprising superior quality knowledge and understanding of performing different business activities while eradicating the expenses (Teece et al., 1997; winter, 1987; Prahalad and Hamel, 1990), by having an approach of dynamic and vibrant capabilities (Teece et al., 1997) and through alignment of the organizational resources with the customers needs and demands (Seggie & Griffith 2008).

This vast array of previous literature depicts that organizations need to be very careful in providing effective leadership to their management and employees, involve all the employees in decision making and manage the performance of the employees with respect to the overall strategic goals of the organization for proper TQM implementation with the aim of achieving competitive advantage by providing superior value to the customers.

THEORETICAL FRAMEWORK:

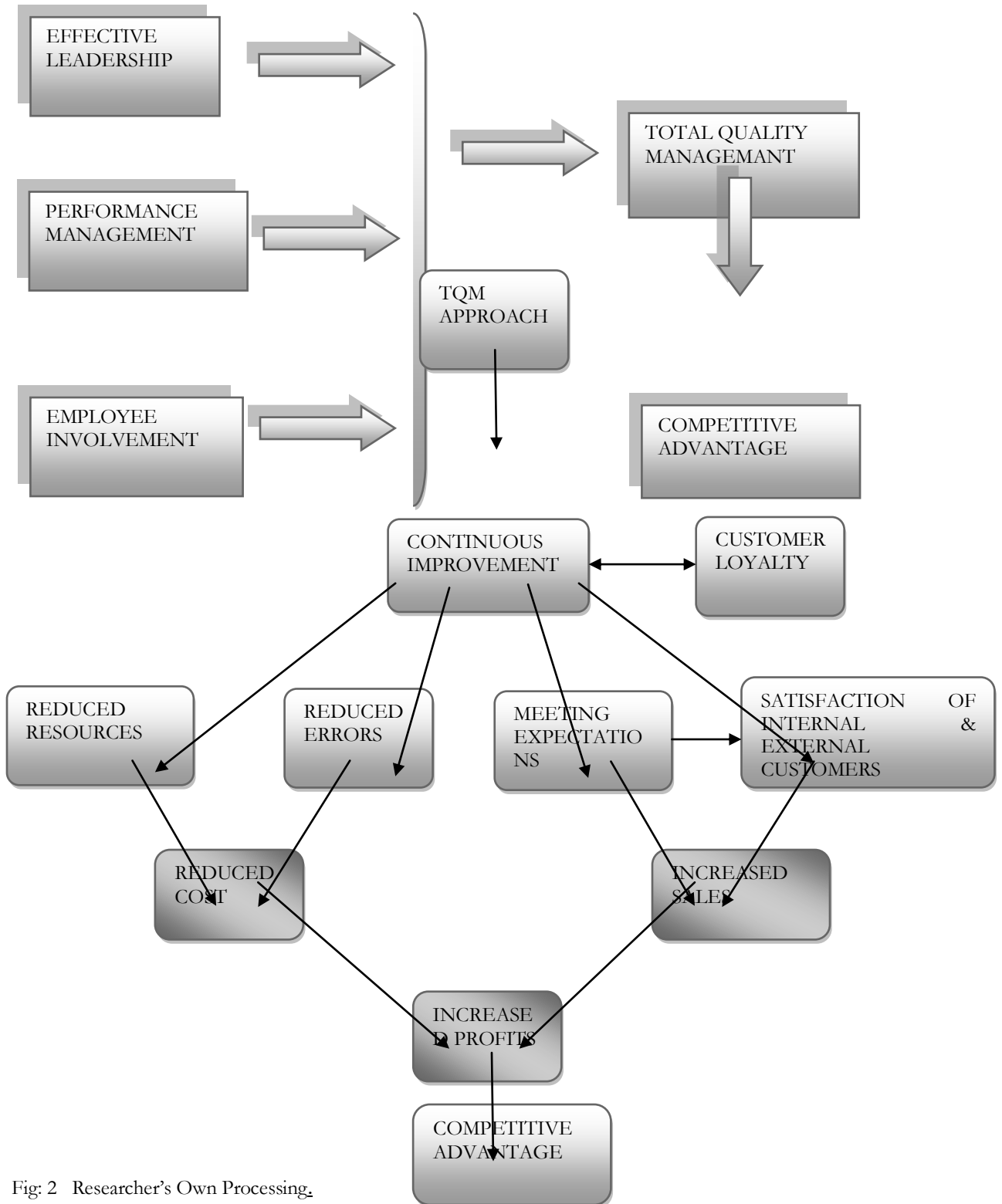


Fig. 2 Researcher's Own Processing.

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EFFECT OF GREEN MANURING JANTAR (*SESBANIA ACCULATA*. L.) ON THE GROWTH AND YIELD OF CROPS GROWN IN WHEAT-BASED CROPPING SYSTEMS

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Abstract

A proposed field study of wheat-based cropping systems was conducted at Faisalabad (Post-Graduate Research Station). We used 7 treatments and Jantar as a green manuring crop to increase the fertility status of soil; after the vegetative phases of wheat, rice, sorghum, and mungbean, the agronomic parameters of these crops were recorded. Hopefully all increased with jantar treatment when compared with controls. The benefit:cost ratio and physicochemical characteristics of the soil before and after the crop harvest were also calculated.

Key words: Wheat-Based Cropping Systems, Jantar Treatment, Benefit:Cost Ratio, Physicochemical Characteristics

INTRODUCTION

The fertility of soils in Pakistan is decreasing due to intensive cultivation of crops and the use of nutritional elements in low quantities. Deficiencies in different crop growth elements have been reported by many groups (Kouyate et al., 2000, Shah et al., 2000.) Adding inorganic fertilizers is a good way of correcting the deficiency of nutritional elements, but they not only add to the cost of production but often are not available to meet the demands of farmers. Although the fertilizers are very effective in increasing yield, they may deteriorate the soil structure and pollute the groundwater. In addition, chemical fertilizers are expensive due to the energy crisis and are unavailable to many farmers, particularly in developing countries. In this situation, green manure can serve as a cheaper source of plant nutrition and has become popular with farmers. Green manuring is the process of growing leguminous crops and ploughing the same in soil. On decomposition, it results in increased soil fertility. At the same time, improving the organic matter content of soil also improves its water-holding capacity, aeration, colloidal complex, and hence its ability to retain nutrients.

The soils of Pakistan are generally low in organic matter due to higher decomposition rates and low addition of organic residues in the soil, because green manuring is practiced at a very low scale. Biological nitrogen fixation by some legumes and their incorporation into the soil as green manure can substitute for artificial fertilizers, which will not only reduce the cost of production but also maintain and improve the fertility of the soil. Jantar is a very suitable crop for this purpose and can be adjusted in the present cropping system (Aulakh et al., 2001). Soil productivity can be enhanced through the utilization of organic matter and green manuring (Singh and Singh, 200

In Pakistan wheat-cotton, wheat-rice, wheat-pulses, and wheat-summer fodders are the major cropping systems that are adopted by the farming community. In the districts of Sialkot, Gujranwala, Sheikhupura, Lahore, Kasur, and Gujrat, the most prevalent cropping system is rice-

wheat. In these districts, about 73% of wheat is rotated with rice, followed by wheat-cotton, wheat-summer pulses, and wheat-summer fodders. These cropping systems are exhaustive and deplete soil fertility by deteriorating its physical, chemical, and biological properties. Therefore, there is a need to replenish the soil by adding a green manure crop in these cropping systems and adding crop residues in the soil. Thus, this study examined the effects of jantar as a green manure crop in wheat-based cropping systems

MATERIALS AND METHODS

The proposed study was conducted at the Postgraduate Agricultural Research Station (PARS), University of Agriculture, Faisalabad, on sandy clay loam soil. Wheat crop of rabi was harvested with a combine harvester. Jantar crop was sown as the green manure crop, as the relay crop in treatments T₃, T₅, and T₇, and as the sequence crop in T₂, T₄, and T₆. The various kharif crops were planted after rotavating the Jantar crop according to the treatment schedule during the kharif season. Yield and yield parameters of these crops were recorded. In the following rabi season, wheat was planted in all cropping systems. The effects of green manuring and the kharif crops on wheat planted during the following rabi season were studied.

Rice, mungbean, and sorghum were sown as a sequential pattern after wheat. The experiment was set up in randomized, complete block design with three replications. The net plot size was 12 m. A physicochemical analysis of the soil before green manure crop and after completion of the crop rotation was carried out.

The experiment comprised the following treatments/crop rotations:

- T1 = Wheat-rice-wheat
- T2 = Wheat-jantar-rice-wheat
- T3 = Wheat/jantar-rice-wheat
- T4 = Wheat-jantar-sorghum-wheat
- T5 = Wheat/jantar-sorghum-wheat
- T6 = Wheat-jantar-mungbean-wheat
- T7 = Wheat/jantar-mungbean-wheat

Wheat/Jantar refers to the relay cropping of jantar in wheat, while wheat-jantar indicates the sowing of jantar in sequence after the wheat harvest. Crops in the proposed cropping sequence above were sown per their recommended sowing times. All agronomic practices for raising these crops were applied uniformly. Crops were harvested when they attained their physiological maturity. However, jantar was ploughed up at the blooming stage as green manure crop. The following observations on the growth and yield parameters of the crops were taken made per standard procedures:

PROCEDURES FOR TAKING OBSERVATIONS

The procedures used for recording observations on different parameters of the component crop were as follows.

WHEAT

1. Plant Height at Maturity (cm)

Ten tillers were selected at random from each plot at harvest. Their heights were measured, recorded, and then averaged.

i. Number of plants per m²

An area of one square meter was marked at random at three different locations in each plot and, the number of plants was counted.

ii. Number of tillers per m²

All the tillers, whether bearing spikes or not, in a unit area of one square meter were counted and recorded from every plot randomly at harvest.

iii. Number of productive tillers per m²

The number of spike-bearing tillers in a unit area of one m² was counted from three sites randomly and then averaged.

iv. Number of grains per spike

Ten spikes from each plot were taken randomly. They were threshed by hand, and their grains were counted and averaged to calculate grains per spike.

v. 1000-grain weight (g)

1000 grains were taken at random from a lot of each plot by counting and weighing.

vi. Grain yield (t ha⁻¹)

Grain yield was recorded on a net plot basis in kg and then calculated in tones per hectare.

vii. Straw yield (t ha⁻¹)

Straw yield was calculated by subtracting the grain yield from biological yield.

viii. Harvest index (%)

Harvest index (H.I) for each treatment was computed using the following formula:

$$\text{H.I.} = \frac{\text{Economic Yield} \times 100}{\text{Biological yield}}$$

RICE

i. Plant height at maturity (cm).

Ten plants from each plot were selected randomly. The height of each plant was measured with a meter rod, and the average was calculated.

ii. Number of plants per m².

The number of plants from a unit area of one square meter of each plot was counted after complete germination.

iii. Number of tillers per plants.

The number of tillers per plant was counted by selecting 10 plants randomly from each plot.

iv. Number of panicle-bearing tillers per m².

Of the total number of tillers per unit area in each plot, the panicle-bearing tillers were sorted out, counted, and then calculated on a per-m² basis.

v. Number of spikelets per panicle.

Ten panicles were randomly selected from different plants, and the number of spikelets was calculated.

vi. 1000-kernal weight (g).

Three samples of 1000 grains from each paddy lot of each plot were taken and weighed, and the average 1000-grain weight was calculated.

vii. Paddy yield (t ha⁻¹)

Paddy yield was recorded in kg per plot and then converted into t ha⁻¹.

viii. Straw yield (t ha⁻¹)

Straw yield was recorded in kg per plot and then converted into t ha⁻¹.

ix. Harvest index (%)

Harvest index was calculated using the following formula:

$$\text{H.I.} = \frac{\text{Paddy yield}}{\text{Biological yield}} \times 100$$

MUNGBEAN

i. Number of plants m⁻².

It represents the number of growing plants per square meter at harvest. It was calculated by counting the number of plants from two 1-meter rows from each subplot at three randomly selected places and converting it to the number of plants m⁻².

ii. Number of pods per plants.

The total number of pods of 20 randomly selected plants from each subplot was counted, and their average was calculated.

iii. Number of seeds per pod.

Total number of pods removed from 20 randomly selected plants was threshed, and the grains were counted and averaged.

iv. 1000-seed weight (g)

Three samples of 1000 seeds were taken from each subplot, their weight was recorded separately with an electrical balance, and the average values were computed.

v. Seed yield (t ha⁻¹)

After harvesting and sun-drying, threshing was done manually. Sun-dried bundles from each experimental plot were mechanically threshed to determine grain yield and converted into t ha⁻¹.

vi. Straw yield (t ha⁻¹)

Straw yield was recorded in kg per plot and converted into t ha⁻¹.

vii. Harvest index (%)

Harvest index (H.I.) for each plot was computed by the following formula.

$$\text{H.I.} = \frac{\text{Economic Yield}}{\text{Biological yield}} \times 100$$

SORGHUM

- i. **Number of plants m⁻².**
The number of plants was counted in one square meter at three randomly selected places in each plot, and the averages were calculated.
- ii. **Plant height at maturity (cm).**
The plants were randomly selected from each plot; their height was measured from the base to the tip of the highest leaf with a measuring tap, and their averages were calculated.
- iii. **Fodder yield (t ha⁻¹)**
All pots of each replication were harvested, weighed separately to obtain the yield in kg plot⁻¹, and converted to tones ha⁻¹.

Economic Analysis

The cost of production for each cropping system was calculated to determine the net returns.

1. Net income (Rs. Ha⁻¹)

Net income was calculated as

$$\text{Net income} = \text{Gross income} - \text{Cost of production}$$

2. Benefit cost ratio

Benefit cost ratio was calculated as

$$\text{BCR} = \frac{\text{Net income}}{\text{Total Cost}}$$

Physicochemical analysis of soil

The physical and chemical properties of soil were determined per standard methods (Nelson and Sommers, 1982).

Macro- and micronutrients in soil

Soil samples, 5 g each, were collected from the experimental pots at a uniform depth of 5 cm, suspended in 50 ml of distilled water, stirred continuously for 20 min, and filtered. The filtrate was used for the analysis.

Electrical conductivity

Five grams of soil was mixed with 50 ml distilled water and stirred for 1 h. The suspension was left overnight to allow the soil to settle to the bottom. The electrical conductivity of the supernatant was determined using an Ec meter.

Soil pH

Soil samples (25 g each) were placed in 100 ml beakers, each filled with 25 ml of distilled water, and stirred for 10 min before recording the pH (Recommended soil chemical test procedure, 1988).

Moisture content

Soil samples (20 g each) were taken from a uniform depth of 5 cm. The fresh weight of the samples was recorded. Dry weight was determined after drying the soil in an oven for 72 h at 70°C to a constant weight, and the moisture percentage was calculated.

Fresh weight and dry weight

The fresh weight of the seedlings was recorded upon harvest. Dry weight was recorded after drying the seedlings in an oven at 70°C for 24 h.

Determination of nitrogen, phosphorus, potassium, calcium, magnesium, iron, and manganese

Nitrate-nitrogen was determined per Soltanpour and Schwab (1977); K, Mg, Mn, and Ca were extracted from the soil sample, as described by Mehlich (1953 and 1984); and concentrations of Fe, Mg, Mn, and Zn were determined using an atomic absorption spectrophotometer (Shimadzu, AA-670). Solutions for the spectrophotometry were prepared per Whitney (1988).

Statistical analysis

The data was analyzed statistically using Fisher's analysis of variance technique, and the treatment means were compared using the least significant difference (LSD) test at a 0.05 probability level (Steel and Torrie, 1984).

RESULTS AND DISCUSSION

Various cropping systems were studied at PARS. Wheat crop of rabi was the harvester. Jantar crop was sown as the green manure crop; as the relay crop in treatments T3, T5, and T7; and as the sequence crop in T2, T4, and T6. The various kharif crops were planted after rotavating the jantar crop according to the treatment schedule during the kharif season. The yield and yield parameters of these crops were recorded. In the following rabi season, wheat was planted in all cropping systems. The effects of the green manuring and the kharif crops on wheat that was planted during the following rabi season were studied.

The data on yield and yield parameters of this wheat crop were recorded and are discussed below.

1). Plant height at maturity (cm). The data regarding plant height are presented in Table 1. The plant height of wheat was affected significantly by various planting systems. A maximum plant height of 85 cm was recorded in the wheat/jantar-rice wheat (T3) cropping system. All cropping systems except, T1 (Wheat-rice wheat) and T5 (wheat/jantar-sorghum-wheat), yielded similar plant heights. The lowest plant height (80.5 cm) was on par with the T5 (wheat/jantar-sorghum-wheat) cropping system. The higher plant height in the wheat/jantar-rice-wheat (T3) system was attributed to the favorable effect of green manuring and the beneficial effect of the previous crop on soil fertility. The higher plant height in this treatment might have been at the expense of nitrogen that could have been fixed by the jantar crop.

These results are consistent with those of Khan *et al.* (1968) and Saleem (1993). They reported that green manuring of soil increased the plant height of following wheat.

Table 1. Plant Height of Wheat at Maturity (cm)

S.O.V	D.F	S.S	M.S	F.R	S.E
Rep.	2	0.738	0.369	0.1864	
Treatment	6	53.452	8.909	4.490*	0.8124
Errors	12	23.762	1.980		
Total	20	77.952			

*significant

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	80.50 c
T2 wheat-jantar-rice-wheat	82.33 abc
T3 wheat/jantar-rice-wheat	85.00 a
T4 wheat-jantar-sorghum-wheat	83.67 ab
T5 wheat/jantar-sorghum-wheat	81.00 bc
T6 wheat-jantar-mungbean-wheat	84.67 a
T7 wheat/jantar-mungbean-wheat	83.00 abc
LSD	2.50

Any two means that do not share letters differ significantly at $P < 0.05$.

2). Number of plants per m⁻². The data regarding the number of plants per m⁻² are presented in Table 2. The number of plants m⁻² was not affected significantly by the various cropping systems. The highest number of plants m⁻² was recorded in the wheat-rice-wheat (T1) cropping system. The lowest number of plants m⁻² was recorded in the wheat/jantar-rice-wheat (T3) cropping system. Thus, the previous crop did not have favorable or adverse effects on seed germination, and germination depends entirely upon the seed condition and health. These results contrast those of Muzzaffar (1994), who reported that green manuring increases the number of plants m⁻².

3). Number of tillers m⁻². The data regarding the number of tiller m⁻² are shown in Table 3. The number of tillers m⁻² was affected significantly by the various planting systems. The wheat-jantar-mungbean-wheat system generated the highest number of tillers m⁻² (364.67), followed by wheat-jantar-rice-wheat (360.33), wheat-rice-wheat (357.67), T1 (357.67), T5 (355.67), and T7 (357.00). The lowest number of tillers (352.00) was recorded in the wheat-jantar-sorghum-wheat cropping system, because in that season, the sorghum was comparatively exhaustive, which might have depleted the soil fertility; thus, the following wheat crop suffered from a lack of nutrition, resulting in a lower number of tillers. These results are consistent with Khan *et al.* (1968), who reported that green manuring increases the number of tillers m⁻².

Table 2. Number of plants m⁻² of wheat per cropping system

S.O.V	D.F	ANOVA				S.E
		S.S	M.S	F.R		
Rep.	2	1207.238	603.619	1.7298		
Treatment	6	649.143	108.190	0.3100NS	10.7851	
Errors	12	4187.429	348.952			
Total	20	6043.810				

NS=NON SIGNIFANT

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	229.33
T2 wheat-jantar-rice-wheat	221.33

T3	wheat/jantar-rice-wheat	210.33
T4	wheat-jantar-sorghum-wheat	214.00
T5	wheat/jantar-sorghum-wheat	221.00
T6	wheat-jantar-mungbean-wheat	219.67
T7	wheat/jantar-mungbean-wheat	219.00

Table 3. Number of Tillers M² of Wheat Per Cropping System

ANOVA					
S.O.V	D.F	S.S	M.S	F.R	S.E
Rep.	2	40.667	20.333	7.6250	
Treatment	6	316.000	52.667	19.7500**	0.9428
Errors	12	32.000	2.667		
Total	20	388.667			

**significant

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	357.67 bc
T2 wheat-jantar-rice-wheat	360.33 b
T3 wheat/jantar-rice-wheat	354.00 de
T4 wheat-jantar-sorghum-wheat	352.00 e
T5 wheat/jantar-sorghum-wheat	355.67 cd
T6 wheat-jantar-mungbean-wheat	364.67 a
T7 wheat/jantar-mungbean-wheat	357.00 cd
LSD	2.91

Any two means that do not share letters differ significantly at P<0.05

4. Number of productive tillers m⁻² of wheat. The number of productive tillers m⁻² is a key component of the yield of wheat. The data regarding the number of productive tillers m⁻² of wheat are shown in Table 4 and Figure 6. The number of productive tillers m⁻² was affected significantly. The wheat/jantar-sorghum-wheat system effected an increase in the number of productive tillers m⁻² (252.67), followed by the wheat-jantar-mungbean-wheat (T6) system (236.67). The wheat-jantar-rice-wheat (T2) and wheat-jantar-sorghum-wheat (T4) systems were statistically equal. The lowest number of productive tillers was in the wheat-rice-wheat system, might have been due to the depletion of soil fertility, subjecting the following wheat crop to nutrient deficiency. These results are consistent with Muzaffar (1994), who reported that green manuring increases the number of productive tillers m⁻².

Table 4. Number of Tillers M² of Wheat Per Cropping System

ANOVA					
S.O.V	D.F	S.S	M.S	F.R	S.E
Rep.	2	506.952	253.476	1.7742	
Treatment	6	7355.905	1225.984	8.5814**	6.9008
Errors	12	1714.381	142.865		
Total	20	9577.238			

**significant

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	190.67 d
T2 wheat-jantar-rice-wheat	223.00 bc
T3 wheat/jantar-rice-wheat	209.67 cd
T4 wheat-jantar-sorghum-wheat	222.00 bc
T5 wheat/jantar-sorghum-wheat	252.67 a
T6 wheat-jantar-mungbean-wheat	236.67 ab
T7 wheat/jantar-mungbean-wheat	208.67 cd
LSD	21.26

Any two means that do not share letters differ significantly at $P < 0.05$

5. Number of grains spike⁻¹. Grains per spike is an important yield component in cereals and is influenced by wheat-based cropping systems. The data Table 5 and Figure 7 demonstrate that the number of grains per spike of wheat crop was not affected significantly in various cropping systems. The number of grains spike⁻¹ varied from 41.75 to 45.67 in various plots. These results contrast those of Khan *et al.* (1968) and Goswami *et al.* (1998), who reported that green manuring increases the number of grains per spike.

6. 1000-grain weight (g). As shown in Table 6 and Figure 8, the 1000-grain weight was not significantly affected by green manuring. The wheat/jantar-sorghum-wheat (T5) system gave the highest (43.72 g) 1000-grain weight, and the wheat-jantar-rice-wheat (T2) system yielded an intermediate height. These results contrast those of Khan *et al.* (1968), who reported that the sowing of leguminous crops in wheat facilitated the development of grain weight.

Table 5. Number of Grains Spike⁻¹ of Wheat Per Cropping System

S.O.V	D.F	S.S	M.S	ANOVA	
				F.R	S.E
Rep.	2	1.505	0.753	0.1377	
Treatment	6	33.213	5.536	1.013NS	1.3496
Errors	12	65.572	5.464		
Total	20	100.290			

NS: significant.

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	44.91
T2 wheat-jantar-rice-wheat	43.44
T3 wheat/jantar-rice-wheat	41.75
T4 wheat-jantar-sorghum-wheat	45.75
T5 wheat/jantar-sorghum-wheat	45.33
T6 wheat-jantar-mungbean-wheat	45.67
T7 wheat/jantar-mungbean-wheat	45.33

Table 6. 1000-grain weight of wheat (g) by cropping system

S.O.V	D.F	S.S	M.S	ANOVA	
				F.R	S.E
Rep.	2	9.426	4.17	1.5442	
Treatment	6	12.215	2.036	0.6671NS	1.0086
Errors	12	36.624	3.052		

Total 20 58.265
 NS:significant.

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	42.76
T2 wheat-jantar-rice-wheat	41.27
T3 wheat/jantar-rice-wheat	42.04
T4 wheat-jantar-sorghum-wheat	41.48
T5 wheat/jantar-sorghum-wheat	43.72
T6 wheat-jantar-mungbean-wheat	42.40
T7 wheat/jantar-mungbean-wheat	42.52

7. Grain yield (t ha⁻¹). The final grain yield of a crop is a function of the combination of its individual yield components, which are likely to be influenced by genetic and environmental factors. The data on grain yield per hectare in Table 7 and Figure 9 were significant. The wheat-jantar-mungbean-wheat (T6) system produced the highest grain yield (5.36 t ha⁻¹), followed by the wheat/jantar-mungbean-wheat (T7) system (5.29 t ha⁻¹). The grain yields of the wheat-jantar-rice-wheat (T2), wheat/jantar-sorghum-wheat (T5), and wheat/jantar-rice-wheat (T3) systems were lower than the treatments above, but these treatments were statistically on par with each other. The grain yield of the wheat-jantar-sorghum-wheat (T4) system was 5.05 t ha⁻¹. The yields in these plots might be linked to exhaustion by the sorghum crop, which depleted the soil in the kharif season. The lowest yield was generated by the wheat-rice-wheat (T1) system (4.77 t ha⁻¹). These results are consistent with those of Somani (1990), Azam and Yousaf (1991), Swarup (1991), and Saleem (1993).

Table 7. Wheat Grain Yield (t ha⁻¹) Per Cropping System

ANOVA					
S.O.V	D.F	S.S	M.S	F.R	S.E
Rep.	2	0.000	0.000	0.0031	
Treatment	6	0.682	0.114	24.5851**	0.0393
Errors	12	0.056	0.005		
Total	20	0.738			

**Highly significant

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	4.77e
T2 wheat-jantar-rice-wheat	5.21 bc
T3 wheat/jantar-rice-wheat	5.10 cd
T4 wheat-jantar-sorghum-wheat	5.05 d
T5 wheat/jantar-sorghum-wheat	5.18 bcd
T6 wheat-jantar-mungbean-wheat	5.36 a
T7 wheat/jantar-mungbean-wheat	5.29 ab
LSD	0.13

Any two means that do not share letters differ significantly at P<0.05

8. Straw Yield . Straw yield (t ha⁻¹) is a function of the accumulated effects of growth parameters, such as tillers m⁻² and final plant height. The data on straw yield in t ha⁻¹ are shown in Table 8 and Figure 10. The straw yield of wheat was affected significantly by various cropping systems. The highest straw yield (6.98 t ha⁻¹) was generated by the wheat- jantar-mungbean-wheat (T₇) system, by the wheat/jantar-rice-wheat (T₃) system (6.91 t ha⁻¹). The wheat/jantar-sorghum-wheat

(T₅) and wheat/jantar-rice-wheat (T₂) systems had statistically similar yields. The wheat-jantar-sorghum-wheat (T₄) system effected a straw yield of 6.28 t ha⁻¹, which was on par with treatments above. The wheat-rice-wheat (T₁) cropping system had the lowest straw yield of 5.76 t ha⁻¹, likely because green manuring was not performed in this plot. These results were consistent with those of Muzaffar (1994), Zia et al. (1998), and Saleem (1993), who reported that green manuring increases the straw yield of wheat.

Table 8. Wheat Straw Yield (t ha⁻¹) Per Cropping System.

S.O.V	D.F	S.S	M.S	ANOVA	
				F.R	S.E
Rep.	2	0.001	0.001	0.8021	
Treatment	6	3.167	0.528	569.9053**	0.0176
Errors	12	0.011	0.001		
Total	20	3.180			

NS: significant

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	5.76 f
T2 wheat-jantar-rice-wheat	6.39 c
T3 wheat/jantar-rice-wheat	6.91 b
T4 wheat-jantar-sorghum-wheat	6.28 d
T5 wheat/jantar-sorghum-wheat	6.34 c
T6 wheat-jantar-mungbean-wheat	6.22 e
T7 wheat/jantar-mungbean-wheat	6.98 a
LSD	0.06
LSD	

Any two means that do not share letters differ significantly at P<0.05.

9. Harvest index (%). Harvest index indicates the productive efficiency of a crop. Higher harvest index values reflect greater efficiency and vice versa. Harvest index was affected significantly by various cropping systems. The highest harvest index (46.28%) was recorded for the wheat jantar mungbean wheat (T₆) cropping system, followed by the wheat rice wheat (T₁), wheat jantar rice wheat (T₂), wheat jantar sorghum wheat (T₄), and wheat/jantar sorghum wheat (T₅) systems (45.29, 44.96, 44.57, and 44.96, respectively) The harvest index of the wheat/jantar rice wheat (T₃) (42.46%) was statistically on par with that of the (T₇) treatment (43.11%).

The results were consistent with those of Muzaffar (1994), who investigated the effects of green manuring on wheat production in a field trial and reported that this might be due to green manuring.

Table 9. Wheat Harvest Index Per Cropping System.

Individual Comparison of Treatment Means

Treatments	Means
T1 wheat-rice-wheat	45.29 b
T2 wheat-jantar-rice-wheat	44.96 b
T3 wheat/jantar-rice-wheat	42.46 d
T4 wheat-jantar-sorghum-wheat	44.57 bc
T5 wheat/jantar-sorghum-wheat	49.96 b

T6	wheat-jantar-mungbean-wheat	46.28 a
T7	wheat/jantar-mungbean-wheat	43.11 b
LSD		0.71

Any two means that do not share letters differ significantly at $P < 0.05$.

Benefit-Cost Ratio of Different Wheat-Based Cropping Systems

The benefit-cost ratios of various cropping systems were calculated and are shown in Table 13. Consequently, net return and BCR were calculated. The T_3 treatment (wheat/jantar-rice-wheat) generated the highest benefit-cost ratio (1.39), followed by the T_2 (wheat-jantar-rice-wheat) (1.37), T_1 (wheat-rice-wheat) (1.33), and T_5 (wheat/jantar-wheat) (1.16) systems. The T_7 (wheat/jantar-mungbean-wheat) and T_4 (wheatjantar-sorghum-wheat) cropping systems generated a BCR of 1.12.

The T_3 (wheat/jantar-rice-wheat) system yielded a net return of Rs. 31360.45 ha^{-1} and a benefit-cost ratio of 1.39. The second-most profitable cropping system was T_2 (wheat-jantar-rice-wheat) generate a net return of Rs. 30401.85 ha^{-1} and a benefit-cost ratio of 1.37. The lowest net return was observed in the T_1 (wheat-rice-wheat) cropping system (Rs. 24721.8 ha^{-1} and and a benefit-cost ratio of 1.33).

There were two sorghum-based cropping systems two treatments, T_4 (wheat-jantar-sorghum-whet) and T_5 (wheat/jantar-sorghum-wheat), which were were compared with each other. The relay cropped jantar (wheat/jantar-sorghum-wheat) gave a higher net return (Rs. 11937.38 ha^{-1}) and benefit-cost ratio of 1.16 than the sequential cropping T_4 (wheat-jantar-sorghum-wheat) system, which gave a net return of Rs. 9415/- ha^{-1} ; thus, the sorghum-based cropping systems with relay cropping of jantar were better. The T_7 mungbean-based cropping system (wheat/jantar-mungbean-wheat) gave a net return of Rs. 9311/- ha^{-1} and a BCR of 1.13, higher than those of T_6 (wheat jantar mungbean wheat) (Rs. 8837.63 ha^{-1} and 1.122).

Yield and Yield Parameters of Various Kharif Crops in Various Cropping Systems.

The following Kharif crops were grown during the Kharif season, planted after the green manuring of Jantar. All crops were sown at their proper showing times. All inputs for these crops were applied at their recommended rates. The data on yield and yield parameters were recorded and are shown in Table 10.

Rice

Rice was transplanted on July and harvested on November 10 in the first three treatments. The yield and yield parameters were recorded and are discussed below:

1. **Plan height at maturity (cm).** Plant height at maturity in these treatments ranged from 76.68-80.40 cm. The wheat/jantar- rice-wheat (T_3) system generated the highest plant height (80.40 cm), and the wheat-rice-wheat (T_1) system had the lowest (76.68 cm).

Table 10: Yield and Yield Parameters of Various Kharif Crops in various Cropping Systems.

Treatments	Plant height at maturity (cm)	Number of Plants m ⁻²	Number of tillers m ⁻¹	Number of panicle-bearing tillers plant ⁻¹ Number of pod plants ⁻¹	Number of spikiest panicle ⁻¹ Number of seed pots ⁻¹	1000- Kernel wt. (g) rice 1000-seed wt. mung.	Paddy yield t ha ⁻¹ Seed yield t ha ⁻¹ Forage yield ha ⁻¹	Straw yield t ha ⁻¹	Harvest index (%)
T ₁ : Wheat-rice-wheat	78.14	209.33	11.32	9.37	120.86	17.09	3.33	8.93	9.37
T ₂ : Wheat-jantar-rice-wheat	76.68	212.33	11.33	9.43	121.63	17.51	4.07	9.05	31.02
T ₃ : Wheat/jantar-rice- wheat	80.40	207.67	11.36	9.42	122.30	17.44	4.08	9.23	30.65
T ₄ : wheat-jantar-sorghum-wheat	137.00	39.36					37.38		
T ₅ : Wheat/jantar-sorghum-wheat	137.33	40.93					37.18		
T ₆ : Wheat-jantar- mungbean-wheat		43.33		23.72	11.05	53.78	0.91	2.904	23.88
T ₇ : Wheat/jantar-mungbean-wheat		44.33		23.93	11.78	55.17	0.90	3.05	22.78

2. **Number of plants m⁻².** The wheat-jantar-rice-wheat (T2) system produced the highest number of plants m⁻² (212.33), and the wheat/jantar-rice-wheat (T3) system generated the lowest (207.67).
3. **Number of tillers plant⁻¹.** The highest number of tillers plant⁻¹ was obtained with the wheat/Jantar-rice-wheat (T3) system (11.36), and the lowest value was observed with the wheat-rice-wheat (T1) system (11.32). The T1 system yielded 9.37 tillers per plant versus 9.43 for the wheat/jantar-rice-wheat (T2) system.
4. **Number of spikelets panicle⁻¹.** The wheat-rice-wheat (T1), wheat-jantar-rice-wheat (T²), and wheat/jantar-rice-wheat treatments yielded 120.86, 121.63, and 122.30 spikelets panicle⁻¹, respectively.
5. **1000-Kernel weight (g)**
The wheat-rice-wheat (T1), wheat-jantar-rice-wheat (T2), and wheat/jantar-rice-wheat (T3) systems gave 1000-kernal weights of 17.9, 17.51, and 17.44 gm, respectively.
6. **Paddy Yield (t ha⁻¹).** The highest paddy yield was obtained in the wheat/jantar-rice-wheat (T3) system which was 4.08 t ha⁻¹ versus 3.33 t ha⁻¹ for the wheat-rice-wheat (T1) system. The higher paddy yield in the wheat/jantar-rice-wheat (T3) cropping system was attributed to the favorable affects of green manuring and the beneficial effects of the previous crop on soil fertility. The paddy yield in treatment was increased at the expense of improved soil fertility by jantar crops. These results are consistent with those of Furoc et al. (1988), Goswami et al. (1988), John et al. (1989), Balasubramanian (1991), and Swarup (1991), who performed field experiments and demonstrated that green manuring jantar increases the paddy yield of rice.
7. **Straw Yield (t ha⁻¹).** The wheat/jantar-rice-wheat (T3) system produced the highest straw yield (9.23 t ha⁻¹), whereas the wheat-rice-wheat (T1) system gave the lowest (8.93 t ha⁻¹). Goswami et al. (1988) and Mian et al. (1988) reported that green manuring increases the straw yield of rice.
8. **Harvest Index (%).** The harvest index reflects the product efficiency of a crop. Higher harvest index values indicate greater efficiency and vice versa. The highest harvest index was recorded in the wheat-jantar-rice-wheat (T2) system. The lowest harvest index was recorded in the wheat-rice-wheat (T1) system.
9. **Sorghum.** Sorghum was sown in July in the T₄ and T₅ cropping systems for forage purposes. Forage yield and other parameters are discussed below:

SORGHUM

- 1) **Plant height at maturity (cm).** The plant height of sorghum in these treatments ranged from 137.00 to 137.33 cm in the T₄ and T₅ treatments.
- 2) **Number of Plants m⁻².** The number of plants m⁻² of sorghum in the relay crop ((wheat/jantar-sorghum-wheat) was 40.93 versus 39.36 plants per m⁻² in the sequential crop (wheat-jantar-sorghum-wheat).
- 3) **Forage yield (t ha⁻¹).** Forage yield is a function of the combined effects of plant stand and plant height. Wheat-jantar-sorghum-wheat had a higher (37.38 t ha⁻¹) yield, and wheat/jantar-sorghum-wheat had a lower yield (37.18 t ha⁻¹) Kouyot et al. (2002) conducted a field experiment and observed that crop residues and legume rotations increase sorghum yield.

MUNGBEAN

Mungbean was planted on July 17 in the last two treatments. The results are discussed below:

1. **Number of plants m⁻².** The wheat-jantar-mungbean-wheat (T6) and wheat/jantar-mungbean-wheat (T7) systems generated 43.33 and 44.33 plants m⁻², respectively.
2. **Number of pods plant⁻¹.** The most pods plant⁻¹ were recorded in the T7 wheat/jantar-mungbean-wheat system (23.93) versus the lowest value in the T₆ (wheat-jantar-mungbean-wheat) system (23.72 pods plant⁻¹).

3. Number of seeds pod⁻¹. The number of seeds pod⁻¹ is an important factor that directly exploits the potential yield of crops. Table 11 shows that the T⁷ cropping system (wheat/jantar-mungbean-wheat) gave 11.78 seeds per pod, followed by the T⁶ cropping system (wheat-jantar-mungbean-wheat) (11.05 seeds pod⁻¹).

4. 1000-seed weight (g). The wheat/jantar-mungbean-wheat (T₇) system gave 55.17 g in 1000-seed weight, and the wheat-jantar-mungbean-wheat (T₆) system generated 53.78 g in 1000-seed weight.

5. Seed yield (t ha⁻¹). Seed yield is function of the combined effects of individual yield components, which are influenced by various agronomic practices and the environment. The wheat/jantar-mungbean-wheat and wheat-jantar-mungbean-wheat treatments yielded 0.90 t ha⁻¹ and 0.91 t ha⁻¹ of grains, respectively.

Sharma et al. (2000) conducted similar experiments and demonstrated that green manuring increases the yield of mungbean.

6. Straw yield (t ha⁻¹)

The T₆ wheat-jantar-mungbean-wheat and wheat/jantar-mungbean-wheat (T₇) systems produced 2.90 and 3.05 t ha⁻¹, respectively.

7. Harvest index (%)

The wheat/jantar-mungbean-wheat (T₆) and wheat-jantar-mungbean-wheat (T₇) cropping systems yielded 23.88% and 22.78%, respectively.

SOIL ANALYSIS

Soil analysis was performed twice (shown in Tables 11 and 12)—before the sowing of jantar crop and at the completion of the each cropping system. EC, soil pH, organic matter %age, N %age, available P, available K, and saturation %age were estimated and are shown in Tables 12 and 13.

In the T₁ (wheat-rice-wheat) cropping system, EC increased from 0.10 to 0.11 dSm⁻¹ and available P rose from 16.0 to 17.1 ppm; the following parameters decreased: soil pH from 8.2 to 8.1, organic matter %age from 1.5 to 1.3%, N content from 0.052 to 0.051%, available K from 160 to 140 ppm, and saturation %age from 32 to 31%. In the T₂ (wheat-jantar-rice-wheat) cropping system, the following values increased on completion: EC from 0.13 to 0.14 dSm⁻¹, organic matter %age from 1.03 to 1.13%, N content from 0.050 to 0.056%, and available P from 16.1 to 16.9 ppm; the values that decreased were: soil pH from 8.2 to 8.1, available K from 180 to 170 ppm, and saturation %age from 33 to 32%. In the T₃ (wheat/jantar-rice-wheat) cropping system, in the following values rose: EC from 0.11 to 0.12 dSm⁻¹, organic matter %age from 0.93 to 1.14, N content from 0.046 to 0.057%, available P from 15.1 to 15.9 ppm, available K from 180 to 200 ppm, and saturation %age from 32 to 33%. In this cropping system, soil pH declined from 8.2 to 8.1. The improvement in soil fertility was likely due to incorporation of organic residues of jantar crop, which was rotavated as a green manure crop.

The T₄ (wheat-jantar-sorghum-wheat) cropping system also had various soil properties affected. The values that increased on completion of the cropping system were: EC from 0.10 to 0.14 and available P from 15.5 to 17.2 ppm. Those that decreased were: soil pH from 8.2 to 8.1, organic matter %age from 1.14 to 1.03%, N content from 0.57 to 0.51%, available K from 180 to 140 ppm, and saturation %age from 34 to 33%. The decrease in organic matter, N content, and available K was likely due to the sorghum crop, which is very exhaustive in nature.

In the T₅ (wheat/jantar-sorghum -wheat) cropping system, the values that increased were EC from 0.12 to 0.13 dSm⁻¹ and available P from 15.4 to 16.7 ppm, while saturation %age were remained the same. The following parameters fell: organic matter from 1.10 to 1.04%, N content from 0.055 to 0.052%, pH from 8.2 to 8.1, and available K from 200 to 130 ppm.

In the T₆ (wheat-jantar-mungbean-wheat) cropping system, the values that increased were: EC from 0.11 to 0.15 dSm⁻¹, organic matter %age from 1.02 to 1.13%, N content from 0.051 to 0.056%, available P from 15.5 to 16.8 ppm, and saturation %age from 31 to 33. Those that decreased were soil pH from 8.2 to 8.1 and available K from 165 to 135 ppm.

The T₇ (wheat/jantar-mungbean-wheat) cropping system also had various soil properties affected. EC increased from 0.10 to 0.12 and available P rose from 14.4 to 16.9 ppm. The following values decreased: soil pH from 8.2 to 8.1, organic matter %age from 1.14 to 1.13%, N content from 0.057 to 0.056%, available K from 150 to 140, and saturation %age 32 to 31%.

CONCLUSIONS

A field study was performed at the Postgraduate Agricultural Research Station (PARS), University of Agriculture, Faisalabad, to examine the influence of green manuring jantar (*Sesbania aculeate*. L) on the growth and yield of crops grown in wheat-based cropping systems. Wheat crop of rabi was harvested with a combine harvester. Jantar crop was sown for green manuring; as the relay crop in treatments T₃, T₅, and T₇, and as the sequence crop in the T₂, T₄, and T₆ treatments. The various kharif crops were planted after rotavating the jantar crop according to the treatment schedules during the kharif season. Yield and yield parameters of these crops were recorded. In the following rabi season, wheat was planted in all cropping systems. The experiment was laid out in

randomized complete block design (RCBD) with three replications. The net plot size was 12 m x 25 m. Physicochemical analysis of the soil was performed before the sowing of green manure crop and on completion of crops grown in different cropping systems. The effects of green manuring and the kharif crops on various parameters and yield of wheat that was planted during the following rabi season were studied. The results are summarized below:

Plant height at maturity, number of tillers m^{-2} , and number of productive tillers m^{-2} were affected significantly in the various cropping systems. The number of plants m^{-2} , number of grains per spike, and 1000-grain weight were not affected significantly. Grain and straw yield were influenced significantly. The highest grain yield ($5.36 t ha^{-1}$) was recorded in the wheat-jantar-sorghum-wheat cropping system versus the lowest ($4.77 t ha^{-1}$) in the wheat-rice-wheat cropping system. The highest paddy yield of rice was recorded in the T_3 (wheat jantar rice wheat) cropping system compared with the lowest in the T_1 (wheat rice wheat) cropping system.

The T_3 (wheat jantar rice wheat) cropping system was the best cropping system that improved the fertility status of the soil. Minimum effects on soil fertility were observed in the T_1 (wheat rice wheat) cropping system.

Of the various cropping systems, the highest net return (Rs. 31360.45 ha^{-1}) was recorded in the T_3 (wheat /jantar- rice -wheat) cropping system, followed by T_2 (wheat- jantar -rice -wheat) (Rs. 30401.85 ha^{-1}), T_4 (wheat- jantar- sorghum -sorghum wheat) (Rs. 9415/- ha^{-1}), T_7 (wheat/jantar- mungbean-wheat) (Rs. 9311/- ha^{-1}), and T_6 (wheat- jantar-mungbean-wheat) (Rs. 8837.63 ha^{-1}). The highest BCR was observed in the T_3 (wheat/ jantar- rice -wheat) cropping system (1.39); the lowest was calculated for T_6 (wheat- jantar-mungbean- wheat) (1.12).

Thus, we conclude that the T_3 (wheat/jantar-rice-wheat) cropping system effected the highest net return and benefit-cost ratio. Therefore, the wheat jantar rice wheat cropping system should be implemented to obtain maximum net returns and improve the fertility status of soil.

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Table 11. Soil Analysis (before sowing of jantar)

Treatments	Depth (cm)	Electric conductivity (EC dSm ⁻¹)	Soil pH	Organic matter (%)	Available N (ppm)	Available P (ppm)	Available K (ppm)	S
T1: Wheat-rice-wheat	0-15	0.10	8.2	0.83	0.041	16.0	160	
T2: Wheat-jantar-rice-wheat	0-15	0.13	8.2	0.93	0.046	16.1	180	
T3: Wheat/jantar-rice-Wheat	0-15	0.11	8.2	1.03	0.05	15.1	200	
T4: Wheat-jantar-sorghum-Wheat	0-15	0.10	8.2	1.14	0.057	15.5	180	
T5: Wheat/jantar-sorghum-wheat	0-15	0.12	8.2	1.10	0.055	15.4	200	
T6: Wheat-jantar-mungbean-wheat	0-15	0.11	8.2	1.02	0.051	15.5	165	
T7: Wheat/jantar-mungbean-wheat	0-15	0.10	8.2	1.14	0.057	14.4	150	

Table 12. Soil Analysis (after the completion of cropping systems)

Treatments	Depth (cm)	Electric conductivity (EC dSm ⁻¹)	Soil pH	Organic matter (%)	Available N (ppm)	Available P (ppm)	Available K (ppm)	S
T1: Wheat-rice-wheat	0-15	0.16	8.1	1.04	0.052	19.1	140	
T2: Wheat-jantar-rice-wheat	0-15	0.14	8.1	1.14	0.057	19.9	170	
T3: Wheat/jantar-rice-Wheat	0-15	0.12	8.1	1.13	0.056	15.9	180	
T4: Wheat-jantar-sorghum-Wheat	0-15	0.14	8.1	1.03	0.051	17.2	140	
T5: Wheat/jantar-sorghum-wheat	0-15	0.13	8.1	1.04	0.052	16.7	130	
T6: Wheat-jantar-mungbean-wheat	0-15	0.15	8.1	1.13	0.056	16.8	135	
T7: Wheat/jantar-mungbean-wheat	0-15	0.12	8.1	1.12	0.056	16.9	140	

Table 13. Economic analysis

	Cost/ha ⁻¹ per crop	Total cost of crops	Gross income
Treatments	----- (Rs.)-----		
T ₁ : Wheat-rice-wheat	16861.11-18115.98-17296.11	74773.20	26250+38295+349
T ₂ : Wheat-jantar-rice-wheat	16861.11-5730.42-119180.52-17506.10	81803.15	26285+46805+3915
T ₃ : Wheat/jantar-rice- wheat	16861.11/4042.33-19194.90-17461.11	80059.55	26250+46920+38250=
T ₄ : wheat-jantar-sorghum-wheat	16861.11-5730.42-10865.47-17442.36	73399.36	26250+18690+37875=
T ₅ : Wheat/jantar-sorghum-wheat	16861.11/4042.43-10857.97-17491.11	71752.62	26250+18590+38850=
T ₆ : Wheat-jantar- mungbean-wheat	16861.11-5730.42-9330.73-17491.11	71913.37	226250+14301+40200=
T ₇ : Wheat/jantar-mungbean-wheat	16861.11/4042.43-9322.85-17506.11	70232.5	26250+14144+39150=

Net income = Total income – Total cost

Benefit-cost ratio = Gross income / Total cost

APPLICATION OF MARINE BIOMASS FOR THE REMOVAL OF METALS FROM INDUSTRIAL WASTEWATER

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Abstract

*A batch adsorption experiment was carried out using marine algae – seaweed (*Ascophyllum nodosum*) as adsorbent for metal removal at two temperatures (23.5°C and 37°C) and four pH values (2, 5, 7 and 10). Atomic Absorption Spectroscopy (AAS) adsorption results show maximum adsorption capacities of 93.41% for lead at pH 2, 53.13% for cadmium at pH 10 and no adsorption for chromium throughout the pH range and temperature was found to have no significant effect on the adsorption process, especially for cadmium and lead. However, the effect of pH was significant and varied with each metal. These results were found to be comparable to results reported from previous works. The results show that the removal efficiency of each adsorbent is highly dependent on pH, and metal ion removal occurred in the preferential order lead > cadmium > chromium, depicting strong contributions from the ionic radius of each metal ion. These results demonstrate the immense potential of the adsorbent as alternatives for metal removal from industrial effluent treatment.*

Key words: Adsorbent; Adsorption; Trace Metals; Sludge.

INTRODUCTION

Heavy metal contamination in industrial effluents has been an issue of environmental and public health concern since the advent of industrialisation, owing to their non-biodegradable, toxic and bio-accumulative nature (Bailey et al, 1999; Nomanbhay and Palanisamy, 2005). The rapid growth in global population and urbanisation has driven an exponential increase in industrial activities, which is accompanied by an increase in the amount of industrial wastes being discharged into the environment. Hence, the increase in heavy metals such as Cadmium, Mercury, Lead, Copper, Zinc, Nickel and Chromium posing significant risk to soil, water and human health. Heavy metals are discharged into the environment by industries such as mining, textile, petro-chemical, tannery and plating among others.

Various treatment methods have been employed in the removal of heavy metals from industrial effluents. Among them include chemical precipitation, membrane filtration, ion exchange, reverse osmosis, electrodialysis, solvent extraction, evaporation, oxidation, activated carbon adsorption (Shukla et al, 2002; Papparlado, Jumean and Abdo, 2010). However, these methods are often expensive and difficult to maintain due to high capital and operational costs, as well as, extra cost of treating the resultant sludge generated before disposal. The generated secondary waste, apart from requiring additional treatment along with the accompanying cost, also poses disposal hazards and pollution risks to the environment (Kumar, 2006). Hence, the need for cost-effective and efficient naturally abundant alternatives to the conventional methods of metal contaminated industrial wastewater treatment (Oilgae, 2010).

In response to this need, studies on cheaper methods of treating metal-enriched industrial wastewater involving the possible use of low-cost and commonly available organic materials with high adsorptive capacities is now a growing research area (Oboh, Aluyor and Audu,

2009). Low-cost organic materials which have been found to possess potentials for viable use in the treatment of industrial wastewater include reed plant, tree bark, moss, cotton wool, reed plant, corn hobs, rice husk, orange peel, banana peel, sawdust, apple-waste, mango peel, etc. (Bailey et al, 1999; Kanamadi, Ahalya and Ramachandra, 2006). The choice of an organic adsorbent usually depends on a number of factors which include availability, location, locality, seasonality, cost-effectiveness, etc.

Apart from availability, location, seasonality and cost-effectiveness, studies have demonstrated that the use of low-cost adsorbents has distinct advantages over conventional methods of metal removal from industrial wastewater (Gardea-Torresdey, De la Rosa and Peralta-Videa, 2004). This property has fuelled the growing attraction for researchers towards the use of readily available organic adsorbents for the removal of heavy metals from wastewater. These advantages include: low cost, high efficiency, reduced production of sludge, ease of regeneration of biosorbents and metal recovery (Sud, Mahajan and Kaur, 2008). Other sustainable benefits to industries include; meeting statutory discharge limits for industrial wastewater and enhancement of their corporate social and environmental responsibility profiles (Shukla et al, 2002). This paper aims to assess the effectiveness of a commonly available marine biomass for the treatment of industrial effluents. The paper also investigated the effects of temperature and pH on the adsorptive capacities of the selected bio-resource. The choice of this material was based on its availability in large quantity and low cost. It is found abundantly along coastline and beaches in both tropical and temperate region on the world, which constitutes a nuisance to coastal vessels and fishermen.

MATERIALS AND METHODS

1. Preparation of adsorbents. The marine biomass used as biosorbent for this study was seaweed (*Ascophyllum nodosum*). It was used in its natural forms after washing and drying and devoid of any chemical pre-treatment. It was collected at the Broughty Ferry beach, Dundee, Scotland. After collection, it was washed with tap water, followed by distilled water to remove the sand and stones entangled in them. It was then dried in the oven at 105°C for 24 hours. After which the sample was blended into a powder using a commercial blender and further reduced to finer particles of 0.5mm particle-size using Fritsch Rotor Speed Mill-Pulverisette 14 and stored in clearly-labelled transparent containers.

2. Metal solutions. All metal salts and chemical reagents used were of analytical grade (Aldrich U.K). Standard Stock solutions of Cd^{2+} , Pb^{2+} , and Cr^{3+} , were prepared to the required concentrations in mg/L by dissolving the appropriate amount of Cadmium solid, KCrO_4 , and $\text{Pb}(\text{NO}_3)_2$ in de-ionized water. De-ionized water was used for the preparation of standard solutions.

3. Instrument and apparatus. A pre- and post adsorption determination of the types and distribution of functional groups present in the dry adsorbent samples was carried out by Perkin Elmer Fourier Transform Infrared (FTIR) RX1 spectroscopy, using Potassium Bromate (KBr) disc to prepare the feedstock. The spectral range varied from 4000 to 400cm^{-1} . The Cd^{2+} , Pb^{2+} , and Cr^{3+} , concentrations were determined by using Perkin-Elmer Model Atomic Absorption Spectrometer (AAS) equipped with deuterium lamp background correction. All pH measurements were taken with a Hanna Educational HI 208 ion-meter and calibrated with buffer solutions of pH 4.0, 7.0 and 10.0.

Adsorption Experiment

The adsorption experiments were carried out in Batch mode at various pH (2, 5, 7 and 10), temperature (23.5°C and 37°C) and adsorbent dose of 20g l^{-1} . for a contact time of 180min. For each 50ml of metal (Cd^{2+} , Pb^{2+} , Cr^{3+}) solution of 200mg/l was used and pH adjusted before adding

adsorbent. The mixture was agitated on mechanical shaker for 180 min. After that, the mixture was centrifuged for 20 minutes at a speed of 5400 rpm using an Impact-5 Centrifuge to separate the supernatants from the adsorbent. The residual concentration of metals in the supernatant was determined using AAS. All the experiments were done in replicated and results averaged. The percentage removal and metal uptake efficiencies of all adsorbents were determined with following expressions:

$$\text{Metal uptake} = \frac{(C_i - C_f)}{C_i} \times 100 \quad (1)$$

The amount of metal adsorbed, Q (mg metal/gram sorbent) was computed using equation 2.

$$Q = \frac{(C_i - C_f)}{m} V \quad (2)$$

Where,

Q = Amount of metal adsorbed (mg/g)

C_i = Initial metal concentration in solution (mg/l)

C_f = Final metal concentration in supernatant after adsorption (mg/l)

V = Volume of solution (ml)

m = Mass of the adsorbent (g), which in this experiment = 1g, approximately.

RESULTS AND DISCUSSIONS

Seaweed has been reported to be rich in other extracellular polymers on its cell wall matrix, with the alginate polysaccharide being responsible for ion-exchange capacity of the brown algae due to high concentration of carboxyl groups (Mehta and Gaur, 2005; Freitas, Delerue-Matos and Boaventura, 2009). The functional groups found to occur on the binding surface of seaweed include the carboxyl, hydroxyl, amine, phosphate and sulphate groups, as well as other chemical functional groups contained in cell sugars and proteins. However, the carboxyl and sulphate groups are thought to be the most active groups in the binding of metals during adsorption (Romera et al, 2007). The functionalities of these groups in adsorption have been reported to be pH-dependent.

Fourier Transform Infrared Analysis of Adsorbents.

The FTIR spectral of adsorbent (seaweed) before and after adsorption of metals were used to determine the vibration frequency changes in the functional groups. The spectra of adsorbents were measured within the range of 400 – 4000 cm^{-1} wave number. The pre-adsorption FTIR analysis results (figure 1d) suggested the presence of such functional groups as the carboxylic acid or alcoholic O-H bond stretching which may overlap with amine (N-H) bond stretching at peaks between 3250-3400 cm^{-1} ; possible C=O bond of carbonyl or amide groups within 1640-1670 cm^{-1} ; C-O and O-H bond stretchings of alcohol and ethers at 1000-1260 cm^{-1} of the finger-print region. The post-adsorption FTIR results (figure 1e-1g) showed only slight changes suggesting no significant changes in distribution of the identified functional groups and probable uniformity in manner of adsorption as the adsorbent is organic and may bind metals in similar manners. A deeper trough was observed at 1400 cm^{-1} suggesting possible binding of cadmium at this site. No significant change was observed after chromium adsorption which may explain the poor adsorption of chromium, possibly due to the effect of the high initial chromium content of seaweed. Lead adsorption showed a strikingly deeper trough at 1384.5 cm^{-1} indicating possible binding to the nitro N=O stretching. These identified regions may be indicative of functional groups responsible for the individual metal-binding activity of the adsorbent, apart from the groups indicated in previous studies (Kanamadi, Ahalya and Ramachandra, 2006).

Effect of Temperature and pH on the Adsorption of Metal Ions

The adsorption experiments were carried out at two temperatures, 23.5°C and 37°C; and four different pH values- 2, 5, 7 and 10 respectively. The effect of temperature and pH on the adsorption of each metal ion by the seaweed is shown in Figures 1a-1c. From the graphs, it can be seen that temperature had no significant effect on the percentage adsorption of metal ions by the adsorbent as similar percentage adsorptions are recorded at both temperatures for all the metals. Cadmium adsorption at 23.5°C and 37°C yielded similar percentage adsorptions at all pH values except for pH 7 where adsorption at 37°C (44.55%) can be seen to be higher than that at 23.5°C (41.60%) (Figure 1a). The percentage adsorption of cadmium can also be seen to increase gradually with increase in pH with the least adsorption of 31.53% occurring at pH 2 and the highest of 53.13% at pH 10. Adsorption at pH 5 and 7 were 39.10% and 43.08%, respectively. This trend suggests an enhanced capacity for cadmium uptake in alkaline solutions. Hence, the poor adsorption of cadmium onto the adsorbent surface at acidic pH may depend on ionic attractions as the ligands on the adsorbent surface are positively-charged due to close association with hydronium ions (H_3O^+) or H^+ , causing reduced attraction for the cadmium cations and as such, a reduced rate of adsorption (Yu et al, 2001; Ho, 2005). However, as pH increases, more negatively-charged ligands such as the carboxyl or amino groups are progressively exposed as a result of proton release. This increases the negative charge density on the seaweed surface, thereby attracting the cadmium cations onto the adsorbent binding sites until equilibrium is attained and adsorption begins to decline due to possible precipitation of insoluble hydroxides of the metal ions which has been reported at alkaline pH values (Goyal et al, 2008; Hussain, Salleh and Milow, 2009). This precipitation may be responsible for the 53.13% cadmium removal at pH 10 by seaweed observed in this study.

Percentage chromium adsorption generally decreased with increasing pH with its highest adsorption at pH 2 (Figure 1b). This may be attributed to the form in which chromium ion exists at such acidic pH which facilitates its removal from acidic solution than from alkaline solution, as well as, the dominating charge on the adsorbent surface at such pH (Bansal et al, 2009). Chromium exists only in two oxidation states in nature +3 and +6 and when in solution, the Cr(III) state hydrolyses in a complicated manner to produce Cr(VI). At acidic pH, the predominant species of Chromium are $Cr_2O_7^{-2}$, $HCrO_4^{-1}$, H_2CrO_4 , $Cr_3O_{10}^{-2}$ and $Cr_4O_{13}^{-2}$. Thus, at pH 2, Cr(VI) exists mainly in the anionic form, $HCrO_4^{-1}$, and its adsorption may be favoured by highly protonated or positively-charged adsorbent surface. However, this level of protonation of the adsorbent surface reduces as pH increases, thus, slowing down the rate of adsorption. A further increase in pH leads to a situation where the abundant OH^- groups of the adsorbent polysaccharides start to compete with the $HCrO_4^{-1}$ ions for the available protonated binding sites, leading to OH^- groups being preferentially adsorbed due to their predominance over the chromate ion in solution. This reduce action of chromium adsorption as supported by similar studies (Davies, Volesky and Mucci, 2003; Olayinka, Alo and Adu, 2007).

Other results of higher adsorption of chromium at low pH values have been reported in earlier studies (Kanamadi, Ahalya and Ramachandra, 2006; Bhattacharya, Mandal and Das, 2006; Olayinka, Alo and Adu, 2007; Dhungana and Yadav, 2008/2009; Olayinka, Oyedeji and Oyeyiola, 2009 and Bansal et al, 2009). Considering the pre-adsorption chromium content per adsorbent gram, it is possible that the already bound chromium ions may have competitively impeded the uptake of the chromium ions in solution by occupying some of the adsorbent binding sites, thereby contributing to the poor percentage adsorption of chromium by the seaweed which had some concentration of chromium prior to the adsorption experiments. Maximum adsorption at such acidic pH may have practical implications because discharging treated wastewater at such acidic pH may entail a lot of health and safety issues and chemical requirements. This is because such acidic

wastewater would need to be neutralised before being discharged into the environment, unless the receiving water body is already highly alkaline due to prior pollution. In which case, such acidic discharge would help restore the neutrality of the aquatic environment. Otherwise, such discharge into a neutral aquatic environment may increase the acidity of the water thereby causing precipitated metals to go back into solution. This may increase the level of toxicity due to dissolved metals and may cause loss of aquatic life-forms.

The percentage lead adsorption decreased with increasing pH until pH 7 before increasing slightly at pH 10 (Figure 1c). Maximum adsorption of 93.41% occurred at pH 2 and the least of 57.04% at pH 7, with the difference in percentage adsorption highest between the 88.77% and 57.04% recorded at pH 5 and 7, respectively. The high removal of lead at pH 2 than at higher pH may be indicative of an enhanced ability to adsorb lead from solution in acidic solution than in basic solutions, although this observation is considered unusual as most studies have reported an increase in the uptake of lead from solution with increasing pH until equilibrium is attained around pH 5 before a decline in adsorption starts to occur (Souag et al, 2009; Hussain, Salleh and Milow, 2009). This unexpected result suggests that electrostatic interactions alone may not suffice in explaining the changes in lead uptake with variations in pH, as there could be other or multiple mechanisms at play in the removal of lead from solution at such very acidic pH (Jin and Bai, 2002). Which is similar to lead adsorption using chitosan/PVA (poly vinyl alcohol) where a decrease in solution pH resulted in increase in lead uptake from solution Jin and Bai (2002). pH 5 yielded the highest percentage lead removal of 88.8% in this study and this approximates the degree of lead removal reported in most previous works at this pH (Ho, 2005; Souag et al, 2009; Hussain, Salleh and Milow, 2009).

CONCLUSION

The results from this study indicate that the studied seaweed (*Ascophyllum nodosum*) is suitable for use in the removal of metal ions from industrial effluents. Adsorptive capacity and metal removal efficiency of the adsorbent studied varied significantly with each metal ion and with pH but not with temperature. Adsorption of cadmium increased with increase in pH while that of chromium exhibited an inverse relationship with increase in pH. The trend of lead adsorption varied with increasing pH. The efficiency of adsorbent per metal ion presented interesting results comparable to results from previous works. Chromium adsorption was generally poor exhibiting no efficiency for chromium removal but yielded maximum lead and cadmium removal of 93.41% and 53.13% at pH 2 and 10 respectively. The results show that the removal efficiency of each adsorbent is highly dependent on pH, and Metal ion removal occurred in the preferential order lead > cadmium > chromium, depicting strong contributions from the ionic radius of each metal ion. Based on this trend, seaweed is considered an efficient adsorbent for cadmium in neutral or alkaline solutions and for lead in acidic solutions.

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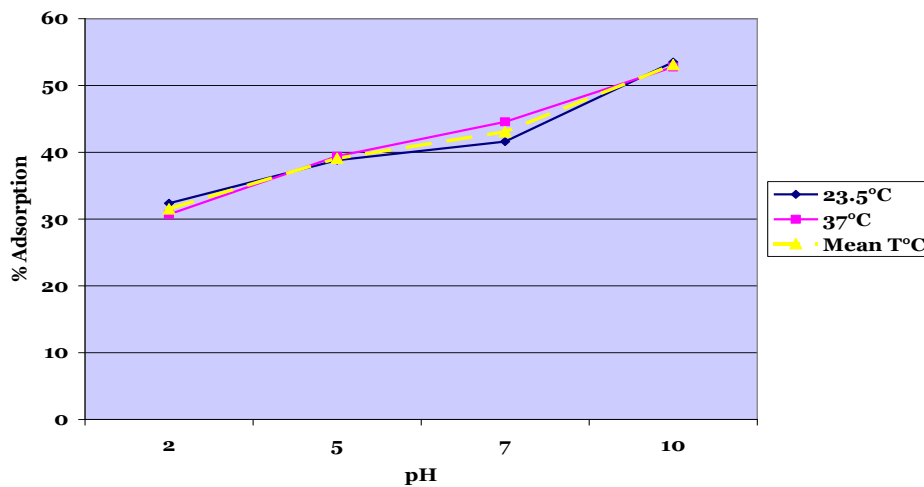


Figure 1a: Effect of temperature and pH on cadmium adsorption using seaweed.

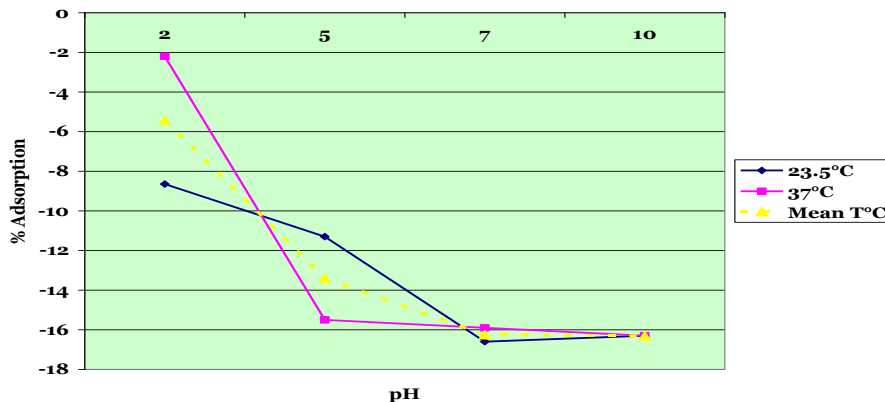


Figure 1b: Effect of temperature and pH on chromium adsorption using seaweed.

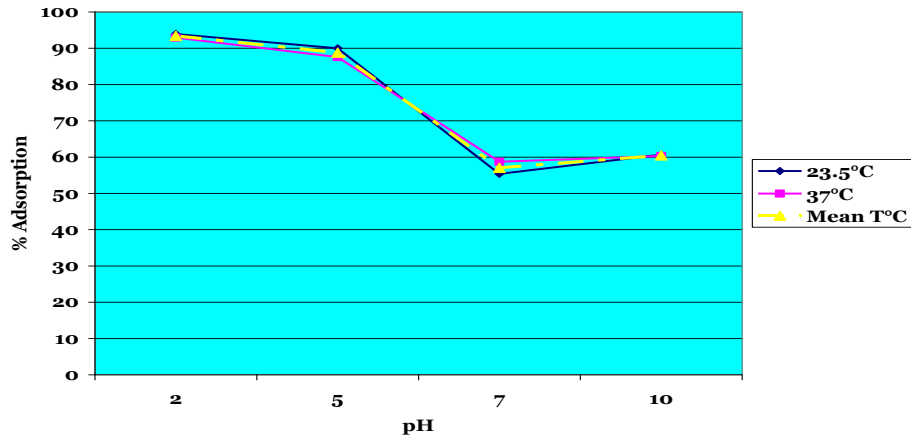
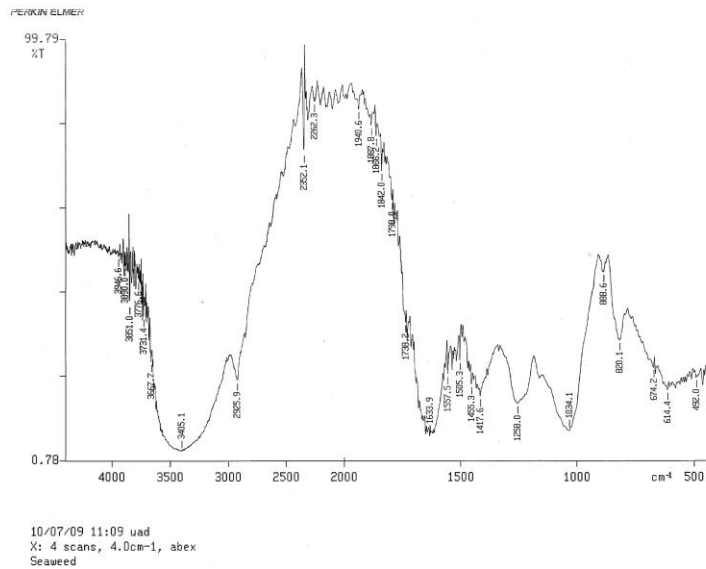
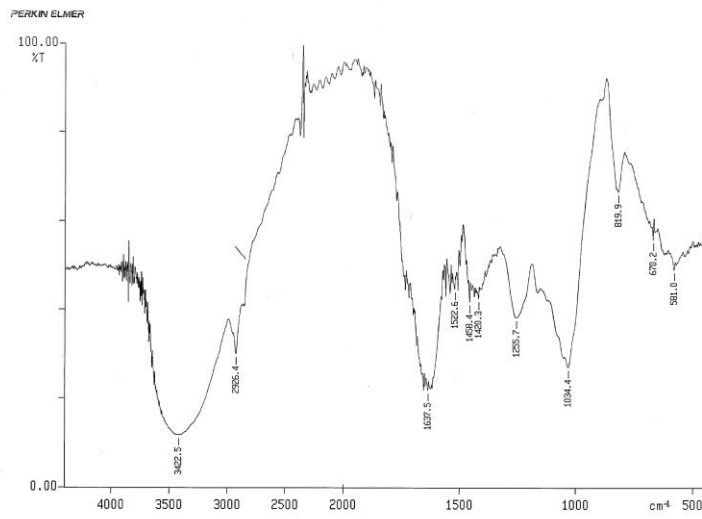


Figure 1c: Effect of temperature and pH on lead adsorption using seaweed.

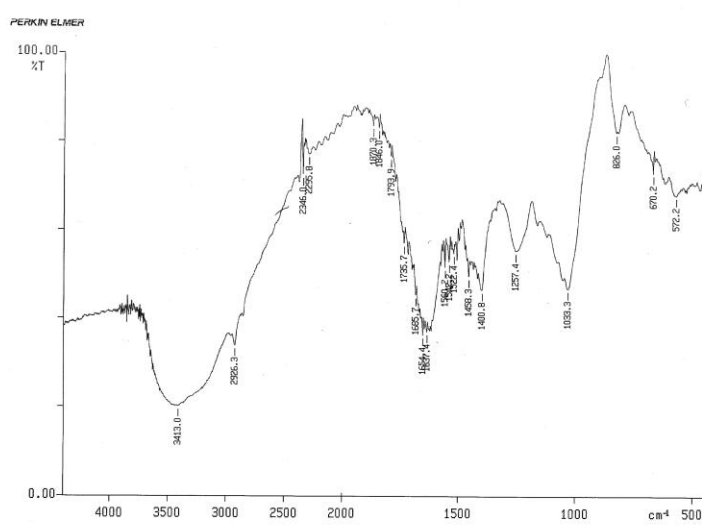


1d: FTIR spectrum of seaweed (Pre-adsorption).



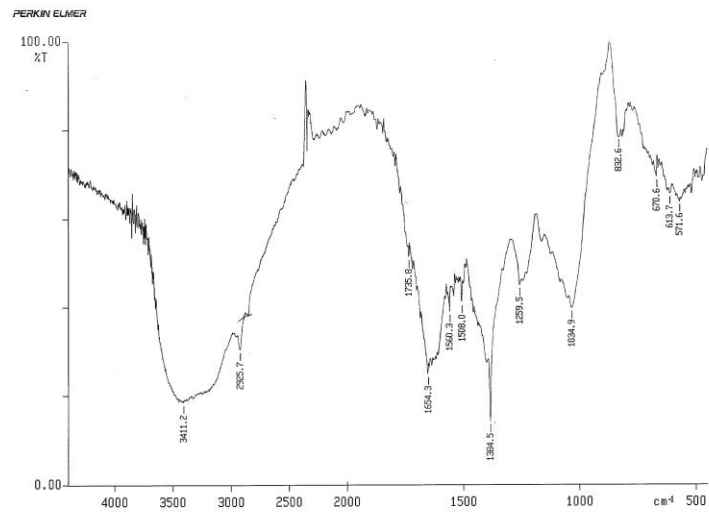
10/08/20 10:46 uad
 Y: 4 scans, 4.0cm-1, abex
 Seaweed-Cr (post adsorption)

1e: FTIR spectrum of seaweed after chromium adsorption



10/08/20 11:23 uad
 Z: 4 scans, 4.0cm-1, abex
 Seaweed-Cd (post adsorption)

1f: FTIR spectrum of seaweed after cadmium adsorption.



10/08/20 10:03 uad
X: 1 scan, 4.0cm-1, flat, abex
Seaweed-Pb(post adsorption)

1g: FTIR spectrum of seaweed after lead adsorption

GLOBALIZATION AND FACTOR MOBILITY

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Abstract

A large number of works have been done about globalization via factor mobility and its various effects on the global world economy. This paper aims at discussing the most important aspects of globalization and factor mobility, and its major impact on the World at large. In the first section of this report, the concepts of globalization and factor mobility are identified, while in the second section forces causing the accelerated growth of globalization are discussed. Then, the author thoroughly identified and discussed the advantages and disadvantages of globalization, and the main challenges facing the idea. The remainder of the report discusses factor mobility in four folds, i.e. forms of factor mobility, why factor of production move, the effect of their movement in the world, and finally, the relationship between factor mobility and global trade. The report concludes with the author's recommendations and suggestions on how to counter the challenges of globalization while maintaining individual nation's ability to reap all its magnificent benefits. Upon completion of reading this report, readers are expected to have a deeper and better understanding of the concept of globalization as related to factor mobility.

Key Words: Globalization, Factor Mobility, Capital, Labour, Raw material, Technology and Trade.

INTRODUCTION**Globalization**

The term Globalization is so powerful such that it's difficult to create a compact definition of it. It may be defined from different perspectives and in several ways. One can say Globalization refers to the combination of Economics and Societies all over the world. It connects technological, economic, political, and cultural exchanges made possible by the progress in transportation, infrastructure, and communication. An alternative definition would be increasing linkages between the world, including the international spread of cultures as well as diseases and crimes, while natural and artificial barriers between nations fall. Finally, the most well-known definition is referring to Globalization as the shrinking of the world into a global village, as borders disappear, distance decreases, and time shorten. "Globalization has changed us into a company that searches the world, not just to sell or to source, but to find intellectual capital - the world's best talents and greatest ideas"-Jack Welch

Globalization is displayed in the growth of world trade as a share of output, the percentage of world imports to gross world product GWP increased from 7% in 1938 to 10% in 1970 and to more than 18% in 1996. This is reflected in the surge of foreign direct investment (FDI): FDI in developing countries rose from \$2.2 billion in 1970 to \$154 billion in 1997. It has also accrued in national capital markets becoming integrated. The source of Globalization lies in the development of technology. The cost of Transportation, communication, and travel has fallen dramatically in the last period, almost roughly because of the advancement of technology. Here are some facts: Average revenue per passenger mile fell by more than 80% between 1930 and 1990, from \$0.68 to \$0.11. In 1947, average tariffs on manufactures imports were 47%, but by 1980 they

went down to 6%. A three minute call from the USA to Britain cost \$12, whereas today it costs .48 cents.

Globalization refers to the integration of economics and societies all over the world. There are two kinds of Integration, Negative and Positive. Positive Integration concentrates on standardizing international economic laws and guidelines. For Example, A country with its own set of Policies on tariffs with a country which has its own policies on taxation find ways of trading together. With Positive Integration, and the expansion of globalization, these countries work to have related or even equivalent policies on tariffs.

Negative Integration is the elimination of trade barriers or defensive barriers as quotas and tariffs. The removal of barriers can benefit a country if such removal is for products that are necessary for the economy. For Example, by breakingdown barriers, the total cost of imported raw material will decrease as the supply goes up, making it cheaper to produce the final product for export (Car parts, clothes etc.). On the other hand, the total cost of importation will also decrease

Factor Mobility

Factor Mobility can be defined as the movement of factors of production like Natural resources, Labor, Technology, and capital from their original domain to be put to a productive use in other locations. There are many effects of Factor Mobility on the Host and Home Countries, Positive as well as negative. Factor mobility rose as globalization expanded over the years.

RESEARCH METHODOLOGY

In this research, the author identified the concept of globalization and its challenges, the advantages and disadvantages of globalization on societies as a whole and in sub groups. The challenges in achieving global integration and perfect globalization are also discussed along with solutions to identified obstacles. In this research, I reviewed several literatures in collecting data, and in subsequent analysis of issues relating to the concept of globalization, its history and evolution throughout the years. In addition, the opinions of entrepreneurs, other Scholars and experts in the field of globalization were sought, collected and analysed to reveal both; the bright and the dark side of the phenomenon of global integration. Consequently; solutions were suggested and recommendations made about how to remove some of the obstacles that could occur in the process of true Globalization.

THE FORCES DRIVING GLOBALIZATION

Measuring globalization could be a problematic issue, especially, in making historical comparisons. First, countries interdependency must be measured indirectly. Second, when national boundaries shift (for example: the breakup of the former Soviet Union or the reunification of East and West Germany), some hitherto domestic business transactions can then become international transaction and vice versa. In addition, various reliable indicators assure that globalization has been increasing in the recent years, at least since the mid-twentieth century. Currently, about 25% of the world production is sold outside their respective countries of origin, as opposed to about 7% in 1950. Restrictions on imports have generally been decreasing, and output from foreign-owned investments as a percentage of world production has been increasing. In almost every year since World War II, world trade has grown more rapidly than world production. However, in recessionary periods such as 2008, global trade and investment contract grew even more.

However, globalization is less pervasive than anyone might believe. Most of the world (including rural Africa, Asia, and Latin America to name a few), lack the resources to establish more than the barest connection with anyone beyond the outskirts of their isolated domains. Only few countries are able to either sell over half their products abroad or depend on foreign output for over half their consumption. That means that most of the world's goods and services are still sold in their domestic markets and not in international markets.

These measurements address only the economic aspects of global interdependence. Various studies have relied on different indicators for comparison. One of the most comprehensive is the A.T. Kearney- Foreign Policy Globalization Index, Which shows not only that some countries are more globalized than others but also that a given country may be highly globalized on one dimension and not on another. This index ranks 72 countries across four dimensions:

- 1- Economic - International trade and investment.
- 2- Technological – Internet connectivity.
- 3- Personal contact – International travel and tourism, international telephone traffic, and personal transfers of funds internationally.
- 4- Political- Participation in international organizations and government monetary transfers.

In the recent years, the index has ranked Singapore and Hong Kong as the most globalized countries and India and Iran as the least globalized. The ranking of the United States shows how globalization can differ by dimension: The United States ranks first on the technological scale but only 71st on the economic scale.

Factors in Increased Globalization

Many Companies go international to be able to increase the value of their business, as well as the value of their profit. Therefore; it became imperative for companies to build a long term, sustainable business. There are many factors that companies need to develop to be able to survive in the global market, E.g. The following are a number of factors that have contributed to the increase in growth globalization in recent decades:

- 1- Increase in and expansion of technology.
- 2- Liberalization of cross-border trade and resource movements.
- 3- Development of services that support international business.
- 4- Growing consumer pressures. (both local & international)
- 5- Increased global competition.
- 6- Changing political situation and climate.
- 7- Expanded cross-national cooperation

There are a number of other factors that make rapid international expansion a necessity, rather than an option to be reviewed when the time is right. Those factors include the following:

Market transparency. In the good old days, 8-10 years ago, software companies could develop a product, market it at home, and then quietly start to sell their technology in overseas markets, often going after one market at a time. With the Internet, however, a product or a business concept is there for everyone to see, as a result, competitors in overseas markets are able to replicate the

product or service. There have been many cases of U.S. companies going to Europe, only to find that their business model, their name and even their Website have been replicated.

Emerging markets . While the U.S. is still the dominant force in technology development, we today see a lot of innovation from new markets such as Sweden, Israel, South Africa, India, Singapore and China. Quite often, the levels of innovation displayed are impressive, this implies that the U.S. companies will be facing new competitors not from other advanced countries, but from the emerging ones and targeting the same markets. This will increase the competition for clients and channels of distribution, all the benefit of the average consumer World Wide.

Geographic diversity. There are three major trading blocks in the world economy: North America, Europe and Asia-Pacific. These major trading blocks, don't move up and down in the same time as they are the most affected ones in the market, so a company can make itself less vulnerable according to the demand in one region by having a diverse source of revenues. This emerged after the Internet bubble and the technology of telecom. The European market, while slowing down, was not hit as hard as the U.S. market, so companies with significant operations in Europe were able to partially offset the slower sales at home.

Globalization Advantages

Globalization has had significant impacts on all economies of the world. It affects their production of goods and services; it also affects the employment of labour and other inputs into the production process. Globalization also affects investment in all its forms; it affects technology and its transition from developed countries to developing and under-developed Ones. It has great effects on productivity, efficiency, and competitiveness in both local and international markets. Globalization has many positive, innovative and dynamic effects, which have led the world to produce great economies, great income, and good employment opportunities. Some examples of these good benefits are listed below:

1. Increased competition

One of the most positive and visible effects of globalization is the improved quality of goods and services due to global competition. As domestic companies have to fight out foreign competition, they are forced to raise their standards and levels of concern about customer satisfaction issues, in order to survive in the global market. This on-going fight creates competition in the market and a situation where the best and the fittest only can survive.

2. Employment

Employment is one of the positive and negative effects of globalization, depending on the point of view of each nation. Globalization has given a lot of opportunities to invest in developing, under-developed, and emerging markets, and also brought out hidden talents and skills which are available globally. On the negative side, developed countries have lost jobs due to the movement of jobs and investment opportunities to developing countries, thus it is a pinch felt by developed countries and people of the "first world" too. The impact of globalization has affected the employment of women as well, as greater trade openness has increased women's share of paid employment, as well as multinationals companies

having to employ more and more female workers around the world, especially in Asia and in Africa.

3. Investment and capital flows

One of the most visible effects of globalization is the flow of foreign trade and capital. India has been one of the most developing countries with more cash and investment flow than other countries. Indian companies which have been performing well, both in India and offshore, have attracted a lot of foreign investment, thus pushing up the reserve of foreign exchange available to India.

Trade flow also increased 12-fold in the past fifty years as a result of the removal of natural and artificial barriers. Exports are now US \$7 trillion a year, with more than a fifth of the world's goods and services being traded. Capital flows expanded even faster, with Foreign Direct Investment amounting to US\$400 billion in 1997, seven times its real level in the 1970's and portfolio and other short-term capital flows amounted to US \$2 trillion in gross terms, three times what they were in the '80's. These in turn pave way for what has happened in the foreign exchange markets, where volumes increased over a hundred times between the mid-70's and the mid-90's, with a US \$1.5 trillion daily turnover in 1998. At the same time, international bank lending grew more than sixteen times, from US \$265 million in 1973 to US \$4.2 trillion in 1994.

4. Foreign trade

While trade originated in the times of early kingdoms, it has been developed and institutionalized due to globalization. People had to involve in wars and destroy other nations in order to get what they want, but today, it is done in a more human and civilized way through fair trade, Mutual Corporation, trade block agreements and multilateral organizations. A Nation which practice unfair trade or operate in an uncivilized way has to face the WTO and other world organizations that have been established to regulate and control international trade activities, and to draw proper consequences to unfair trade practices among and between countries and nations.

5. Spread of technical know-how

Without globalization, the knowledge of new inventions and technical know-how would remain kept in the developed and rich countries which invented them, and the rest of the world would not benefit. But due to globalization and the essential role of WTO, there is flow of information all over the world. The spread of technological know-how was also expanded to include political and economic knowledge; which too has spread far and wide.

6. Cultural integration

The world as we know it today is the result of several cultures coming together. Societies have become larger as they welcomed people from other backgrounds and civilizations to create a whole new culture of their own. The world has become a small village, and traditions, customs, diets, and different languages have spread all over the world due to globalization.

7. Spread of education

The spread of education is one of the most positive and powerful effects of globalization, especially on women all over the world. Today, a person living in Saudi Arabia can go to

another continent for new experiences and educational purposes which one might not find in the home country, and return with great amount of experience and knowledge to spread in their home country. The impact of education on women is even greater, for it made women around the world to gain opportunities for jobs and have better chances to secure their rightful share in employment opportunities.

8. Legal and ethical effects

Due to globalization, countries and security agencies of the world have developed understanding and commitment amongst themselves to prevent and fight global terrorism and other cross border crimes. It is no longer possible for criminals to hide and seek asylum in a foreign country away from their home Countries, but instead, they will most likely be brought to their home country to face the justice system therein. This is definitely one of the greatest effects of globalization on societies and global security.

9. Foundation of organizations for environmental and social concerns

Over the years, humans have done great amount of damage to themselves and to the environment around them, through the industrial revolution and wars throughout the years. Nations have decided to come together to find a way to save the world from themselves, by finding organizations monitoring climate change and global warming, as well as those which look after the welfare of animals and marine life all over the world. The ability to protect the environment and the world has been one of the most positive effects of globalization and the overall welfare of the world.

Those were some of the positive and bright side of globalization and its effects on nations and human beings around the world. Other benefits from globalization include the gains from trade in which both parties gain in a mutually beneficial exchanges, where the "parties" can be individuals, firms and other organizations, nations, trading blocs, continents, or other entities. Globalization can also result in increased productivity as a result of the rationalization of production on a global scale and the spread of technology and competitive pressures for continual innovation on a worldwide basis.

Globalization Disadvantages & Challenges

“Accordingly, globalization is not only something that will concern and threaten us in the future, but something that is taking place in the present and to which we must first open our eyes”- Ulrich Beck.

What is the harm if the whole world is coming together on one floor? Why do people even discuss if Globalization is bad for the world? Whereas; the world has benefited from Globalization, there are also negative aspects of it. The bad side of Globalization (disadvantages) centers around the fact that desires differs from one country to another, coming to a general agreement that any issue becomes more difficult when much permission are needed. The difference between the poor and rich countries can be a major difficulty when it comes to globalization. Even though the rich countries will try to help the poor nations to grow, they (the Wealthy Nations) will not give up on their national concerns.

Disadvantages of Globalization

1. Economic contagion

When the entire world becomes a global Village, any kind of economic interruption in one nation will have a huge impact on several other nations, which are closely related to it in terms of trade and commerce. A disturbance in one Country will result in a chain of multiple disturbances in the other nations.

2. Loss of cultural identities

Critics of Globalization say that it will restrict some age-old cultures, which have been religiously practiced all over the world. There are many countries that won't even think to adjust when it comes to religion and culture. The effect of local cultures, habits, and traditions will slowly get compromised, as migration will become easier. This could lead to loss of Cultural Sovereignty for many Nations. For example, when we look at the young people of today in any given country, you will find a great similarity in most of them in terms of the choices of music, appearance and dress codes, Expressions, eating habits and so on. This is as a result of Globalization; there is nothing local anymore.

3. Unemployment

Some people feel that Globalization is promoting Employment, but the fact is that the opposite is happening. Certainly in developed countries where people are losing their jobs because of outsourcing (Cheap and skilled labor overseas). For Example a huge number of companies in Europe and USA have outsourced a lot of their jobs to developing nations (China, India, Mexico etc.) in order to cut cost, and this often resulted in unemployment in the home countries.

4. Human insecurity (spread of diseases)

Crimes and diseases are now more rampant than ever, Globalization leads to many cross border crimes such as: drugs, weapons, woman and children trafficking and also to modern day slavery. The outcome of this includes the spread of sexually communicable disease like HIV/Aids and other social vices. The free movement between the boundaries of each country today has come with surge in cross border crimes and created tension in many hot spots wherein, the population growth are not met with increase in means of livelihood, Improvements in infrastructures, Security and general economic activities

5. Unbalanced distribution of benefits

Between Countries, the benefits are not distributed equally. Wealth of developed countries continues to grow twice as much as those of the developing world.

Within Countries, Income inequity is rising in developed and developing countries, which lead to unemployment and low-income security for unskilled labor. For Example, an IT professional in a developed country may get more value for his work than in a developing country.

6. Contagion of corruption

In addition to other cross border crimes, Globalization also allows Corruption or at least contributes to the growth of it in the developing Nations. For Example, a lot of multinational corporations have been caught committing the crime of corruption, which would have attracted severe punitive measures in their home countries. The Case of Halliburton bribing Government officials to secure Multi Million dollars Contract in the Energy sector in Nigeria readily comes to mind.

7. Affects local industries (in third world countries)

When foreign goods enter the local market, and local consumers begin to buy them with excessive preference, it is usually at the expense of the local goods, precisely in loss of sales, and therefore loss of revenue to the local producers in the developing countries. This in turn affects the growth of local industries in the developing Countries, and the collateral effects include unemployment and evaporation in purchasing power and subsequent decline in overall GDP in these Countries

Challenges of Globalization

Globalization faces four dramatic challenges that will have to be addressed by different governments, civil societies, and other policy actors.

1. Guarantee that all the benefits of Globalization extend to all countries. This will not happen automatically without the requisite platform to facilitate it.
2. Deal with the concern that Globalization may lead to instability, which is mainly in the developing countries.
3. Globalization and all its major problems must not be used as an excuse to eliminate searching for new ways to cooperation between the world's countries for their benefits.
4. Face the main fear of Globalisation in the industrial world, i.e. a rise in global competition could lead to a decrease in wages, labour rights, and a decline in the overall economic environment.

Factor – Mobility Theory

Factor mobility refers to the ability to move factors of production – labor, capital or land - out of one production domain to another. On one hand factor mobility may involve the movement of factors between firms within one industry, as when one steel plant closes but sells its production equipment to another steel firm. Factor mobility may involve the movement of factors across industries within a country, as when a worker leaves employment at a textile firm and begins work at an automobile factory. On a broader scope, mobility may involve the movement of factors between countries either within industries or across industries, as when a farm worker in Bangladesh migrates to Saudi Arabia to work in a factory or when a factory is located away from its country of origin.

The standard assumptions in the literature are that factors of production are free and costless in mobility between firms within an industry and between industries within a country, but are immobile between countries. The rationale for the first assumption, that factors are freely mobile

within an industry, is perhaps closest to reality. The skills acquired by workers and the productivity of capital are likely to be very similar across firms producing identical or closely substitutable products. Although, there would likely be some transition costs incurred, such as the cost of location (market) search, transportation and other transactions, but it still remains reasonable to assume for simplicity that the transfer of factors is costless.

The assumption that factors are easily movable across industries within a country is probably unrealistic, especially in the short-run. Indeed this assumption has been a standard source of criticism for traditional trade models. In the Ricardian and Heckscher-Ohlin models, factors are assumed to be homogeneous and freely and costless mobile between industries. When changes occur in the economy requiring the expansion of one industry and a contraction of another, it just happens. There are no search, transportation or transaction costs. There is no unemployment of resources. Also, since the factors are assumed to be homogeneous, once transferred to a completely different industry, they immediately become just as productive as the factors that had originally been employed in that industry. Clearly, these conditions cannot be expected to hold in very many realistic situations. For some, this inconsistency is enough to cast doubt on all of the propositions that result from these theories.

The final issue on Factors mobility involves the mobility of factors of production between countries. In most international trade models, factors are assumed to be immobile across borders. Traditionally, most workers remain in their country of national origin due to immigration restrictions while capital controls have in some periods restricted international movements of capital. When international factor mobility is not possible, trade models demonstrate how national gains can arise through trading in goods and services.

Of course, international mobility can and does happen to varying degrees. Workers migrate across borders, sometimes in violation of immigration laws, while capital flows readily across borders in today's markets. The implications of international factor mobility have been addressed in the context of some trade models. A classic result by Mundell (1957) demonstrates that international factor mobility can act as a substitute for international trade in goods and services.

Why Do Production Factors Move

1. Capital

Factors mobility concerns the free movement of factors of production, such as labor, capital, raw material and technology across national borders. While the proportions of factor mobility vary widely among countries, pressures exist for the most abundant factors to move to countries with greater scarcity, where they can command a better return on investment.

Companies and private individuals first and foremost transfer capital because of differences in expected returns. They find information on interest rate differences readily available, and they can transfer capital immediately at a low cost. While capital is the most internationally mobile factor, short-term capital is the most mobile of all. Short-term capital is more mobile than long term capital such as direct investment because, there is more likely to be active markets through which investors can quickly buy foreign holdings and sell them if they want to transfer capital back home or to another country.

Investors' perception of risks and where they prefer to invest their capital is mainly affected by various economic and political conditions. Most companies invest long term abroad to enter new foreign markets that are competitive e.g. lower operating costs. Yet businesses i.e. MNE's (Multi National Enterprises) are not the only source of international capital movements. Government's agencies and other related authorities give foreign aid and loans. Also, Non-for-profit organizations such as NGO's donate funds to nations in need, e.g. nations suffering from bad economic and social conditions such as wars. And not to forget Also, Individuals migrant workers who remit funds back to their families and friends in their home Countries. Regardless of the donor or motive, the result affects factor endowments.

3. People

People are also internationally mobile, although less than capital. On daily bases, people move from one country to another for several reasons including, tourism, education and work. People who travel for the first two reasons i.e. tourism and education do not affect factor endowment of the host nation because they don't work in it. While people who move to another nation for the main purpose of work, do affect factor endowment of the host nation. Unlike capital that is transferred between nations at a low cost, people usually pay high measurable cost to work in another country. If they move legally, they must get immigration papers and pay for transportations; in addition, most countries give these documents scarcely. Cost is not the only obstacle facing people movement; other difficulties may include learning new language, adjusting to new culture and living away from their main support groups i.e. family and friends. Despite all these obstacles, a lot of people take the risk and move to foreign countries primarily out necessity.

In fact, migration was the major engine of globalization during the latter part of the nineteenth and early part of the twentieth centuries, and nowadays; it is important again. About 3% of the world's population - over 200 million people - have immigrated to other countries. This percentage is spread unevenly; therefore it's much greater in some countries than in others.

Of the people who move to other nations, some stays permanently i.e. spend the rest of their lives in the host countries, in other words they become citizens of the host countries, while other move temporarily i.e. with the intention of going back to their home countries later. For instance, multinational companies often assign people to work abroad for a given time of period that could be months or years, after which the employee return to his home country. Plus, some countries allow workers to enter on temporary work permits usually for short periods. For example, about two-thirds of the populations in the United Arab Emirates are temporary workers. In a nutshell, most people leave their countries with the intention of coming back after saving a certain amount of money in their work abroad expeditions.

Two key motives for people movement

1- Economic motives

People, whether professionals or unskilled workers, mostly work in another country for economic reasons. For example, Indonesian labours work in Malaysia because they can make almost ten times as much per day, as they could if at home.

2- Political motives

People also move for political reasons. For example, because of persecution or dangers of war and other social instability, in which case they are known as refugees and usually become part of the labour pool in their new homelands i.e. where they find refuge (e.g. people fleeing the wars in Iraq, Libya, Yemen, and Syria). Sometimes it's difficult to distinguish between economic and political motives associated with international labour mobility, because poor economic conditions often accompany repressive and or uncertain political conditions. For example, in the early twenty-first century, hundreds of thousands of Colombians left the country, fleeing both a civil war and unemployment.

Technology and Raw Material

Technology and raw materials move across borders due to scarcity. While some countries are rich in raw materials (i.e. oil in Saudi Arabia) and /or technology (e.g. Japan) other countries suffer from shortages in one or both of them. Furthermore; with the presence of globalization today, the world is witnessing an increased relocation of production from the technology rich countries towards low labor cost countries. On one hand, the technology rich countries have a vast pool of advanced technology. On the other hand, the developing markets demand for technology –in terms of know how and hardware- is significantly increasing, these countries rely on exporting the needed production factors (technology and/or raw materials) to cover their shortages. Needless to say, countries exporting these factors will obtain foreign income in return, which would be used in funding budgetary provisions and public policy initiatives. Furthermore, both technology and raw materials are essential in the production process. While technology is a medium or mechanism of production, raw materials are vital inputs in the production process.

The Effects of Factor Mobility

The factor mobility theory of trade factors focuses on the reasons why production factors move (labour, capital, technology, and raw materials), and the effects that such movements have on Globalization and world trade. It is essential to understand why those factors move, how they move, and the effects of their movement on both the home and the host countries, and also their overall effect on global integration.

Labor

A very controversial issue is the effect of labour migration on both home and host countries. On one hand, countries lose productive resources when skilled and educated labour force move to an another country, creating a phenomenon called "Brain Drain"; which means the migration of skilled knowledgeable people to foreign countries. On the other hand, the home country will receive money from people who work abroad; which directly contribute to the increase of GDP and GNP; which always mean better quality of life and greater standards of living. For example, Ecuador lost almost five percent of its population between the years of 1999 and 2001, including 10,000 teachers and many other people with important skills; however, many of those people are now responsible for the livelihood of many other people at home by sending remittances back to their home country. It is evident that the movement of labour gives great chances to begin new small businesses in the home country. Additionally, these immigrants learn different languages, Technical expertise, management skills and other ideas abroad and transfer them to their home

countries. This movement of labour eventually leads to economic growth in both home and host countries, and offers a solution to the unemployment problem in their home countries. As for the host countries, the advantages as well as the disadvantages are many. The advantages include having cheap skilled labour (on the short-run); when labour migrate to a new country, it is rather right to say that they would settle for any salary and any living circumstances. But after gaining experience and better status at work, they will start asking for higher salaries and better standards of work environment. Also, population growth due to migration of labour leads to bigger market size; and great changes in the market demographics to cover all levels of society. No wonder that all of this can generate prosperity in the economy, and even great growth in all aspects of life.

The disadvantages cannot go unnoticeable. The risk of unemployment among the citizens of the home countries always remains a great concern; due to the labour influx to these countries with foreign workers taking jobs from the natives. Also, when population grows, stress on the infra-structure would increase; which could lead to bigger problems in the future for the government of the host countries. True globalization would not be possible if, labour did not move from one country to another, taking different languages, cultures, and traditions from one place to another, and across the world.

Capital

Capital moves because of its importance in the production process, for gaining bigger market share, for brand globalization, for security of investment, to facilitate free trade among nations, and for the fact that investors are always looking better and more returns on their investments. Capital movement has its own effects on both home and host countries, because capital is one of the most important factors of production that is directly linked to globalization in so many aspects. When capital flies to a foreign country, it creates better investment opportunities and better chance to initiate successful FDI. (Foreign Direct Investments) Additionally, new markets can emerge due to new investments and new product lines for new trends and different life styles. New Products and services come to the market due newly identified opportunities. The risk of nationalizing the new investment is always kept on mind; where the government can force individuals or multinationals to nationalize their investment. Cross-border investment and losing the investment to foreign hands is also a disadvantage that can occur from capital flight to a foreign nation.

As for the country sending the capital away, there would be advantages as well as disadvantages. Cross-border economic growth is one of the most considerable advantages; where the out-of –the- country investment can generate income which is sent back to the home country; which in turn can be translated to growth in local economy; the ultimate purpose of every nation. The risk of foreign hands taking over the local's economy is always a fear when sending capital to initiate investment in a foreign country. On the long run that can appear to be an obstacle facing any country considering FDI, or any other form of investment.

Technology

Technology transfer has its own effects on countries and contributes to the facilitation of globalization. When a country exports technology to foreign countries; that often means income earning generated from sales of technology to foreign countries. More money and income coming to any country contributes directly to the Balance of Trade and balance of Payment (more exports than

imports is always good news). This economic growth leads to the creation of new jobs in the local market; as solving the unemployment problem is the no.1 priority to any nation.

As for the host country receiving the technology, besides the fact that it is needed in the production process as an essential production input, it also contributes to the economy of scales; where the nation becomes slowly industrialized and begins to manufacture goods locally. Local industrial growth is closely related to improving standards of living, as well as increasing the GDP of the nation. Employment is also present in the bigger picture; as new jobs are being offered in new industries and factories.

The disadvantages of gaining new technologies are also present; as the pollution and environmental problems can occur due to growth in industries. Human-skills exploitation and human-rights abuses cannot go unmentioned; as people work in the expected new factories and plants, they are often exploited because, they tend to work longer hours for lesser pay than what obtains from the advanced Countries.

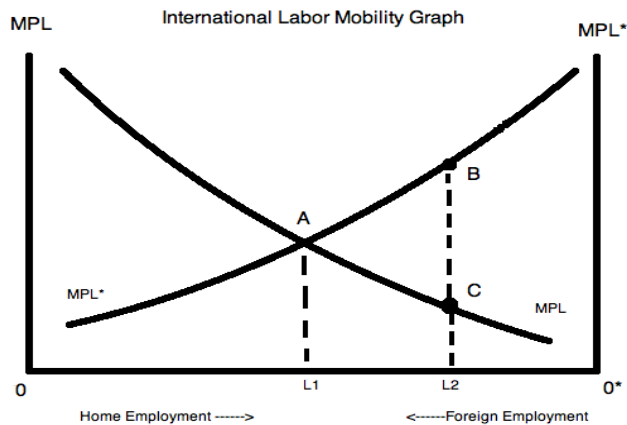
Raw Material

When a country exports raw materials, it gains income; which directly contributes to the increase of the GDP and GNP of the country. Growth of the economy is inevitable in such cases where the nation gains sustainable income.

The disadvantages of such process might include environmental pollution caused by using those raw materials in plants, as well as environmental exploitation to the process and the methodology involve in getting these raw materials. Evidently; this is usually at some cost to the environment in one way or another. Also, the host countries importing raw materials enjoy the good news of. Having the needed raw materials as inputs of production in the local market as well as in international markets. Finally, economic growth and social stability arises from this integration of resources, leading to the bigger picture of Globalization that is happening every day all around the world.

Examples of Labour Movement and its Importance in Facilitating Globalization

The following model illustrates the importance of labour movement. Home and foreign countries are each represented by a MPL curve. Initially, home labour force is at point C and foreign labour force is at point B. In the absence of labour mobility, these points would stay the same. However, when you allow labour to move between countries, assuming the costs of movement are zero, the real wage converges on point A and workers in Home move to Foreign where they will earn a higher wage.



The examples of Countries that allow free- labour movement are many; and here are some of them:

Japan: Japan used to have tight immigration laws, but since the early 1990's it has loosen up her strict laws to allow special entry permits for foreigners of Japanese ancestry to make up the shortage in the labor-force. According to Japanese immigration center, the number of foreign residents in Japan has been steadily increasing, and the numbers of foreign residents were more than 2.2 million people in 2008.

Countries in Europe: Some EU member states are currently receiving large-scale immigration of workers: e.g. Spain, Germany, Italy, The United Kingdom, France and recently Turkey.

The Relationship Between Trade and Factor Mobility

Commodity movements and factor movements are substitutes. Therefore, Factor movement is an alternative to trade that may or may not be a more efficient use of resources. There are two extreme cases between which the conditions in the real world can be found, there may be perfect factor mobility but no trade, or factor immobility with unrestricted trade.

The following section discusses how the mixture of factor mobility and free trade always lead to the highest resources allocation efficiency.

Substitution

When there is a significant variation of factors availability among countries, abundant factors move to countries with greater scarcity, to command a better return. As a result, in countries where labour is abundant compared to capital, labourers suffer from unemployed or low wages. If allowed, many of those abundant workers will move to nations that pay higher wages and enjoy full employment status or at least high employment rates.

Likewise, capital movement is done in the same manners, i.e. it moves from nations in which it's abundant to those in which it's scarce. A good example on that is movement of labour and capital between the United States and Mexico, whereas; Mexico gets capital from the United States, the United State gets workers from Mexico. If the movement of goods and factors of production i.e. capital, labour, technology and raw materials are permitted around the globe then the

comparative cost of transferring these goods and factors would be the sole determinant of the location of production.

Nevertheless, restrictions exist on trade and factor movement and this limits their global availability. For example, the U.S. immigration restriction imposed on Mexican workers that limit their ability to move to the United State and the Mexican ownership restrictions in the petroleum industry that limits U.S. capital movements to invest in the industry. Meanwhile, many other jobs that defy mechanization-such as bussing tables at restaurants and changing beds in hotels- are largely filled by unskilled immigrants in developed countries.

CONCLUSION and RECOMMENDATIONS

As Globalization describes the process by which regional economies, societies, and cultures have become integrated through communication, transportation, and trade. It increases the market for demand. Many critics wrote about its disadvantages and the bad effect of it. Nevertheless, we need globalization for its many positive effects on nations, but we need to have solutions to its disadvantages as well as to make the most out of globalization. The whole world can get benefit from globalization by minimizing its disadvantage in one of the following ways

The Choices

The main question of globalization: is it worth keeping? And how we can keep it? Actually we have three choices or alternatives, first alternative is to stay with the present situation, i.e. keep the situation as it is. Even though globalization increases human insecurity at the same time it opens many opportunities in the market for nations. This alternative is still under studies as it's become unacceptable.

Second alternative, is to move backward, to the time where there was no WTO, which become the symbol of globalization. But it's very hard to accept this alternative as WTO is powerful and opens many opportunities for people with endless new systems that have been successfully used. As result, the only acceptable and logical alternative is to manage globalization in a better way, so in doing this, it will downside the inequity, instability, and the insecurity and other negatives attributes that are associated with it so as to minimize the negative effects and maximized it's benefits. Fortunately, the negative trends of globalization can be reversed for the benefit of many nations.

Agenda for Action

While solutions may differ from country to country depending on the cultural and historical contexts in which they take place, The need of certain actual actions at t national level to appropriate economic and social policies are needed to capture the framework of opportunities in trades, as well as capital flow and migration to protect people against the vulnerabilities' that globalization creates. For example, Governments can manage trades and capital flows more carefully.

Finally, despite the negative aspects of Globalization one cannot deny its much bigger positive aspects. Simply stated, we cannot live without globalization. But. dealing with globalization and its negative effect should be studied and understood thoroughly in order to help people worldwide develop their home nations in the small village that globalization creates.

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STRATEGY FOR IMPROVING THE USE OF ELECTRONIC TEACHING AND LEARNING (E-LEARNING) IN AGRIC SCIENCE AND HOME ECONOMICS IN TERTIARY INSTITUTIONS OF ANAMBRA STATE-NIGERIA

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Abstract

The paper sought to identify the strategies for improving the use of electronic teaching and learning of agricultural science and home economics in tertiary institutions of Anambra State. Simple random sampling was used in selecting 30 lecturers and 150 students of agricultural science and Home Economics education. The questionnaire was the instrument used for data collection. The data collected were analysed using mean and frequency counts. The findings of the study revealed that most schools lack some of the e-learning devices and the problems facing the use of e-learning network in teaching include poor power supply, financial problems, low computer literacy level, low quality and expensive nature of VAST connections etc. The strategies that could be adopted to improve the use of electronic teaching and learning include amongst others training of teachers in ICT, allocation of more fund for e-learning, schools to source out fund, and telephone lines to be digitalized.

INTRODUCTION

Electronic teaching and learning represents the latest innovation in education delivery system. It offers flexibility in space and time teaching on-line involves use of the world wide web. An instructor has to develop a course syllabus, develop goals and objective, select quality textbooks and journal article readings, create learning exercises and develop quiz and examinations. The instructor should have assistance with all of the software required to deliver on-line courses. Some sites on the web offer photo essays, documents, articles and recordings. These provide raw materials with which you can fashion a focused and relevant assignment for discussion (Ko & Rosen, 2004). They further stated that discussion forums are essential for creating meaningful interactions among students and between Jegede (2005) described electronic learning as the presentation and delivery of the materials using the electronic media. Also Ajayi, (2005) defines e-learning and learning through electronic means such as via the web, internet or other multimedia materials like computer, projector, television, audio and audio visual cassette, radio disc e.t.c, the learner whether far or near have easy access to quality learning materials have robust and unlimited interaction with instructional contents, facilitators and other learners and are given support and appropriate time, make reasonable and responsible contributions to the learning process.

To design and deliver on-line course instructors require a thorough knowledge of the main components of on-line teaching and learning. Khan (1997) identifies the critical components of online education; content development multimedia component, internet tools, computers and storage devices service providers, authoring programs, servers, browsers and other applications

Abidoye (2010) identifies the following learning devices as effective communication tools in teaching and learning

1. Multi-media device – multimedia is in form of streamline audio video, screen images, and three dimensional graphics which can drastically enhance e-learning
2. Web based training (WBT). This is an on-line learning platform containing communication and course management tools on an intranet or internet.
3. Synchronous internet communication (SIC). This includes things like charts, video conferencing via the internet and voice charts.
4. Hybrids: These are any combinations of synchronous internet communication (SIC) and web based training (WBT) with classical classroom training or hybrids make personal contact between participants and instructors or teachers

The instructors or teachers must have a clear understanding of learning and instructional theories to create the content and developed components of online courses. They must also have a thorough understanding of instructional design and curriculum development theories. This would include knowledge of instructional systems design, process analysis design, development, implementation and evaluation, cognitive learning theories and constructivism.

STATEMENT OF PROBLEM

Good educational policies are backed with well designed programs which for part of adequate political will on the part of government and educational institution authorities are ineffectively and inefficiently implemented. Thus has led to learners not being adequately exposed to those experiences that will guarantee the total development of their being. At present we live in a global village. Around the globe the latest and most complex technology is the area of information and communication technology. The growth in on-line technology and its application in education have brought great transformation in the world. The use of ICT gadget has made teaching and learning less burdensome effective and result oriented by providing cyberspace for learning, avenue for sharing idea and information. The level of development in any society is usually determined by the quality and quantity of knowledge in the various spheres of human activity available to and acquired by the citizens.

Knowledge is acquired and sustained through efficient information and communication system based on the technology level attained, children in any country who fail to use and master new technologies would definitely lack behind. However, there are many constraints in delivering the ICT to the right people at the right time. In developing countries like Nigeria, there is frequently a shortage of qualified ICT teachers, and lack of fund. The rapid changes that have taken place all over the world poses a challenge to the educational sector. There is the need to enrich the present tertiary institutions which ICT program for effective teaching and process.

PURPOSE OF THE STUDY

The aim of the study is to identify the strategies for improving the use of electronic teaching and learning in agric science and home economics in tertiary institutions of Anambra State. Specifically the study intends to find out

1. The E-learning devices that are available for the teaching of agric science and Home economics in tertiary institutions of Anambra State.
2. The role of e-learning network in teaching and learning of agric science and Home economics.
3. The problems facing the use of e-learning network in teaching and learning of agric science and Home economics education.
4. Strategies for improving the use of electronic teaching and learning in agric science and home economics.

SIGNIFICANCE OF THE STUDY

The result of the study would be of immense benefits to the government. The results of the study would show the devices that are lacking in these institutions so that the government would supply them to the schools. Schools now will increasingly use ICTs to reduce the cost and improve the efficiency of administration. The quality of education will be raised since routine repetitive tasks can be automated with the use of ICT infrastructure. Through equipping the schools with ICT devices, the learners will have access to a wide range of information resources. This will also enable the teacher to manage a large class effectively and makes the tasks of teaching simplified.

RESEARCH QUESTIONS

The following research questions were posed to guide the study

1. What are the e-learning devices available for the teaching and agric science and Home economics in tertiary institutions of Anambra State?
2. What roles do e-learning network play in the teaching of agric science and Home economics in tertiary institutions of Anambra State?
3. What are the problems facing the use of e-learning network in the teaching of agric science and home economics in tertiary institutions of Anambra State?
4. What strategies could be adopted to improve the use of electronic teaching and learning in agric science and Home economics?

METHODOLOGY

The population of the study comprised all the agricultural science and home economics students and lectures in the tertiary institutions of Anambra stat that offer agric science and home economics education.(Federal College of Education (Tech) Umunze and Nwafor Orizu College of Education Nsugbe).

Table 1 (a). The Population were as follows:

	Lecturers	Students
Agric science	29	79

Home economics	21	104
Total	50	183

Source: statistics unit: NOCEN and F.C.E.(T) Umunze)

Sample and Sampling Techniques

Simple random sampling was used in selecting 15 lecturers each from agric science and Home economics. Also random sampling was used in selecting 75 each of agric science and home economics students. Thus the sample size become 30 lecturers and 150 students making it a total of 180 respondents.

Instrument for Data Collection

The instrument for data collection was questionnaire which sought the view of the respondents on the strategies for improving the use of e-learning in agric science and home economics education. A four point scale strongly agree (SA), Agree (A), disagree (D) and strongly disagree (SD) was used to elicit information from the respondents.

Validation of the Instrument

The instrument was validated by processing to two experts each in agricultural education and home economics of F.C.E. (T) Umunze and the validators made some comments which formed the basis for either modifying or rejecting some of the items.

Reliability of the Instrument

To determine the reliability of the instrument, copies of the questionnaire was given to the agricultural science and home economics students in tertiary institution of Abia State after which the data collected was computed using crombach alpha. An internal consistence of 0.82 was obtained for the instrument.

METHOD OF DATA ANALYSIS

The data collected were analysed using mean. The mean was calculated by assigning nominal value to the response categories-strongly agree (SA) 4, agree (A) 3, disagree (D) 2 and strongly disagree (SD) 1.

The main then is

$$\frac{4 + 3 + 2 + 1}{4}$$

$$= \frac{10}{4} = 2.5$$

Using an interval scale of 0.5 was added to the mean to give 3.00. Any response of 3 and above is regarded as agreed while response rating less than 3.00 is regarded as disagree.

RESULTS

Table 1 (b): Mean Responses of Respondents on E-learning Devices available for the Teaching and Learning of Agricultural Science and Home Economics.

S.N	ITEMS	SA	A	D	SD	N	\bar{X}	DECISION
1.	Web based training	-	-	-	180	180	1.00	Disagree
2.	Synchronous internet	-	-	80	100	100	1.44	Disagree
3.	Communication (SIC)	90	90	-	-	180	3.50	Agreed
4.	Audio-video	95	85	-	-	180	3.53	Agreed
5.	3 dimensional	-	-	-	180	180	1.00	Disagree
6.	Internet	180	-	-	-	180	4.00	Agreed
7.	Computers	180	-	-	-	180	4.00	Agree
8.	Projector	80	100	-	-	180	3.44	Agree

Items 1, 2 and 5 had mean values below the cut-off point of 3.00 and was disagreed by the students while the other items had mean values above the cut-off point of 3.00 and was agreed by the respondents

Table 2: Mean Responses of Respondents on the Role of E-learning Network in the Teaching of Agricultural Science and Home Economics.

S.N	ITEMS	SA	A	D	SD	N	\bar{X}	DECISION
1.	Help teachers to demonstrate experiments and concepts	80	100	-	-	180	3.44	Agreed
2.	Cover a large number of people spread over a wide area	85	85	10	10	180	3.31	Agreed
3.	e-learning is cost effective	180	-	-	-	180	4.00	Agreed
4.	Provides opportunity for individualization of learning	90	90	-	-	180	3.5	Agreed
5.	Offers a greater variety of learning resources	180	-	-	-	180	4.00	Agreed
6.	Creates greater opportunity for interactive learning	95	85	-	-	180	3.53	Agreed
7.	Raises the overate quality of	180	-	-	-	180	4.0	Agreed

	education							
8.	Provision of access to unlimited information from different sources	160	20	-	-	180	3.88	Agreed

All the items in table above had mean values above the cut-off point of 3.00 and were agreed by the respondents.

Table 3: Mean Responses of Respondents on the Problems Facing the Use of E-learning Network in Teaching Agricultural Science and Home Economics.

S.N	ITEMS	SA	A	D	SD	N	\bar{X}	DECISION
1.	Poor power supply	140	40	-	-	180	3.78	Agreed
2.	Financial problem	120	60	-	-	180	3.67	Agreed
3.	Inability to sustain the use of e-learning network	180	-	-	-	180	4.00	Agreed
4.	Low computer literacy level of teachers	150	30	-	-	180	3.83	Agreed
5.	Low computer literacy level of students	140	40	-	-	180	3.78	Agreed
6.	Inability of the government to support intensive use of e-learning network for teaching and learning	170	10	-	-	180	3.94	Agreed
7.	Quality assurance i.e finding and fixing errors before the e-learning predict is used	130	50	-	-	180	3.72	Agreed
8.	Low quality and expensive nature of VSAT connections	80	100	-	-	180	3.44	Agreed

All the items in table 3 above had mean values above cut-off point of 3.00 showing that the respondents agreed in all the items.

Table 4: Mean Ratings on the Strategies to be Adopted to Improve the Use of E-learning

S.N	ITEMS	SA	A	D	SD	N	\bar{X}	DECISION
1.	Training of teaches in ICT	180	-	-	-	180	4.00	Agreed
2.	Government to allocate more fund for implementation of e-learning	110	70	-	-	180	3.61	Agreed
3.	Problem of erratic power supply to be addressed	180	-	-	-	180	4.00	Agreed

4.	Workshops to be organized for teachers students on ICT	135	45	-	-	180	3.75	Agreed
5.	Adequate employment of ICT teachers in schools	80	100	-	-	180	3.44	Agreed
6.	Schools to source out funds for their ICT centres	95	85	-	-	180	3.53	Agreed
7.	Telephone line to be digitalized so that people will get connected to internets	90	90	-	-	180	3.50	Agreed

All the items had mean values above the cut-off point of 3.00 and was agreed by the respondents

DISCUSSION

Results in table 1 showed that schools offering agriculture and home economics education in Anambra state have some of e-learning devices such as audio video, 3 dimensional graphics, internet, computers and projectors while others like synchronous internet, web based training, screen images etc are lacking. The findings are in line with what Onyeanu (2009) found out that computer and other ICT facilities are expensive to purchase and as such not all school can offered the purchase of ICT facilities. Also, Ajayi (2002) observed that most of our educational outlets are not yet computerized and therefore the professionals do not have access to the different information and communication technologies. The reason being the poverty level affecting the schools.

Research question 2 seeks to find out the role of e-learning network in the teaching of agricultural science and home economics. Results revealed that e-learning networks helps teachers demonstrate experiments and concepts, cover a large number of people, provides opportunity for individualization, offers a great variety of learning resources, creates a greater opportunities for interactive learning, raises the overall quality of education and provides access to unlimited information from different sources. Okoroh (2006) observes that ICT facilities do not only help students but they also assist teachers in the preparation of teaching materials demonstration of equipments and concept.

Research question 3 was designed to find out the problems facing the use of e-learning network in teaching and learning of agricultural science and home economics education. Results revealed that such problems as finance poor power supply, computer literacy level, poor support from governments quality assurance, low quality and expensive nature of VSAT connections affect the use of e-learning. That is why Ozoji (2003) stated that lack of fund affects the use of ICT in teaching as many schools lack ICT materials even those that have them cannot properly maintain them due to lack of money.

Results in table 4 revealed that strategies to be adopted to improve the use of e-learning in teaching includes training of teachers in ICT, government to allocate fund to ICT, problem of poor power supply to be addressed, schools to source out funds and telephone lines to be digitalized. In his write up Okereke (2009) stated that there is a compelling need for training and retraining of teachers in the effective use of information and communication technology.

RECOMMENDATIONS

Based on the findings, the following are recommended

1. Provision of ICT infrastructure to schools by the government
2. Efforts should be put to ensure a continuous steady supply of electricity
3. Seminars, workshops, conferences to be organized for pre-service and in-service teachers
4. Adequate fund should be allocated for the development of ICTs in schools.

CONCLUSION

The rapid changes that have taken place all over the world poses a challenge to the educational sector. There is the need to use e-learning in teaching and learning in schools as this will enhance and complement learning and teaching of agric science and home economics.

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PSYCHOLOGICAL CONTRACT AND JOB OUTCOMES: MEDIATING ROLE OF AFFECTIVE COMMITMENT

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Abstract

In this cross sectional field survey we examined the relationship between psychological contracts, affective commitment and job outcomes. The data was collected from 302 employees of several organizations in a large city of Pakistan. The results revealed that affective commitment fully mediated between relational contracts and job satisfaction and affective commitment mediated the relationship between relational contracts and turnover intention

Key Words: Psychological Contracts, Affective Commitment, Job Outcomes

INTRODUCTION

Researchers have carried out ample research on two important constructs in organizational behavior literature psychological contracts and affective commitment (Allen & Meyer, 1996; Raja, Johns & Ntalianis, 2004, Robinson & Rousseau, 1994). We investigated the linkage of 02 hot topics of current OB research with specific focus on establishment of key links through which the psychological contracts and outcome relationship exists. As it is evident from research that processes through which job behaviors are determined are much more important than job outcomes itself (Colquitt, Greenberg, & Zapata-Phelan, 2005). Firstly, this study is aimed to investigate the relationship between psychological contracts and job outcomes (job satisfaction & intention to quit). Secondly, exploration of the mediating process of affective commitment in relationship between psychological contract and outcomes. “Psychological contract is an exchange relationship between employee and employer “(Schein, 1978). It is about the individual’s beliefs, potential opportunities and mutual commitment in exchange relationships (Rousseau, 1989). “Psychological contract are of two types, relational contract and transactional contract (Morrison & Robinson 1997; Rousseau, 1995).” “ Relational contracts are associated with emotional interactional dimensions, with non- financial, socio emotional, intrinsic focus between employees and employers (Rousseau, 1995).” “Transactional contract explain the economic exchange relations with extrinsic, financial and narrow focus. The construct of psychological contract derived from social exchange theory (Blau, 1964; Organ, 1988).”

Social exchange relationships involve economic as well as exchange of socio-emotional benefits (Cropanzano, Rupp, & Byrne 2003). Affective commitment can be defined as emotional binding and employees’ desire to be identified and affiliated with organization. It comprises of magnified emotions of attachment, belongingness and constancy (Meyer & Allen 1993). As both of these constructs are related to cognitive and emotional attachment of employees with the organization due to some extrinsic and intrinsic factors. All those positive factors which are the basis for formation of psychological contract (economic and socio emotional) are considered the antecedents for higher levels of affective commitment. Exchange of economic as well as socio

emotional benefits from employer to employee causes the increased level of affective commitment, which works as a mechanism through which individuals with certain types of contracts are linked to job outcomes. Social exchange theory provides strong logical support in establishment of this mediation mechanism of affective commitment in this study.

Psychological Contracts and Job Outcomes

“Psychological contract is defined as a person’s perception and expectations about the shared obligation in an employment exchange relationship (Rousseau, 1989)”. Psychological contract is some thing that is beyond or more than expectation. It is an implicit unwritten and non verbal expectation of employees and employers (Schein, 1978). “Psycho logical contract is a relationship of the mutual obligation between employee and employer (Rousseau, 1989)”. “Each individual hold his / her different perception of mutual obligation under the contract (Robinson, Kraatz & Rousseau 1994)”. “Psychological contract is belief or perception and promise that rules and regulations accepted by employees and employer (Robinson & Rousseau 1994)”. MacNeil’s (1985) explained two major types of contracts; Transactional contract and the relational contract. “ Transactional contracts are economically based and short-term oriented (Morrison & Robinson, 1997; Raja et al., 2004; Rousseau, 1990).” Rousseau (1990) defined those having their contract as transactional characterized as have “high competitive wage rates and absence of organizational commitment” (p. 391) generally organizations temporarily hire individuals for specific purpose in order to meet current requirements.

The relational contract includes long term and extensive obligations, based on exchange of socio -emotional components such as loyalty, commitment and trust (Raja et al., 2004; Robinson, Kraatz & Rousseau 1994; Rousseau, 1990; Rousseau & McLean Parks, 1993).

“Generally, in relational contract firm hire individuals and train them in order to meet future needs (Miles & Snow, 1980)”. “Rousseau (1990) argues that in relational psycho logical contract employees want to make a long-term relationship with their employers or organization.” The employees’ relation with the firm changes with the phases of time.

Job satisfaction can be defined as “a positive or negative evaluative judgment of one’s job or job situation” “(Weiss & Cropanzano, 1996, p. 2). Job satisfaction is said to be a function of the perceived relationship between what one wants from one’s job and what one perceives it as offering (Locke, 1969). Following this logic, a discrepancy between promised and received inducements is likely to lead to feelings of dissatisfaction.”

Hoppock’s (1935) found a strong correlation between workers’ emotional adjustment and their levels of job satisfaction. “Lock (1976) found that individuals react affectively when they get outcomes inconsistent with their expectations. These affective reactions can be positive when outcomes encountered are valued and pleasant. Consistent with this argument it is likely that job satisfaction will be more positive when it is felt that received outcomes are consistent with an individual’s expectation”. Relational contract based on exchange of socio - emotional components such as loyalty, commitment and trust, therefore employees in relational contract are generally more satisfied (Raja et al., 2004; Robinson, Kraatz & Rousseau 1994; Rousseau, 1990; Rousseau & McLean Parks, 1993). Relational contract was positively related to job satisfaction and transactional contract was negatively related to job satisfaction (Millward & Hopkin 1998; Raja et al., 2004). Keeping in view this literary support, we propose the following hypothesis.

Hypothesis

H0,a: Relational contract will be positively related to Job satisfaction.

H0,b: Transactional contract will be negatively related to job satisfaction.

Employee may leave the organization voluntarily or involuntarily due to certain reasons. Turnover intention is defined as employee's decision to leave the organization (Mobley 1977). Voluntary turnover may be due to unfavorable work environment, better career objectives and attractive financial sources. Organization may want to terminate the employee due to incompatibilities, or retire the person due to old age or death is also included in involuntary turnover (Mobley, 1977). The relational contract includes long term obligations, based on socio-emotional components such as loyalty, commitment and trust (Robinson, Kraatz & Rousseau 1994). Literature support that when employees exhibit relational contract, they have less or no turnover intention, on the other hand the transactional nature of contract are in which employees exhibit high turnover intention (Morrison & Robinson, 1997; Raja et al., 2004; Rousseau, 1990). Keeping of above support in view this research purposed that

H0_{2a}: Relational contract will be negatively related to intention to leave.

H0_{2b}: Transactional contract will be positively related to intention to leave.

Affective Commitment and Job Outcomes

The major acceleration in affective commitment literature was the contribution of Allen and Mayer (1990) they defined affective commitment as Individuals' emotional connection, feeling of ownership and inner desire to be identified with organization. There are four facets of affective commitment: individuals' personal attributes, structural factors, job related features and tenure (Mowday, Porter & Steers 1982). Personal characteristics include demographic variables such as age, sex, education and tenure are linked to commitment (Angle & Perry, 1981). Meta analysis by Meyer, Stanley, Herscovitch, and Topolnysky (2002) proves that affective commitment is negatively correlated with turnover and job satisfaction.

Allen and Meyer (1996) reported several studies with strong positive correlation between affective commitment and job satisfaction. The correlation values ranged from ($r = 0.50$ to $r = 0.64$, $p > 0.05$) for reported from eight different studies (p, 262). The strong positive relationship has been found in several studies between affective commitment and job satisfaction (Jenkins, 1993; Konovsky & Cropanzano, 1991; Lee, 1992; Lynn, 1992; Morrison, 1994, Withey, 1988). Literature provides considerable empirical evidence on the association between affective commitment and turnover intention (Huselid & Day 1991; Lverson & Buttigieg, 1999; Mowday et al., 1982). The Meta analysis by Griffeth, Hom & Gaertner, (2000) and Mayer et al., (2002) proves that affective commitment is negatively correlated with employees turn over intention. Employees with affective commitment are more to have intentions to remain with the organization (Meyer, et al., 1993). Affective commitment has developed strong research background with turnover intention (Mowday, Porter & Steers, 1982; Griffeth et al., 2000). Therefore current study purpose that

H0_{3a} : Affective commitment will be positively related to job satisfaction.

H0_{3b} : Affective commitment will be negatively related to turnover intention.

Psychological Contract and Affective Commitment

“Affective commitment related to emotional attachment with the organization (Allen & Mayer, 1990).” Mayer and Allen (1991) suggest that an influenced by the extent to which the individuals' expectations about the organization are coordinated by their actual experiences. “This clearly links with the perceived reciprocal obligations of the psychological contract (Robinson et al., 1994). Previous literature has established the relationship between psychological contracts and organizational commitment (Millward & Hopkins, 1998; Raja et al., 2004; Rousseau, 1990).”

Relational contract based on socio emotional components like commitment and trust

(Robinson et al., 1994). Relational contract has positive significant association with organizational commitment (Millward & Hopkin 1998; Raja et al., 2004).

“Transactional contracts are economically based and short-term oriented (Morrison & Robinson, 1997). Transactional contract are monetary in nature with short term time orientation (Raja et al., 2004; Rousseau, 1990)”. “Rousseau (1990) argues that those with transactional psychological contracts are likely to have high competitive compensation with low organizational commitment”. So transactional contract is negatively related to the organizational commitment (Millward & Hopkin, 1998; Raja et al., 2004). On the basis of this literature support, we propose the following hypothesis.

H0_{4a} : Relational contract will be positively related to Affective Commitment.

H0_{4b} : Transactional contract will be negatively related to Affective Commitment.

Affective Commitment as Mediator

“Social exchange theory suggests that one’s relationship with an employer provides a proximal cause for work attitude and turnover intentions (Cropanzano et al., 2003).” Psychological contracts and affective commitment both are related to cognitive and emotional attachment of employees with the organization. According to social exchange theory (economic and socio emotional) exchanges form some psychological link of employees with organization. On the other hand these exchanges are considered to be the antecedents for higher levels of affective commitment.

Exchange of economic as well as socio emotional benefits from employer to employee causes the increased level of commitment for relational contract employee and decreased level of affective commitment for transactional employee. This phenomena based on social exchange theory provides strong logical support in establishment of this mediation mechanism of affective commitment in this study.

The Attitude- Behavior Theory (Fishbein & Ajzen's, 1975) also supports this notion of affective commitment mediation mechanism between psychological contract and outcomes. This theory suggests that job attitude originated from individuals' beliefs about the different aspects of the environment. Affective commitment can be considered as an attitudinal reaction which resulted from employment experiences and beliefs about the work environment (Rousseau, 1995). A belief that in case of relational contract should positively affect the attitude (commitment) towards the organization and for transactional contract should negatively affect commitment towards the organization. Thus we propose that affective commitment is the mechanism through which individuals outcomes are leading towards individuals’ psychological contracts. We therefore suggest hypothesis about the mediation of affective commitment between psychological contracts and outcomes.

H0_{5a} : Affective commitment mediate the relationship between relational contract and job satisfaction.

H0_{5b} : Affective commitment mediate the relationship between transactional contract and job satisfaction.

H0_{6a} : Affective commitment mediate the relationship between relational contracts and turnover intention.

H0_{6b} : Affective commitment mediate the relationship between transactional contracts and turnover intention.

RESEARCH METHODOLOGY

Sample and Procedures

Our survey consists of employees of 8 different organizations from private and public sector of Pakistan. Two of the organizations were top telecom companies and five were well-established universities. One of the organizations is well known multinational company.” In a brief cover letter we explained the research objective and scope of the study along with guarantee of rigid confidentiality. In total 400 questionnaires were circulated in the above mentioned organizations.

Overall, 331 filled questionnaires were returned. After discarding unusable questionnaires, we left with 302 useable responses resulting in effective response rate of 76 %. Respondents include the individuals working in all management levels. The qualification of respondents ranged from high school to post graduate and 82 % of the sample consisted of graduate employees.

The mean age of the respondents is 31.71 years with (S.D = 8.26) and 69 % of the respondents were male, which indicates positive growth of female participation in different organizations of Pakistan as compared to reported 6% female participation by (Raja et al., 2004).

Measures

All measures were collected through self reported instrument in which participants responded on 5 or 7 point likert scales. Reported values above the mean considered as higher level of constructs in the questionnaire. As English is the medium of instruction in Pakistani education institutions. Few other studies are conducted in English in Pakistani context like (Butt, Choi & Jaeger, 2005; Raja et al., 2004). This raised our confidence in not using translated scales, to avoid translation and back translation issues.

Job Satisfaction

Job satisfactions were measured using Hoppock's (1935) 04 items scale.. A sample item is: “how much of the time you feel satisfied with your job”. Cronbach's alpha of this scale is (.86).

Affective Commitment

Affective commitment was measured using Meyer and Allen's (1990) eight-item scale. Responses were made on a five-point scale ranging from 1= ‘strongly disagree’ to 5 = ‘strongly agree’. A sample item is” “I would be very happy to spend the rest of my career in this organization”. The Cronbach's alpha of this scale in current data found (.85).

Psychological Contract

20 items Psychological Contract Inventory (PCI) by Rousseau (2000) was used to measure psychological contracts.” Relational and Transactional contracts were measured using 10 items for each contract type. Responses were made on 5–point likert scale ranging from 1= ‘strongly disagree’ to 5= ‘strongly agree’. The sample item for relational contract was, “Is responsive to employee concerns and well-being “and for transactional contract it was, “pay me only specific duties I perform”. The alpha reliabilities for relational contract found (.89) and for transactional contract it was found (.89).

Turnover Intention

Turnover intention was measured using 03 items scale by Cammann, Fichman, Jenkins and Klesh (1982). Responses were made on 5–point likert scale and the sample item included was, “I often think about leaving the organization”. Cronbach alpha for this measure was found (.86).

Control Variable

The results of One-way ANOVA showed significant differences in dependent and mediator variables with three demographic factors; Organization type, designation and field of specialization. All other demographic factors like age, gender and tenure revealed highly insignificant impact on mediator and job outcomes. Therefore, only three variables; organization type, designation and field of specialization were entered into the equation as control variable, when we performed Multiple Regression in this study.

RESULTS

Descriptive Statistics and Correlations

In the table 1 of this study mean and correlations with Alpha reliabilities are reported in bold parenthesis in front of each variable. The descriptive analysis results revealed mean value for affective commitment 2.99 (S.D = 1.11) and the mean value for outcomes were 4.47 (S.D = 1.25) for job satisfaction and 3.17 (S.D = 0.77) for intention to leave.

Affective commitment of the employees and the level of job satisfaction demonstrated strong positive relationship ($r = 0.71, p < .001$) consistent with ($r = 0.67, p < .01$) reported by Raja et al. (2004). The association of commitment and intention to quit was ($r = -0.73, p < .001$) which is consistent with the reported correlation values ($r = -0.66, p < .001$) by Raja et al. (2004). The mean of the relational contract found 3.12 (S.D = 0.75) and for transactional contract 3.15 (S.D = 0.83). The correlation value between psychological contracts and turnover intention found ($r = -0.56, p < .001$) for relational and ($r = 0.61, p < .001$) for transactional contract. We found strong significant support for all main effect hypothesis from correlation matrix analysis reported in table 1.

Table 1: Mean, Standard Deviation, Correlation and Reliabilities

Variables	Mean	S.D	1	2	3	4	5	6	7	8	9	10
1.Age	31.72	8.27										
2.OrgName	4.37	2.58	.17									
3.Designation	2.68	.55	-.57	-.04								
4.Education	3.56	2.49	.36	.07	-.50							
5.Specialization	3.02	.79	.31	.40	-.15	.26						
6.Transaction Contract	3.15	.83	-.15	-.12	.22	-.1	-.07	(.89)				
7.Relational Contract	3.12	.75	.05	-.09	-.09	0	-.08	-.49	(.89)			
8. Affective Commitment	2.99	1.11	.12	0	-.19	.08	-.08	-.61	.57	(.85)		
9. Turnover Intention	3.17	.77	-.14	-.08	.18	-.07	-.08	.61	-.56	-.73	(.86)	
10.Job Satisfaction	4.47	1.25	.20	.05	-.24	.11	.04	-.62	.48	.71	-.74	(.86)

Regression Analysis

Table 2 show results of hierarchical regression analysis. In first step of regression analysis we entered organization types, specialization, and designation as control variables in the equation. In the second step we regressed satisfaction of employees and intent to quit on psychological contract types.

Psychological Contract and Job Outcomes

Hypothesis 1(a) predicts that relational contract will be positively related to job satisfaction and hypothesis 1(b) proposes the negative relationship between transactional contract and job satisfaction. We regressed job satisfaction on both of these contract types and results revealed that job satisfaction ($\beta = .47, p < .001$) was positively related to relational contract and negatively related ($\beta = -.60, p < .001$) to transactional contract.

These strongly significant empirical support confirmed our first main effect hypothesis which was found consistent with previous literature on psychological contract and job satisfaction.

Hypothesis 2(a) proposed negative relationship between relational contract and turnover intention. The results provided strong empirical support of our hypothesis. Turnover intention ($\beta = -.56, p < .001$) found negatively related to relational contract and ($\beta = .59, p < .001$) was related positively with transactional contract.

Affective Commitment and Job Outcomes

Hypotheses 3(a) predict positive relationship between affective commitment and job satisfaction and 3(b) predicts negative relationship between affective commitment and intent to quit. To test these relationships both of the outcomes were regressed on affective commitment. Regression results significantly supported our hypotheses, affective commitment found ($\beta = .69, p < .001$) positively related to job satisfaction and ($\beta = -.73, p < .001$) negatively related to intention to quit. These highly significant results provided strong support of our hypotheses 3(a) and 3(b).

Psychological Contracts and Affective Commitment

Hypothesis 4(a) proposed the positive relationship between relational contract and affective commitment and hypothesis 4(b) proposed the negative relationship between transactional contract and affective commitment. To test these predicted relationships affective commitment was regressed on both of psychological contract types. The results provided strong empirical evidence in support of our hypotheses 4(a) and 4(b).

For mediation analysis, in step 1, we entered control variables. In second step, the mediator affective commitment was entered. In the third step, psychological contract was entered in equation and was regressed on job satisfaction and turnover intention.

Table 2:

Predictors	<i>Affective Commitment</i>			<i>Job Satisfaction</i>			<i>Intention To Quit</i>		
	β	R ²	ΔR^2	β	R ²	ΔR^2	β	R ²	ΔR^2
Model 1:									
Main effects									
Contract Types									
Step 1									
Control Variables		.05			.06			.04	
Step 2									
Transactional Contract	-.6***	.39	.34***	-.6***	.40	.34***	.59***	.37	.33***
Relational Contract	.55***	.35	.30***	.47***	.27	.21***	-.56***	.34	.3***
Model 2:									
Affective Commitment									
Step 1									
Control variables					.06			.04	
Step 2									
Affective commitment				.69***	.52	.46***	-.73***	.55	.51***

“N= 302 Organizational Types, Specialization and Designation was used as control Variable

***p< .001, **p< .001, *p< .05”

Mediation Analysis

We predicted that affective commitment mediates the relationship between contract types and outcomes (job satisfaction and turnover intention). According to Baron and Kenny (1986) mediation can be established with three regression tests”. First contract types (independent variable) should be related to affective commitment (mediator). Second, contract types and mediator (affective commitment) should be related to both outcomes. Third when both contract type (independent variables) and affective commitment (mediator) are concurrently incorporated in regression equation, then the relationship between contract types (independent variables) and the outcomes should be considerably weaker than the main effects of predictor and criterion variables. For mediation analysis, in step 1, we entered control variables. In second step, the mediator affective commitment was entered. In the third step, psychological contract was entered in equation and was regressed on satisfaction with intention to quit.

We regressed job satisfaction, affective commitment and relational contract together as per conditions prescribed by Barron and Kenny (1986). As shown in table 3, results of multiple regression revealed significant reduction in variances (from $\beta = .47***$ to .05 n.s and $\Delta R^2 = .21$, to $\Delta R^2 = .05$). These result confirmed full mediation condition prescribed by Barron and Kenny (1986) providing support of our hypothesis 5(a).

We regressed job satisfaction, affective commitment and transactional contract together as per conditions prescribed by Barron and Kenny (1986). As shown in table 3, results of multiple regression revealed no significant reduction in variances (from $\beta = -.60***$ to $-.55**$). These result unable to fulfill mediation condition prescribed by Barron and Kenny (1986) providing no support and reject our hypothesis 5 (b).

Hypothesis 6 (a) states that affective commitment mediate the relationship between relational contract and turnover intention. To test the mediating effect of affective commitment, we regressed turnover intention, affective commitment, and relation contract together. Results in

table 3 shows significant drop in variances (from $\beta = -.56^{***}$ to $-.17$ n.s and $\Delta R^2 = .33$, to $\Delta R^2 = .05$). These result confirmed full mediation condition prescribed by Barron and Kenny (1986) providing support of our hypothesis 6 (a).

Hypothesis 6 (b) states that affective commitment mediate the relationship between transactional contract and turnover intention. To test the mediating effect of affective commitment, we regressed turnover intention, affective commitment, and transactional contract together. Results in table 3 shows no significant drop in variances (from $\beta = -.59^{***}$ to $.57^{***}$).

Table 3

<i>Predictors</i>	<i>B</i>	<i>Job Satisfaction</i>		β	<i>Intention To Quit</i>	
		<i>R²</i>	ΔR^2		<i>R²</i>	ΔR^2
Model 1						
Main Effects						
Step 1						
Control Variables		.05			.04	
Step 2						
Transactional Contract	-.6***	.4	.34***	.59***	.37	0.33***
Relational Contract	.47***	.35	.21***	-.56***	.34	0.33***
Model 2						
Mediation of						
Affective Commitment						
Step 1						
Control Variables		.6			.04	
Step 2						
Affective Commitment		.51	.46		-.55	.52
Step 3						
Transaction Contract	-.55**	.26	.25**	.57***	.33	.22***
Relational Contract	.05	.57	.05	-.17	.61	.05

These result unable to fulfill mediation condition prescribed by Barron and Kenny (1986) providing no support and reject the hypothesis 6 (b).

N= 302 Organizational Types, Specialization and Designation was used as control Variable

***p< .001, **p< .001, *p< .05

DISCUSSION

The purpose of this research was to investigate the motivational and emotion antecedents of job satisfaction and turnover intention. In doing this, we endeavor to relate the various construct of organizational behavior such as psychological contract, affective commitment satisfaction on the job and intention to quit.

Overall, our finding/results give strong support for all hypotheses. We found that psychological contract (relational and transactional) significantly related to job outcomes (Hypotheses 1,1a,2,2a). Psychological contract is related to job outcome such as job satisfaction and turnover intention. A Meta analysis Zhao et al., (2007) supports the relationship of psychological contract with job outcomes such as job satisfaction turnover intention and citizenship behavior. We also found that psychological contract (relational and transactional contract) is significant linked with commitment (Hypothesis 4,4a) and affective commitment is significantly related to job satisfaction and turnover intention(Hypothesis 3,3b).The contribution of this research is that affective commitment mediates the relationship between psychological relational contract and job outcomes(Hypothesis 5a, 6a). These finding demonstrate that when promise build, the employees in workplace feel emotional attachment with the organizations which increase job satisfaction and decrease their turnover intention.

Limitation of Study

This research has several limitations. First, this research in cross sectional in nature, we believe that longitudinal study would better explain these relationships. Second, all findings were based on self reported, while previous studies also used self reported measure (1996; Morrison & Robinson, 1997; Robinson & Morrison, 2000) so there is a possibility common method error.

Practical Implementation & Future Research

The results of our study have practical implication for managers and employees, our finding suggest that mangers should focus on employee's satisfaction, and it would be possible if employees feel emotional attachment with the organization, further, managers and employees should build and fulfill psychological contracts that's leads to affective commitment which increase employees satisfaction and reduce turnover intention.

Our research based on contract- commitment aftermath. This model should be tested with other outcomes such as organizational citizenship behavior, job performance, creative performance and workplace deviance. Furthermore possible moderating variable regarding contracts-commitment and commitment-outcome should be studied in future research. Cross sectional and longitudinal research design with more outcomes should empirically tested in different cultures.

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E –ACTIVITY, TECHNOLOGY AND VISUAL ART: IMPLICATION FOR UNIVERSAL BASIC EDUCATION SCHEME

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Abstract

With the e-activity assuming a determinant factor in our today's quest for knowledge, and rapidly assuming significance as a vehicle in our desire for quality foundational education which in turn has opened spaces for improvement in our technological advancement in this rapidly changing environment. This paper therefore, strive to examine how the visual art properties are needed and can be systematically manipulated in order to deliver and our society benefit maximally in the achievement of Universal Basic Education using the technology of e-activity as a driving force. And to achieve this, some relevant issues were raised and recommendations to solving the identified problems proffered.

INTRODUCTION

In every aspect of history, there must be certain innovation of events or policy at one time or the other that advances the growth of society, especially the development and advancement of human capacity. This capacity can only be brought about by education, which indisputably is the soul of any society, as it passes from one generation to another with modifications or innovations. Adding impetus to this facts, Dafinone (2008) agreed that the twin phenomena of globalization and information and communication Technology have brought tremendous challenges and opportunities to bear on government agencies, corporate bodies and individuals with the result that no section of the society is immune to these development advancement. he concluded that the old way of doing things is fast giving way to the new with agencies and institutions adopting new approaches.

This dynamic necessitated the launch of Universal Basic Education Scheme in September 1999 by the regime of Chief Olusegun Obasanjo. It is a laudable programme that has come to stay, a scheme that is meant to alleviate Nigeria of its literacy and technological problems and placed her on the same pedestrian with other developed society. Though, according to Tabotndip (2009), the UBE Scheme seems to be a precautionary programme built on the failed Universal Primary Education (UPE) programme, which the lapses that prevailed during the Universal Primary Education (UPE) are still having incursions into the scheme. Lapses such as inadequate statistics of the recipients to be able to track the programme, inadequate manpower, mismanagement of funds and inadequate facilities among others.

As compelling as the lapses may seen, so also is the positive intents of UBE. Universal Basic Education as presently conceived is a scheme that has been designed to off free, compulsory education for the first 9 years of schooling to the Nigerian child comprising of 6 years of primary and 3 years of junior secondary. This vision of Nigeria government regarding child education is aimed at providing quality education that enables the individuals attain full potential to be self-reliant and contribute positively to national developments. However, one of the major challenges in the

realization of the goals is advancement of “quality” education using the benefits of information and communication technology (ICT), and visual art properties as a driving force. The benefits of this trend can not be over emphasized as it has allowed for exploration of distributed learning teaching environment.

The need to rethink and recast the aims and teaching strategies especially in our foundation level of our education became imperative, for effective teaching of our educational goals as envisaged by the UBE scheme, as the type of teaching strategy that can best ensure the realization of the objectives of the school and the Nigerian society which promote problem-solving, logical as well as independent and innovative thinking. The “traditional approach to teaching in our Basic level of our education is time worm and therefore negate the objective of UBE scheme. Suitable teaching styles that will enable learners to use knowledge acquired in other situations and permit the learners to be contributing members of the teaching learning process which technology and visual art properties provide. A critical look at the way apathy seems to have enveloped the adaptation of e-activity at the basic level, which is indisputably the critical stage of our educational development call for strategic turn-around as our nation can no longer pretend in this globalized society.

Most teachers even at this height of technological advancement at all level, persistently uses abstract method that infers only those who remembers these facts and method normally “pass”, while those who forget “fail” in evolution processes. These teacher-centred method can only reduce the essence of teaching especially at the basic level to a mere storage of facts and methods and the resuscitation of these facts and methods on demand during examination which run contrary to the goal of the UBE. However, in order to achieve the objective of UBE and therefore promote technological development through e-activity of our children, the use of more effective teaching learning strategies where children’s creative endeavours can flourish using the window of opportunities created by visual art and technology, need to be encourage.

UBE AND VISUAL ART EDUCATION

Though before the establishment of the UBE programme, the Nigeria teacher according to Tabotndip (2009) has been trained and fully equipped with different skills, competencies and techniques to cope with the challenges in the education sector. However, this training was basically on literary and grammar studies with little or no technical knowledge, this policy innovations in educational sector.

Consequently, the Universal Basic Education model as currently practiced, Stresses Early childhood Care and Development care (ECCDE). As observed by Tijani (2011), the importance of art in early childhood cannot be over emphasized. The author opened that while learning and development occur naturally in young children, they will not occur automatically without conscious contributions from adults either as parents or as teacher. The author conclude by adding that the one way to nature child development is through art, because if properly taught saves as basic to individual development since they move than any other subject, awaken all “sense”, however, this development should not be considered separately from the rest of the child’s development or evolving capacities.

Art generally and visual art in particular contained some psychological attribute that can help in the growth of a child, which include; motor output, imagery memory, meaning, perception and aesthetics. However, a significant proportion of our primary, Junior and even Senior Secondary pupils and Students find it difficult to understand and embrace this underlying attributes of arts just like mathematics. This is largely attributed to the persistent use of traditional teaching methods, which mostly emphasized abstractism even in the teaching and learning arts subject, as if the entire nation was and still in a slumber. Many institutions producing teachers are still toying the old lines

of literacy and grammar studies to the detriment of the current demands of technological knowledge. Though not entirely their making as most of the institutions either have antiquated technical facilities or none at all. Even where there are, there are no experts to man them to the benefit of the recipients.

Similarly, learning result-oriented UBE programme, Robert – Okah (2000) agreed that instructional materials that has art attributes such as audio visual assets, graphic packages, pictures, models and illustrated materials are indispensable for effective teaching and learning. Their use does not only make learning enjoyable, but practical and lively. He added that proper deployment of these instructional materials helps to create material pictures of lessons in the minds of the taught. Regrettably, the UBE scheme designers did not adequately exploit these, even where they seem to have little input about arts attributes, the teachers lack the technological know-how and basic materials.

CONCEPTS AND STRIVE FOR QUALITY EDUCATION AND TECHNOLOGICAL ADVANCEMENT

Generally speaking today's quality service delivery, be it in our educational drive or in our technological advancement, has assumed a make or break factor, the difference between success and failure. Consequently, education as a concept according to Obara (2004; 3) in Farant (1980) creates two implicit ideas. One is that of leading out into new knowledge and experience. And the other is that of feeding and thereby growing and developing. Both ideas put to the fact that education is an essential process in human development. Similarly, Bell-Gam (1995), observed that education is the aggregate of all the process by means of which a person develops abilities, attitudes other forms of positive behavior and of positive value in the society in which he or she lives. This also cornfield that, it is developmental and quality transformatory in nature. From the foregoing the institution vested with the above task and responsibilities in ensuring quality education for all is the school, as a concept, education today still retains its original meaning and our society should strive towards creative learning.

On the other hand, technology according to Ogwo (1996), means the systematic applications of scientific or other organization knowledge to practical task. From the education point of view, what can be understood in this definition is the application scientific or other organization knowledge practical task of providing quality education for all. Therefore, this view endorses Buseri, (2001), where he averred that technological development have made very tremendous progress in all facets of human Endeavour worldwide. Some of the areas so well touched are: education, information technology, transportation, health care delivery service, housing, agriculture, clothing and feeding habits to mention but a few. Hence, this paper emphasizes the fact that visual art discipline that promotes creative and develop imagination for national development. Nigeria in her quest for quality education and technological advancement cannot afford to have a lukewarm attitude towards the acquisition of basic knowledge of visual art education for faster and adaption the concepts.

VISUAL ARTS AND EDUCATION IN NIGERIA

Ellah (1998), while reviewing educational development in Nigeria opined that the earliest days in the history of civilization, the state and its organization have always been intimately associated with education and educational development. He continued that in Nigeria, educational development was greatly influenced by the colonizers who had some educational experience in the early years were thus tremendously influenced by the educational background of the colonizers. But

for the development of visual art in particular, this can be traced to the nineteenth century Christian Missionaries who emphasize the use of alphabetical symbols as a tool for basic knowledge.

However, Talabi (1979), while reviewing art education in Africa and most importantly in Nigeria, opined that the changes that took place in the study and practice of art is with the emergence of European influence leading to divergence from native interest. According to the study, this era witnessed a new vogue in the study of art and large-scale marauding of native art and substitution with foreign influence. According to Ganagana (2001), art has helped the individual to appreciate the importance and the study of visual art to the child in particular, and the society at large. He also added that this trend contributed immensely in enlightening individuals, the inevitable role played by visual art as it forms the bedrock of all disciplines. Curiously, Odesanmi (2000) affirmed that creativity and visual arts are two inseparable bed-mates, the products of their romance are inventions, break-through, technological achievements and so on. Akolo (1992) agrees that creativity is the foundation of technology. He concluded that no country should take her education system with a light hand as it affects creativity. These views no doubt confirmed that creativity is one of the tendencies that will give way to invention and then to technological achievement.

Consequently, there arises the challenges of global networking in learning which technological advancement has thrown up, this challenge has also given rise to necessary adaptation of visual art related courses, since it possesses contents that can accelerate learning, because it has been psychologically proven that what can not be comprehend in text form can be understood and well communicated in pictorial form. Corroborating this fact, Oladumiye (2002), opined that properly fused in our system, the audience (conference, lecture, workshop) would through varieties of visual art properties get a better response. This view as identified by various studies can no longer appear irrelevant in our quest for the attainment of technological advancement and quality education for all, but will improve and grow with the trends of socio-economic and educational development of our society.

VISUAL ART AND TECHNOLOGICAL BREAK-THROUGH

Obara (2004:5) in Ukeji (199), while appraising the expectations of an educational technologist agreed that in the context of his/her professional practice, educational technologist is that creative artist always looking for new combination of media and teaching strategies in order to achieve better teaching /learning process. Again, in this era of information technology where computer is playing an important role, Abimbade (1999) align himself with the relevance of computer technology and literacy in our educational system as enshrined in the Federal Government National Policy in Computer Literacy launched in 1988. According to the policy, the intent of government appears to centre around the need to ensure that everyone appreciates:

- The impact of information and computer technology in today's society
- The importance of the effective use of information to the individual and the society.
- The role of computers in information management, and
- The techniques by which information is processed, managed and communicated.

The interest here is on the latter, for instance, the ability to create a presentation with Power Point which seems to be one of the benefits of technological advancement in our education sector, depends on the understanding of what tools and recourse that are available to the users for designing and delivery of a good presentation. To prepare a paper or lecture for presentation electronically, one has to be confident about the information that is fielded in a slide. If it is not important to you, then it will definitely not be important to your audience. Based on this, it is very important to plan the content of the presentation based on its purpose and your knowledge of your audience.

Interestingly, information technologist equally recognized the important of visual art components. The introduction of power-point software by Microsoft has made it easier as it contained a tool designed, to assist with the creation and delivery of a presentation in slide show, providing text and pictures to help an audience understand what a presenter is telling them. However, like any tool, it must be well used, unless one understand the concept involved in designing a good presentation. Consequently, power point will only enable one to create and deliver professional presentations, but the effectiveness of the presentation is dependant on the manipulation of artistic properties installed into the system like; bullet text, interesting pictures, charts, media elements, colouring and animations. Therefore, denying self the basic knowledge of visual art education as far as the objectives of Universal Basic Education is concerned is highly academically misleading and technologically naïve.

CONCLUSION

Information gathered from this paper has no doubt, revealed that in quite a number of instances, basic knowledge or mastery in the manipulation of artistic properties will no doubt be seen as a recipe in effective delivery of qualitative teaching and learning vis a vis UBE scheme, since it has been psychologically proven that what is difficult for a slow learner to comprehend in text form, can be understood in pictorial form even faster. Therefore, stakeholders in our educational sector should look inward and take advantages of abundant resourcefulness of visual art education, if the growth of technology advancement and the component of UBE is to be used as a driving force to attain the vision 2020 -20 of the Nigeria.

RECOMMENDATION

In the light of the above, since the acquisition of information and communication technology is assuming a determinant factor in our technological advancement for quality education for all, using Universal Basic Education as a driving force, some useful recommendations are necessary here in other to achieve the set out goals.

1. In other to bridge the communication gap that has existed between teachers and learners, taking cognizance of e-activity, especially in our foundation level of education, every teacher should acquire basic knowledge in art education to make teaching complex and abstract subjects more simpler and meaningful to learner.
2. Since art features has been identified as a recipe for, and linkage between information and communication technology and quality approach to learning, government of Nigeria and other stakeholders in educational sector should give more priority to the training and retraining of visual art teachers in our basic to tertiary level of education.
3. As the country is fast becoming industrialized, Government should now begin to consider the desirability of including competent artists in the membership of the planning group of this nation. And finally, the Federal Government should implement recommendations of related committees or professional groups.
4. Expose our UBE – Teachers to various instructional styles and stages of children’s artistic development.
5. Provide adequate training and retraining for UBE teachers emphasizing importance of the role of visual art elements and characteristics in teaching and learning process.

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**STUDY AND PRIORITIZING EFFECTIVE FACTORS ON HUMAN RESOURCE
PRODUCTIVITY BY ACHIEVE MODEL AND TOPSIS METHOD
THE CASE STUDY OF IRAN TRACTOR MANUFACTURING COMPANY**

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Abstract

With over looking to the successful countries of world we can see this counties make necessary worth to the human resource as the most important productivity factor. with contrast, this force with increasing their productivity shear themselves in the revenue of the product. Down productivity in organization, companies and etc happen with different reasons. Every reason has it's own solution for solving. Gradation of productivity is all of the systematic efforts, structured for eliminating or reducing losses of material, machine, human or incorrect balance between them. For gradation of productivity we must know effective factors on productivity. Therefore in this essay after studying the theories about productivity we choose ACHIEVE model which contain seven effective factors (Ability, Clarity, Help, Incentive, Evaluation, validity, Environment) on human resource productivity as a essay pattern and then with indexing for each of dimensions of mentioned model and with using of field method and promoting of questionnaire in the static society (ITMCO) and analyze the result of studying by using TOPSIS method, specified that between the effective factors, ability is the most important factor and evaluation is the less important factor. For testing theories we use Spearman method. The result of Spearman method showed us that there is a meaningful correlation between Ability, Clarity, Help, Incentive, Evaluation, validity, Environment with gradation of productivity. In the order - preferencing effective factors on human resource productivity that getting with the TOPSIS method with the ascending arrangement dimension: 1-Ability 2-Clarity 3-Validity 4- Incentive 5- Environment 6- Help 7-Evaluation stand.

Key words: Productivity, ACHIEVE Model, TOPSIS Method, Human Resource, Human Resource Productivity

INTRODUCTION

Two concept of "Efficiency" and "Effectiveness" have been referred in definitions of productivity and productivity is combination of the two generally, with regard to the definition of "Effectiveness" and "Efficiency" as main concepts in recognition of productivity, it can be said that "Effectiveness" has been defined traditionally as materialization of objectives of an organization and "Efficiency" has been defined traditionally as realization of objectives of an organization and "Efficiency" has been defined as accurate and wise use of resources. "Efficiency" is defined as comparison of degree of outputs thanks to the degree of input or degree of input in comparison with output with due observance to the objectives predefined for system "Effectiveness" is defined as wise and logical use of resources with the aim of moving towards organizational excellence performance and appropriate organizational satisfaction level.

With due observance to these two definitions, productivity is combination of both "Efficiency" and "Effectiveness". In other words, organizational performance will be productive

when activities turn "Efficient" and "Effective" and each of which solely can't indicate productivity growth. Then, as for as productivity concept is concerned, firstly, activity which is done, should be beneficial and accurate and secondly, such activity should be carried out in the best is possible in line with materialization of objectives."Productivity" is the concept which is used for showing proportion of output of an individual unit and organization. The more productivity of an organization is increased, the less production cost will be witnessed in that unit (Boudreau 1983).

In fast-paced development of contemporary world of today, if we intend to increase productivity of our workplace organization, production should be increased with less manpower and workforce, less capital, less time, less space and generally with fewer resources. More than any other factors, productivity of an organization strictly depends on knowledge, skills, capabilities, approaches, behavior and conduct of staff and personnel.

Basic Definition of Productivity

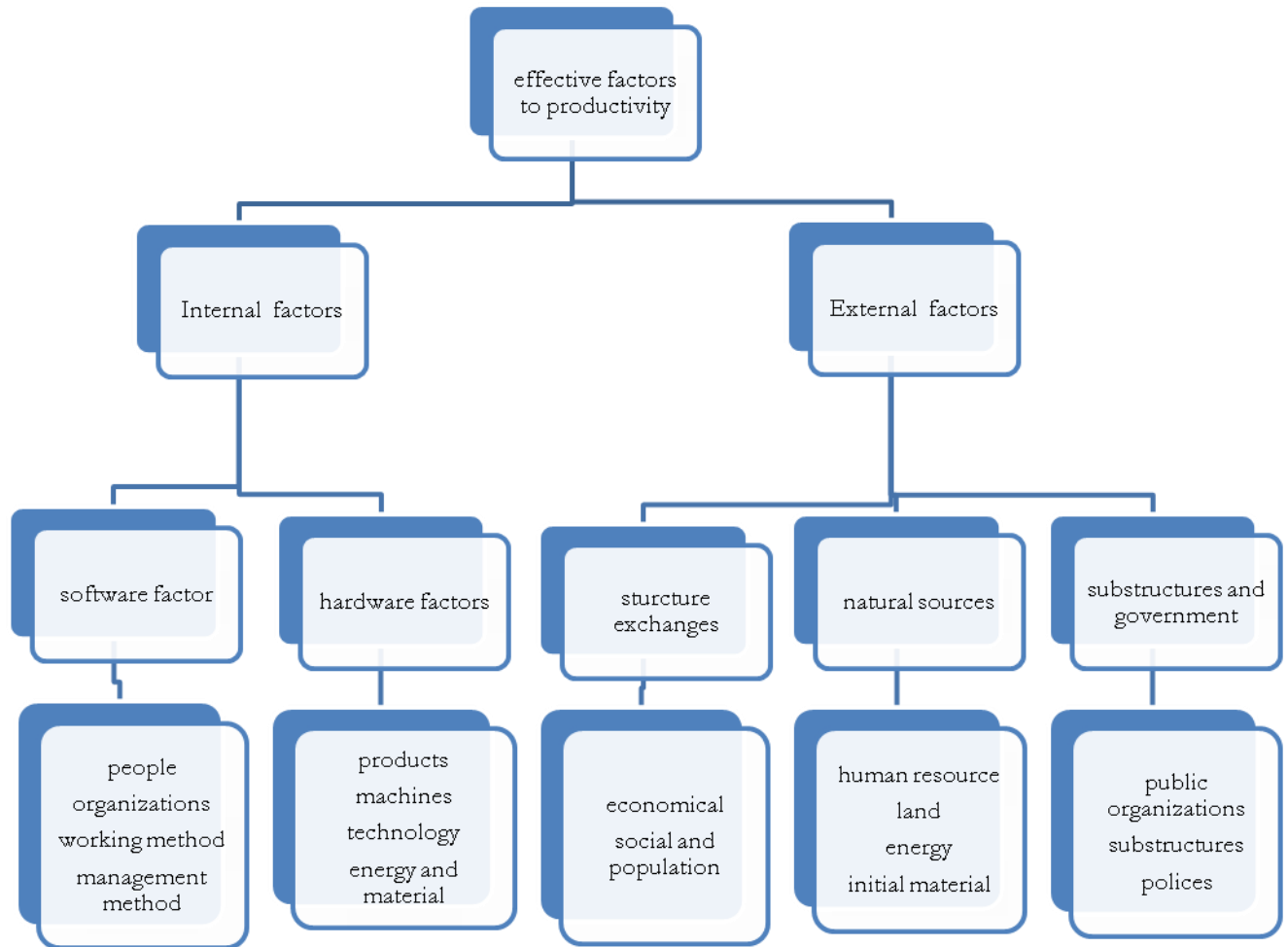
1-Partial productivity: "productivity" defines proportion between output and input of a system generally

$$\text{Partial productivity} = \frac{\text{output}}{\text{one input production factor}}$$

2-Total factor productivity: in fact, this proportion indicates a value which shows employment of staff, personnel and capital facilities of organization to raw materials, parts and purchased services subtracted out of total value of outputs (Lam & Lam 2005)

3- Total productivity: unlike partial productivity, total productivity shows relation between output of system with all consumed resources for producing that output (Hannula, 2002).

Effective Factors to Productivity



Importance and Necessity of Research

During the two last decade, creation importance and extend of productivity and total productivity management in the organizations was become important.

Total productivity management, in the base of strategic plan correct attention to increasing worker's incentive improving of skills by good educational system, making good situation for innovation and rising workers talent in organization, increasing the research and development units, using the new science in doing work, improving the quality of products effort for making the suitable methods for measuring, planning and improving productivity in organization by using the management system.

By using the total productivity in organizations, the manager can define the problems and solve them by necessary information in the suitable time.(Taheri,1385,12)

In the Iran Tractor manufacturing company, according to the intense competitions in the global markets, efforts for developing the bazaar and even stay in the present bazaar, the importance of attending to the productivity especially human resource productivity raised. Especially in the last years by entering the Chinese and Indians tractors, ITMCO should make serious measures for increasing the workers ability, optimum using from the present capacities and decreasing the price of products. Only in this way ITMCO can enter and active in the global bazaars.

Study's Theoretical Jamb

Study's theoretical jamb is the sample that researcher opine based that about the relation between factors that are important in the creativity of problem. In the present study we use Hersi and Goldsmith's model that is contain: 1- ability 2- clarity 3-help 4-inentive 5-evaluation 6- validity 7-environment. In this study after determining the rule of these factors on increasing human resource productivity, the order of their will determine.

Description of this model is:

$$P=F(A.C.H.I.E.V.E)$$

P: Productivity

A: Ability

C: Clarity

H: Help

I: Incentive

E: Evaluation

V: Validity

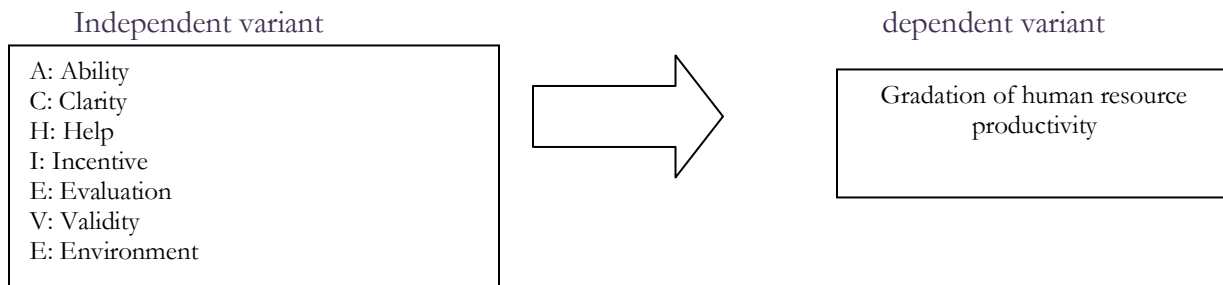
E: Environment

Research Hypothesis

- 1- Worker's ability is effective on the gradation of human resource productivity.
- 2- Job's clarity is effective on the gradation of human resource productivity.
- 3- Organization help is effective on the gradation of human resource productivity.
- 4- Worker's incentive is effective on the gradation of human resource productivity.
- 5- Worker's performance evaluation is effective on the gradation of human resource productivity.
- 6- Rules validity is effective on the gradation of human resource productivity.
- 7- Environment is effective on the gradation of human resource productivity.
- 8- There is meaningful difference among the effective factors of gradation of human resource productivity.

Research Analysis Model

According to the study's theoretical jamb, we show research analysis model like this:



Study's Method

From the goal attitude, the present study method is application and from the method attitude is descriptive traversal and from the two way we use for collecting data. The first, from the library way for collecting literate and research history, inside and outside of country .The second, by the field way by distributing questionnaire among the Iran Tractor Manufacturing company's human resource.

Sampling Method

In this research we selected 300 workers from ITMCOM through the application of random sampling method. For determining the number of sample from the statistic society we use Morgan's table that for 1000 workers from the statistic society with significant level 95% and considered equal to 5% the number of statistic sample will be 278 that we choose 300 workers for more confidence.

Collecting Information Equipment

We used questionnaire and documents of ITMCO for gathering necessary information. The questionnaire contains personal qualification, information sources questions, five selection questions according to Likert spectrum.

Very strong	Strong	average	weak	Very weak
5	4	3	2	1

Validity and Permanent of Questionnaire

For calculating validity of this research we used symbolic validity. For calculating permanent of questionnaire we used Korenbakh Alpha coefficient and we obtain 0.9265 by using SPSS software and this number shows our questionnaire is very permanent.

Number of question	Korenbakh Alpha coefficient
28	0.9265

Data Analysis Method

For analyzing data we use descriptive statistics and indirect comprehensive statistics. For this purpose we used SPSS software. In descriptive statistics level we used statistic index for analyze data. For measuring effective factors on productivity we use Spearman test. At last we used TOPSIS method for prioritizing effective factor. We explain TOPSIS method as a algorithm during we calculate it.

Spearman Ranking Correlation Coefficient

Spearman ranking correlation coefficient is a kind of Peayerson correlation and it is used for ranking scores. In other words our variant data is classified. For calculating Spearman ranking correlation coefficient we use this formula(Delavar,1387)

$$r_s = 1 - \frac{6 \sum D^2}{n(n^2 - 1)}$$

r_s = Spearman ranking correlation coefficient

D^2 = squer of difference between ranks

n= number of rank

In this research we use Spearman method for testing our theories.

Data Analysis

Testing analysis

We test each of research theories by using Spearman method and we specify the result of test for each of theories.

BAHRVARY=productivity

TAVANAY=ability

VOZOH=clarity

ANGIZE=incentive

HEMAYAT=help

ARZYABI=evaluation

EATEBAR=validity

MOHET=environment

Hypothesis

- H0: Worker's ability is not effective on gradation of human resource productivity.
H1: Worker's ability is effective on gradation of human resource productivity.

Correlations

			TAVANAY	BAHRVARY
Spearman's rho	TAVANAY	Correlation Coefficient	1.000	.639**
		Sig. (1-tailed)	.	.000
		N	300	300
	BAHRVARY	Correlation Coefficient	.639**	1.000
		Sig. (1-tailed)	.000	.
		N	300	300

** . Correlation is significant at the .01 level (1-tailed).

The measure of Spearman correlation coefficient ($r_s = 0.639$) and significant level sig=0.000 shows that with 95% confidence there is a significant relation between worker's ability and productivity then H1 is true.

- H0: Job's clarity is not effective on gradation of human resource productivity.
H1: Job's clarity is effective on gradation of human resource productivity.

Correlations

			VOZOH	BAHRVARY
Spearman's rho	VOZOH	Correlation Coefficient	1.000	.747**
		Sig. (1-tailed)	.	.000
		N	300	300
	BAHRVARY	Correlation Coefficient	.747**	1.000
		Sig. (1-tailed)	.000	.
		N	300	300

** . Correlation is significant at the .01 level (1-tailed).

The measure of Spearman correlation coefficient ($r_s = 0.747$) and significant level $\text{sig}=0.000$ shows that with 95% confidence there is a significant relation between job's clarity and productivity then H1 is true.

3. H0: Worker's incentive is not effective on gradation of human resource productivity.
H1: Worker's incentive is effective on gradation of human resource productivity.

Correlations

			ANGIZE	BAHRVARY
Spearman's rho	ANGIZE	Correlation Coefficient	1.000	.812**
		Sig. (1-tailed)	.	.000
		N	300	300
	BAHRVARY	Correlation Coefficient	.812**	1.000
		Sig. (1-tailed)	.000	.
		N	300	300

** . Correlation is significant at the .01 level (1-tailed).

The measure of Spearman correlation coefficient ($r_s = 0.812$) and significant level $\text{sig}=0.000$ shows that with 95% confidence there is a significant relation between worker's incentive and productivity then H1 is true.

4. H0: Organization Help is not effective on gradation of human resource productivity.
H1: Organization Help is effective on gradation of human resource productivity.

Correlations

			HEMAYAT	BAHRVARY
Spearman's rho	HEMAYAT	Correlation Coefficient	1.000	.746**
		Sig. (1-tailed)	.	.000
		N	300	300
	BAHRVARY	Correlation Coefficient	.746**	1.000
		Sig. (1-tailed)	.000	.
		N	300	300

** . Correlation is significant at the .01 level (1-tailed).

The measure of Spearman correlation coefficient ($r_s = 0.746$) and significant level $\text{sig}=0.000$ shows that with 95% confidence there is a significant relation between organization Help and productivity then H1 is true.

5. H0: Worker's performance evaluation is not effective on gradation of human resource productivity.
 H1: Worker's performance evaluation is effective on gradation of human resource productivity.

Correlations

			ARZYABI	BAHRVARY
Spearman's rho	ARZYABI	Correlation Coefficient	1.000	.744**
		Sig. (1-tailed)	.	.000
		N	300	300
	BAHRVARY	Correlation Coefficient	.744**	1.000
		Sig. (1-tailed)	.000	.
		N	300	300

** . Correlation is significant at the .01 level (1-tailed).

The measure of Spearman correlation coefficient ($r_{1s} = 0.744$) and significant level sig=0.000 shows that with 95% confidence there is a significant relation between worker's performance evaluation and productivity then H1 is true.

6. H0: Rules validity is not effective on gradation of human resource productivity.
 H1: Rules validity is effective on gradation of human resource productivity.

Correlations

			EATEBAR	BAHRVARY
Spearman's rho	EATEBAR	Correlation Coefficient	1.000	.824**
		Sig. (1-tailed)	.	.000
		N	300	300
	BAHRVARY	Correlation Coefficient	.824**	1.000
		Sig. (1-tailed)	.000	.
		N	300	300

** . Correlation is significant at the .01 level (1-tailed).

The measure of Spearman correlation coefficient ($r_{1s} = 0.824$) and significant level sig=0.000 shows that with 95% confidence there is a significant relation between rules validity and productivity then H1 is true.

7. H0: Environment is not effective on gradation of human resource productivity.
 H1: Environment is effective on gradation of human resource productivity.

Correlations

			MOHET	BAHRVARY
Spearman's rho	MOHET	Correlation Coefficient	1.000	.853**
		Sig. (1-tailed)	.	.000
		N	300	300
	BAHRVARY	Correlation Coefficient	.853**	1.000
		Sig. (1-tailed)	.000	.
		N	300	300

** . Correlation is significant at the .01 level (1-tailed).

The measure of Spearman correlation coefficient ($r_s = 0.853$) and significant level sig=0.000 shows that with 95% confidence there is a significant relation between environment and productivity then H1 is true.

TOPSIS Method

TOPSIS method was proposed by Hwang and Yoon in 1981. This method is one of the best multi-criteria decision-making models and is used numerously. At this method, alternative m is evaluated by indicator n . Basis of this technique stands at the concept that multiple choice should enjoy less space with positive ideal solution(best possible status) and the most space with negative ideal solution(the worst possible way). It has been assumed that fairness of any indicator will be increased or decreased concertedly (Shih, Shyur and Lee, 2007)

Prioritizing Effective Factors on Gradation of Human Resource Productivity (Asgharpour, 1389)

Step 1: making decision matrix

$$\begin{matrix} & \text{Productivity} \\ \begin{matrix} A1 \\ A2 \\ A3 \\ A4 \\ A5 \\ A6 \\ A7 \end{matrix} & = \begin{matrix} 3.99 \\ 3.93 \\ 3.64 \\ 3.68 \\ 3.61 \\ 3.70 \\ 3.68 \end{matrix} \end{matrix}$$

- A1: ability
- A2: clarity
- A3: help
- A4: incentive
- A5: evaluation
- A6: validity
- A7: environment

Step 2: making dimension matrix

$$n_{ij} = \frac{r_{ij}}{\sqrt{\sum_{i=1}^m r_{ij}^2}}$$

$$N_D = \begin{bmatrix} 0.402 \\ 0.396 \\ 0.367 \\ 0.371 \\ 0.364 \\ 0.373 \\ 0.371 \end{bmatrix}$$

Step 3: making w matrix by using anthropy technique:

$$P_{ij} = \frac{r_{ij}}{\sum_{i=1}^m r_{ij}}$$

$$p = \begin{bmatrix} 0.152 \\ 0.150 \\ 0.139 \\ 0.140 \\ 0.138 \\ 0.141 \\ 0.140 \end{bmatrix}$$

Now by using this formula we can calculate E_j :

$$E_j = -K \sum_{i=1}^m (p_{ij} \cdot \ln p_{ij}); \forall j$$

In this formula $K = \frac{1}{\ln m}$ and m shows the number of decision matrix rows.

$$k = \frac{1}{\ln 7} = 0.51$$

X_1	
0.987	E_j
0.013	$d_j = 1 - E_j$
1	w_j

For calculating w_j we have:

$$w_j = \frac{d_j}{\sum_{j=1}^n d_j}$$

In the mentioned formula n shows the number of decision matrix columns.

Step 4: making weight dimensionless matrix V by using W

$$V = N_D \cdot W_{n \times n} = \begin{bmatrix} v_{11} & \dots & v_{1n} \\ \vdots & \ddots & \vdots \\ v_{m1} & \dots & v_{mn} \end{bmatrix}$$

$$v = \begin{bmatrix} 0.402 \\ 0.396 \\ 0.367 \\ 0.371 \\ 0.364 \\ 0.373 \\ 0.371 \end{bmatrix}$$

Step 5: specifying ideal solution and negative - ideal solution:

$$\text{ideal solution} = A^+ = (\max V_{ij}; j \in J) = \{V_1^+, \dots, V_j^+, \dots, V_n^+\}$$

$$\text{negative - ideal solution} = A^- = (\min V_{ij}; j \in J) = \{V_1^-, \dots, V_j^-, \dots, V_n^-\}$$

$$A^+ = \{0.402\}$$

$$A^- = \{0.364\}$$

Step 6: obtaining space rate of each factor up to positive and negative ideal:

$$d_{i^+} = \left\{ \sum_{j=1}^n (V_{ij} - V_j^+)^2 \right\}^{.5}$$

$$d_{i^-} = \left\{ \sum_{j=1}^n (V_{ij} - V_j^-)^2 \right\}^{.5}$$

$d_{1^+} = 0$	$d_{1^-} = 0.038$
$d_{2^+} = 0.006$	$d_{2^-} = 0.032$
$d_{3^+} = 0.035$	$d_{3^-} = 0.003$
$d_{4^+} = 0.031$	$d_{4^-} = 0.007$
$d_{5^+} = 0.038$	$d_{5^-} = 0$
$d_{6^+} = 0.029$	$d_{6^-} = 0.009$
$d_{7^+} = 0.031$	$d_{7^-} = 0.007$

Step 7: Obtaining relative determination of cl_{i^+} as one factor to ideal solution:

$$cl_{i^+} = \frac{d_{i^-}}{(d_{i^+} + d_{i^-})}$$

$$0 \leq cl_{i^+} \leq 1; i = 1, 2, \dots, m$$

$$cl_{1^+} = 1 \rightarrow A1$$

$$cl_{2^+} = 0.84 \rightarrow A2$$

$$cl_{3^+} = 0.078 \rightarrow A3$$

$$cl_{4^+} = 0.18 \rightarrow A4$$

$$cl_{5^+} = 0 \rightarrow A5$$

$$cl_{6^+} = 0.237 \rightarrow A6$$

$$cl_{7^+} = 0.18 \rightarrow A7$$

Step 8: priority factors rating

A1= ability

A2= clarity

A6 = validity

A4 = incentive

A7= environment

A3= help

A5= evaluation

DISCUSSION AND CONCLUSION

According to information that we obtain by using questionnaire , analyze them with Spearman method and prioritizing factors by TOPSIS method, it is specified that two factors(ability and clarity) is the most effective on gradation of human resource productivity but organization help, incentive, evaluation, rules validity and environment are the factors that are less effective. So it must

be analyzed and these factors must be noticed in ITMCO, so by proving these factors the productivity can increase.

By attention to result of this research, ability and clarity obtain the most effective factor on gradation of productivity. So for making human resource productive, ITMCO must carry on specialty courses for workers, value the creativity of personnel, for achieving the goals of organization. Fertilised the talent of workers is also effective, also workers must be knowed about the goals of organization so they can forward to those goals.

SUGGESTION

- 1- By attention to considerable effect of worker's ability, we suggest that by using analysis of job, the various ability of human resource are recognized and organization can carry on specialty courses for gradation of human ability.
- 2- By attention to considerable effect of job clarity on gradation of human resource, we suggest by documenting explanation of duty, identity certificate of organization and by using information technology for informing or prepare the information about the jobs, can take action for gradation of human productivity.
- 3- By attention to ACHIEVE model, other factors are also effective on gradation but in our statistics society this factors are less effective. So we suggest to other researcher that they study these factors again and analyze the reason of little effect in this statistics society and in other statistic society.

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HUMAN CAPITAL DEVELOPMENT IN SCIENCE AND TECHNOLOGY EDUCATION: CHALLENGES AND NEW RESPONSIBILITIES OF THE TEACHER

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Abstract

The importance of science and technology education cannot be over-emphasized. Human capital development in science and technology education are the gateway to a scientific, technological and progressive society. They are also the bedrock upon which modern scientific, technological and advanced nations are based. Science was featured in very few secondary and teacher training schools in Nigeria between 1859 and 1929. The major subjects taught were astronomy, chemistry, physiology, geology and botany. These were later systematized and then changed first to Nature study and later General Science. Technology education teacher training in Nigeria started in 1962 with the establishment of the department of Vocational teacher education at the University of Nigeria Nsukka under the supervision of Michigan State University U.S.A at its formative years. Human capital development in science and technology education is faced with a lot of challenges such as retraining of science and technology teachers, dearth of qualified technology trainers, inadequate funding among others. This paper addressed how these challenges could be forestalled for successful implementation of human capital development and also the new responsibilities of the teachers for science and technology education in Nigeria.

Keywords: Prediction, Traditional Evaluation, Evaluation Feedback, Composite Mark, Random Assignment, Randomized Cluster.

Concept of Science

Science may be looked at as a human enterprise. It is primarily and usually connected with finding out about the human environment (Buseri, 1995). Inomiesa (1993) sees science as “the what”, “the how”, and “the why” of everything happening in our environment. Science (Inomiesa, 1997) is made up of two important parts. These are products (knowledge) and processes (methods). The products usually deal with the facts, concepts, laws, principles and/or generations and they come to us in the form of classificational, correlational and theoretical concepts.

Historical Background of Science Education in Nigeria

Science was featured in very few secondary and teacher training schools in Nigeria between 1859 and 1929 (Inomiesa, 2010). The major subjects taught were astronomy, chemistry, physiology, geology and botany. These were later systematized and then changed first to nature study and later General science. The first schools in Nigeria were established by private bodies – the missionaries. So initially, government did not take part in the establishment and running of schools. What the government did was the engagement of teachers that were later handed over to the missionaries. It was much later that government established a number of schools of which few of them taught science subjects. Following this, tribal groups, community affiliations and a number of town union associations established their own schools run on the terms established. In the second

half of the 19th century, three patterns of schools emerged. These were: the grammar schools; the teacher training and the pastor training institutions; the vocational and agricultural schools. The teaching of science in secondary schools was very elementary. There were fewer schools and fewer students than now doing science. There were very few science teachers especially those qualified to teach science others were Advanced Level and Certificated Grade I and II teachers from the Teacher Training Colleges. Sizeable and well equipped laboratories existed to make science more real and practical.

Presently (Inomiesa, 2003) observed that science is taught as biology, chemistry and physics. The syllabus has been increased tremendously. Some of the teachers teaching in these schools can be said to be qualified. They hold the following degrees: B.Sc, HND, B.Sc (Ed). B.Sc. Plus NCE or B.Sc plus Postgraduate Diploma in Education.

Concept of Technology Education

Technology education which is synonymous with technical education, industrial technical education and industrial arts is defined by the National Policy on Education (FRN, 2004) as an aspect of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Technology education is further understood to be:

- an integral part of general education;
- a means of preparing for occupational fields and for effective participation in the world of work;
- an aspect of lifelong learning and a preparation for responsible citizenship,
- an instrument for promoting environmentally sound sustainable development;
- A method of alleviating poverty.

Goals of Technology Education in Nigeria

The goals of technology education according to the National Policy on Education are:

- a. provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical levels;
- b. Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development;
- c. Give training and impart the necessary skills to individual who shall be self-reliant economically.

Science and technology are related in the sense that science is the input while technology is the output. Technology education is the teaching and learning of technology subjects in order to acquire practical skills. These definitions are the perceptions of the author

Human Capital Development in Technology Education

Human capital development in technology education is very vital to national development. Hand tools, machines, instructional materials, infrastructural facilities may be available in abundance but without the trained manpower that will man these facilities, learning cannot take place in the school. According to the National Policy on Education (FRN, 2004), no education system may rise above the quality of its teachers. Therefore, human capital development in technology education is paramount to sustainable development. Human capital development according to Ogbaunya and Usoro (2009) is a process of improvement that embraces all those activities that are geared towards the growth and improvement of skills, knowledge and attitude of personnel. A teacher who is not currently in tune with modern trend is dangerous to the system. Staff development in terms of continuing education appears rather very poor, haphazard, politicized

and lack continuity. Dryaklor (1994) asserted that teachers need to be retrained two to six times in lifetime to keep abreast with changes in his profession. The initial attempt by the Federal Government of Nigeria to retrain technical teachers was a failure because such teacher under Technical Teachers Training Programme (TTTP) never came back and even those that came back settled on greener pasture.

Any government that encourages its citizen to be creative and innovative must be conscious of the quality and quantity of teachers in the system. Maduewesi (2005) stated that the issue of human capital development is perhaps the upper most concern of educational planners and administrators while Onwuka and Gladys (2010) defines human capital development as the process of attaining professionalism through acquisition of necessary knowledge, skills and attitudes for competence and effective performance in the job.

Human capital development in Nigeria has metamorphosed tremendously. Currently, categories of teachers practicing it include B.Ed/BA/B.Sc, M.Ed., Ph.D, NCE and TC II (almost in extinction) Nigerian Certificate of education (NCE) is the minimum teaching qualification in Nigeria. There are bodies in-charge of teachers' preparation in Nigeria. The National Policy on education (FRN, 2004) charged the following bodies with the responsibility of human capital development at various levels: Colleges of Education, Faculties of Education, School of Post-Graduate Studies, Institutes of Education, National Teacher's Institute and Schools of Education in Polytechnics. The Federal Government charged the Teachers Registration Council of Nigeria with the responsibility of registration of professional teachers and with institute standard. These are efforts to make human capital development efficient. Despite the process made so far in human capital development there are still problems. Most of the bodies charged with the preparation of programmes still produce teachers with inadequate skills to fit into the contemporary society. Obanya (2002) noted that teacher preparation programmes are still based predominantly on traditional practices. Most teacher preparation programmes neglect creativity, innovativeness, risk taking which are ingredients of entrepreneurship education.

Brief History of Human Capital Development in Technology Education in Nigeria

Technology education teacher training in Nigeria started in 1962 with the establishment of the Department of Vocational teacher education at the University of Nigeria, Nsukka. This department relied heavily on the Michigan State University, U.S.A for technical and material support during its formative years. Later, the Federal Colleges of Education (Technical) at Akoka and Gombe were established while institutions such as the Yaba College of Technology, Yaba, Institute of Management and Technology, Enugu; Kaduna Polytechnic, Kaduna and Ibadan Polytechnic Ibadan also ventured into the area of technical teacher training as parts of their programmes. In 1979, when the new educational system required all secondary schools in the country to offer technical subjects, these institutions proved to be grossly inadequate to meet the nation's needs for technology education teachers.

The paucity of technology education teachers and their critical nature to the successful implementation of the 6-3-3-4 system of education became apparent after the Federal Government had procured technical equipment and distributed them to secondary schools. For many years, some of these equipment remained locked up in their containers some were stolen while some others were misused and destroyed. Consequently, in order to enhance successful implementation of the 6-3-3-4 education system and prevent further wastage of the equipment already procured, the Federal Government entered into bilateral agreements with the governments of United States of America (U.S.A) for the training of technology education teachers. Tailor (1986) reported that the projection was for the nation to produce 500 technology education teachers yearly over a period of ten years.

Starting from 1980, young Nigerians were sent abroad to be trained as technology education teachers. Many of those sent were holders of the NCE, B.Ed/B.Sc., HND, FTC and their scholarship was for a minimum of two years leading to at least a bachelor's degree in technical/technology course; some of those sent also went for master's degrees in technical/technology courses. The technical teacher training programme in America continued for about ten years (1980-1990) before it was phased out.

In 1992, the Technical Teacher Training Programme (TTTP) which was run in America was domiciled in Nigeria owing to the deregulation policy that led to the Structural Adjustment Programme (SAP). The Federal Government could not foot the bill for the training of the technology education teachers in America. According to (Olaitan, 1994) the value of the naira embarked on a sharp decline and by 1990, ten naira hardly exchanged for one dollar. The domestication of the Technical Teachers Programme in Nigeria was approved by the then Honourable Minister of Education and Youth Development, Professor Aliu Babatunde Fafunwa.

The programme took off in January 1992 with an initial intake of 500 students placed in four institutions including University of Nigeria Nsukka and Ahmadu Bello University Zaria. The second set of intakes made up of a total of 545 students were placed in programmes in January 1993 and this is a signal that the nation might now achieve the goal of self-sufficiency in human capital development in technology education but this was, not true. The following challenges (Olaitan 1994) confronted the implementation of the Technical Teacher Training Programme in Nigeria.

1. Insufficient material resources for training: With the take off of the domesticated TTTP, participating institutions have had to take on more students than available machines, equipment and other materials can adequately cater for. With good management skills, some of these institutions were able to maximize the use of available resources. However the fact remains that these institutions would do with more material resources most especially those that would replace obsolete equipment.

Some of these institutions were able to maximize the use of available resources. However the fact remains that these institutions would do with more material resources most especially those that would replace obsolete equipment.

2. Dearth of qualified technical educators: There is a severe shortage of suitably qualified technical educators in both the participating institutions and other institutions that have been marked for involvement in the programme in future. Moreover, some of the existing technical educators or teachers were either trained on obsolete equipment or have worked with such equipment for so long that their skills need to be updated. The training and re-training of technical educators is therefore of paramount importance in the success of the domesticated TTTP.

3. Release of participating students for TTTP: There were complaints from some students that their participation in the TTTP does not receive the full support and co-operation of some of their heads of institutions. As a result, some of these students were not released fully for the programme even when they have been accepted and duly placed. This situation could be very frustrating to both the students concerned and co-ordinators of the TTTP. Heads of Institutions should help in releasing the participants since they will return to them after their training to comply with the terms of their agreements.

4. The need to extend the programme to applicants who are not already teaching: Most participants of the TTTP are those who are already teaching. At best these students would

become more competent technical teachers. However, for successful implementation of the national policy on education, it is equally important to increase drastically the number of technical teachers in the system. Thus, the extension of the TTTP to young school leavers and to the unemployed should be explored for the purpose of increasing the number of technical teachers now on the field.

5. **Use of the quota system for selection of students in TTTP programme:** The need to increase the quality and quantity of technical teachers cuts across all states of the federation. As a result the quota system must be seen to be effective in the TTTP programme. All states of the federation must be represented in the programme.

Challenges of Human Capital Development

Human capital development or the recruitment and training of technology teachers that would man the various technology education programmes in different levels of our institutions may encounter some difficulties if urgent remedies are not taken.

Re-training of Technology Teachers

Some existing technology teachers were either trained on obsolete equipment or have worked with such equipment for a long time that their skills need to be updated. Therefore, training and re-training of teachers is very vital for successful implementation of teaching and learning strategies in schools. Retraining means receiving in-service education. It implies subjecting, or exposing an individual to further teaching and practice after the initial training. It may also be taken as improving the teacher. Our society is dynamic. Our needs, values, aspirations and expectations change from time to time. Knowledge, skills and methodologies also change as a result of research, since education is the fastest tool for socialization and propagation of culture and teachers are tools used to implement the teaching-learning process, all technology education teachers should be retrained on a regular basis. Dryaklor (1994) asserted that teachers need to be re-trained two to six times in their lifetime to keep abreast with changes in his profession.

The Avenues for retraining technology education teachers according to Iwuanyanwu (1998) include

- i. Attending and participating actively in seminars, conference and workshops;
- ii. Belonging to some professional associations where the teachers can meet with experienced colleagues to exchange ideas and talks about new happening and development (innovations) in the teaching subjects and professional teachers' education.
- iii. Departmental or in-house seminars, conferences and workshops where senior colleagues help the others to improve their lots.
- iv. Higher training through part-time programmes, sandwich programmes and full time study leave with pay.

The purpose of retraining of technology teachers is to improve their qualities, expertise or competence, efficiency and effectiveness.

Dearth of Qualified Technology Education Trainers

Trainers of technology education are very few in all levels of technology education. Factors which hinder good human capital development could be traced to the acute shortage of suitably trained and qualified teachers. According to Akpan (2001), the reason for the shortage could be traced to unattractiveness of the teaching profession such that it is difficult to recruit and retain technical teachers at all levels of educational system. For instance in the junior secondary schools in

Delta State, a total of 698 vocational/technical teachers are available for teaching the pre-vocational subjects for the 2007/2008 session (Akpotu and Okonta 2010). Out of this number, 673 (96.4%) are qualified while 25 (3.6%) are unqualified teachers (Akpotu and Okonta, Ibid). according to the authors the students/teachers ratio is 155:1. details of the number of vocational/technical teachers currently available in junior secondary schools are shown in the table below.

Table 1: An Analysis of Available, Required and Differences between Available and Required Number of Vocational/Technical Teachers

Pre-Vocational subject Areas	No of student Per Subject	No of Available Voc/Tech. Trs.		Student/Tr Radio Per Subject	Overall student/ Tr Ratio	No of Required Trs.	Differences between Available & Required Trs.
		Q	NQ				
Intro. Tech	20,061	63	3	318:1		502	439
Practical Agric	23,558	208	16	113:1		589	381
Bus. Studies	24,454	189	4	129:1		611	422
Home Econs	24,724	184	1	134:1	155:1	618	434
Local Crafts	7,039	11	1	640:1		176	165
Computer Edu.	4,362	18	0	242:1		109	91
Total	104,198	673	25			2,605	1,932
Grand Total		698					

Source: Computed from fieldwork in (Akpotu and Okonta, 2010)

Comparing the ratios obtained per subject to the National Policy on Education's standard of 40:1, it can be rightly inferred according to (Akpotu and Okonta, 2010) that there are inadequate numbers of vocational/technical teachers in junior secondary schools in Delta State. To buttress the study of Akpotu and Okonta, that there is inadequate technology education teachers to handle technical subjects, the NERDC report of the state of demand and supply in 1997, revealed that about 270,000 vocational technical teachers nation wide representing 74% of total need were not available (Aina, 2000). This signifies that only 26% of such teachers are on ground.

Inadequate Funding

Technology education is capital intensive and cannot be adequately implemented with poor funding. Technical and applied skills could not manifest from ordinary reading of handouts and pictures of stimulated tools and equipment (Olaitan 1996). Due to poor funding, workshops are either empty or stored with outdated tools and equipment. This problem has greatly reduced the quality of human capital development in technology education.

Poor Workshop Organisation

Teacher trainees are faced with problems of workshop organization as they find it difficult to translate theories imparted into practical experiences. They cannot effectively impart skills as the training environment is not the functional working environment. It must not just be any kind of technology education but a right type of education with workshop facilities for creativity, hardwork and discipline. This will guarantee quality human capital development. What is described as workshop in most technical trade areas is only a classroom with few tools and equipment and where the workshop is available, it serves as a number of units, thereby providing limitations for practical exercises. As ascertained to Idika (1997), one of the major reasons why some technical teachers leave the teaching field could be the non-provision of adequate training facilities such as laboratories, workshops and classrooms.

Inadequate Instructional Materials

The quality of education in Nigeria has fallen in the area of facilities for learning. Odukwe (2003) observed that from primary school to tertiary institution the facilities, infrastructure and learning aids are no longer available. This signifies that the population of the teacher trainees admitted out-weighs the capacity of facilities available. Fajemirolo (2003) asserted that the situation appears so bad in the universities that more than ten technical teacher trainees were regularly assigned to one instructional material with equipment in a crowded workshop. This may hinder good interaction and opportunity for effective workshop experiences.

Strategies for Improving Human Capital Development in Technology Education

Technology has created innovation in industry, segment and component of the society, economy, and culture yet has not done so much in human capital development. The following measures are suggested to improve human capital development.

The Use of ICT in Teaching and Learning

In order to be relevant in the information age, the teacher training institutions should stay current as a successful teacher should keep pace with changes in their field and with times. Teacher training institutions should be equipped with Information and Communication Technology (ICT) to assist the teacher learn how Information and Communication Technology is being used. ICT tool has the ability to shift focus of classroom teacher-centred to student-centred learning. This allows students to actively participate in classroom transaction as they produce and share knowledge. Usoro and Ogbuanya (2009) maintained that ICT is also a catalyst for paradigm shift to new training approaches within an organisation. Companies and industries have now begun to look beyond traditional classroom instruction to meet their training need.

Entrepreneurship Training

To improve business technique in technical teacher education, entrepreneurial skills of marketing skills, financial management, self-motivation, time-management, administrative skills, professional skills and innovative skills should be intensified and emphasized to the total development of the individual trainees. (Hisrich, Peters & Shepherd, 2008).

The training for entrepreneurship according to Nwaokolo (2003) must be in addition to the usual skills training in any of the technology areas since a typist, for example without adequate typing skills is not likely to succeed even when encouraged to open a business centre. It is therefore, important that the introduction of entrepreneurship education will involve the finance of all technology graduates in this manner. Perhaps it is important to stress that in a period of mass unemployment and declining economic fortunes, only the best can survive. The foregoing has pointed out and dealt with curriculum implication of entrepreneurship for technology education.

Application of Appropriate Methodology in Teaching Technical Subjects

For quality human capital development in science and technology education this paper advocates constructivist philosophy in pedagogy. The emerging theory of constructivism may have implication for science and technology education in this century. It would help in the preparation of workers for entry into and advance in the workplace as the 21st century requires an educational programme that provides not only job skills as science and technology education did through out the 1900s but also higher order thinking, problem solving and collaborative work skills (Ogbaunya and Usoro, 2009).

Curriculum Innovation

The curriculum of science and technology teacher training institution should move away from the traditional courses to embrace computer installation and maintenance, graphical arts, petrochemical, instrumentation, food technology, land surveying, metallurgical technology, glass and telecommunication technology and so on. The curriculum of science and technology education should focus more on creativity education. Often industries and colleges reject products of science and technology education whose training was based on the outdated method of developing skills i.e. “Do as I do and repeat after me”. To this end, science and technology education training institutions should shift focus to curriculum that acknowledges particular set of talents and attempt to enable the trainee discover and develop his particular sets of potentials.

Provision of Training Facilities

Science and technology education according to Egboh (2009) cannot be effectively implemented in schools without workshop facilities, laboratories, functional tools, studios and equipment with constant supply of electricity. The state and the federal government of Nigeria should intensify effort to supply and replace outdated tools and equipment, expand the existing workshop, laboratories and training facilities to ensure that science and technology education environment depicts the working environment.

The New Responsibilities of the Teacher in Human Capital Development

In the 21st century, a lot of responsibilities are demanded from the teachers in human capital development. These responsibilities according to the author of this paper are:

- **Teachers being knowledgeable in information and communication technology (ICT):** The intention of the Federal Government of Nigeria to introduce computer education in the teaching curriculum suggested that science and technical teacher trainee should be provided with enabling environment that encourages individualized learning, which is one of the modern approaches for learning of science and technology. In human capital development, the use of ICT will enable the trainers to get more effective results in his teaching. Similarly, teaching and learning becomes easier.
- **Improvement on teaching strategies:** Arubayi, Nworgu, Akpochafor and Odu (2008) suggested the following teaching strategies in science, technology and vocational education that will enhance skill acquisition among teachers and learners in Nigerian secondary schools.
 - a. Concept formation
 - b. Real Life Application
 - c. Job-related skills acquired by learners
 - d. Demonstration
 - e. Equipment, care and maintenance
 - f. Diagrams/illustrations/Drawings

The authors defined the sub-scales below:

- **Concept formation:** This deals with all the ideas coming from the teacher and learners culminating in the formation of what the topic/object of discussion is.
- **Real life application:** This evaluates the ability of the teacher to make the learner relate what is learnt to everyday activities in his environment and beyond. Real life application makes reference to the implication of the concept to real life/possible future careers.

- **Job related skills acquired by the learners:** The topic or subject matter should offer various skills to learners which they can use in the world of work.
- **Demonstration:** This sub-scale explains all the teacher does in the class/laboratory/workshop or studio to engage the attention of the learners to him/her in order to replicate the procedure and process involved in an experiment/workshop practice etc.
- **Diagrams/illustrations/drawings:** These sub-scales emphasize teacher's use of drawing/diagrams as it relates to the topic and stressing the importance of accuracy in spelling, labeling and neatness of diagrams.

CONCLUSION

Human capital development in science and technology education is essential to human and educational development. Unfortunately, a lot of challenges are facing this important issue concerning technology education. These problems are: retraining of science and technology teachers, dearth of qualified technology education trainers, inadequate funding, poor workshop organisation and inadequate instructional materials. The following strategies are recommended by the author of this paper to make human capital development in science and technology education successful. These are: use of ICT in teaching and learning, entrepreneurship training, application of appropriate methodology in teaching science and technology education subjects, curriculum innovation and provision of training facilities.

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DATABASE MANAGEMENT (DBM)**ThankGod C. Olowu***Administration Department, Federal College of Education(Technical), Omoku, Rivers State, Nigeria.**Email:olowu_thankgod@yahoo.com***Abstract**

The views of this paper expressed the management of the database system that enhances the importance usage of computer network to ascertain the task. This describes a serious research to enabling profound solutions on the solved keywords. Universal Database is a relational database management system that supports a variety of client and server platforms and communications protocols. Database management is made up of several administration tools such as the control center and the command center, which simplify the task of managing your environments and data. The basic elements used by universal database objects, data integrity, system catalog tables, directories, storage objects, recovery objects, and configuration files. Database provides several system management facilities to help manage very large data-base and large networks. Those facilities includes being able to perform many administration management tasks while users are still connected to the database, allowing client code to be shared to simplify configuration, and a governor to assist you define how applications behave. Database management program files are physically stored in one location on a particular machine, and created instant point back to the location, and can have several related database located within a single instance.

INTRODUCTION

Database (db) have been in use since the earliest days of electronic computing, it is a programming software package. Database management can simply cover the keywords structures such as Network, Event monitoring, Security, Backup, and Computation. Through its clients to meet the needs from database administration client, database Run-Time clients, and database application development client. Database client software could be acquired by using the database management software client pack CD-ROM which is included with Database Workgroup and Enterprise server editions. The latest database client software can be download from the IBM data management web site. If you need your server to also act as a client, you do not need to install the database client software separately on the server. The database client software is already built into each database product to act as a client by the server. You need to install this software only on a remote system that is to act as a client. Installing the client as it showed, is by using the typical and custom installation types. After the client software is installed. Configuration assistant could be used to find your database on the network.

The data base management also ensuring data security, that is to say, it's set up your database so that data is protected against unauthorized use. On security, there are three (3) security levels control access to database universal database data and functions. The first level of security checking is authentication, where the operation system verifies a user through a user ID and password. Once authenticated by the operating system, authorization is the next level of security where the user must be identified to database code using SQL authorization name or authid. The authid can also be the same as the user ID and is normally used for identifying users to maintain the

database and instances. Unlike other software packages and modern systems which can be applied to widely different database and needs. The vast majority of older systems were linked to the custom of databases in order to gain speed at the expense of flexibility. DBMS were found only in large organizations which the computer hardware needed to support large data sets. In the mid- of 1960s, number of general-purpose database systems emerged, as computers grew in speed and capability and there were number of such systems in commercial use. Interest in a standard began to grow, and a man called Charles Bachman, author of “integrated data store”(IDS), founded the database task group within CODASYL, the group responsible for the creation and standardization of COBOL, in 1971, they delivered their standard which generally became known as the “codasyl approach” and soon a number of commercial products based on this approach were made available .

The codasyl approach was based on the “manual” navigation of a linked data set which was formed into a large network. When the database was first opened, the program was handed back a link to the first record in the database, which also contained pointers to other pieces of data. To find any particular record the programmer had to step through these pointers one at a time until the require record was returned. Simply queries like “find all the people in India” required the program to walk the entire data set and collect the matching result one by one. There was essentially, no concept of “find” or Search” this may sound like a serious limitation today, but in an area where most data was stored on magnetic tape such operations were expensive to contemplate any way, anywhere.

A database management system as software programs, which controls the organization, stored, management and retrieval of data in a database. It’s said to be categorized according to their structure or types. DBM –accepts the requests for data from an application program and instructs the operating system to transfer the appropriate data. The queries and responses must be submitted and received according to a format that conforms to one or more applicable protocols. Database management system (DBMS) when it is in used, intimation systems can be changed more easily as the organization intimation requirements change. New categories of data can be added to the database without disruption to the existing system.

Data

The word “data refers to qualitative or quantitative attributes of a variable or set of variables. Data (phiral of “datum”) are typically the results of measurement and can be the basis of graphs, images or observations of a set of variables. Data are often viewed as the lowest level of abstraction from which information and then knowledge are derived. data is also known as row data and unprocessed information, refers to a collection of numbers, characters, images to convert from row to meaningful and readable information or to convert physical quantitative into symbols.

Management

Management is the process of controlling and organizing a business and organizational activities or act of getting people together or instruments to accomplish desired goals and objectives using available resources efficiently and effectively. Management comprises planning, organizing, staffing. Leading or directing, and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplishing a goal. Resourcing encompasses the deployment and manipulating of human resource, financial resources, technological resources and natural resources. Since organization can be view as system management, can also be defined as human action, and design to facilitate the production of useful outcome from a system. This view opens the opportunity to “manage” one self, a pre-requisite to attempting to manage others.

Trends of DBM

In 1998 database management was in need of a new style of database to solve current database management problems. Researchers realized that the old trends of database management were becoming too complex and there was need for automated configuration and management. Gerhard Weikum, Michael stone braker and surajit chaudhuri were the pioneers that dramatically affected the thought of database management. They believed that database management needed a more modular approach and there were too many development processes of specifications needed for users. This new development process of database management is more possibilities to access. Database management is no longer limited to “monolithic entities”. Many solutions have been developed to satisfy the individual needs of users. The development of database options has created flexibility in database management.

There are several ways database management (DBM) has affected the field technology. Because organizations demand for directory services which have grown as they expand in size, business use directory services that provide prompted searches for company information. Mobile devices are able to store more than just the contact information of users, and can discover (cache) and display a large amount of information on smaller displays. Search engine queries are able to locate data within the world wide web (www). Retailers have also benefited from the development with data ware-housing, recording, recording customer transactions. Online transactions have become tremendously popular for e-business. Consumers and businesses are able to make payments secondly through some company-websites.

Five Key Words to Describe DBM

DBM systems are designed to use these keywords structure to provide simplistic access to information to the user.

The keyword structures are:

- 1) **Network**
- 2) **Event monitoring**
- 3) **Security**
- 4) **Backup**
- 5) **Computation**

Networking: The networking consists of more complex relationships; it can relate to many records and accesses them by following one of several paths. In other words, this structure allows and enable the user to be connected and has link relationships to work together for online effective Communication. This is done through the help of database management programming.

Event monitoring: An event monitoring allows you to collect information about transient events that would be difficult to monitor through snapshot, such as deadlocks, transaction completion, and completion information that includes how long a transaction has take place. Monitoring a database manager event results in information being returned when that event occurs. The information provides a good summary of the activities of a particular event.

Security: For security reason, it is desirable to limit who can see or change specific attributes or graphs of attribute. This may be managed directly on an individual basis, or by the assignment of individuals and privileges to groups, or in the most elaborate models, through the assignment of individuals and groups to roles which are then granted entitlements. There are three (3) security levels control access to universal database management data and functions. The first of security checking is authentication, when the operating system verifies through a user ID and password. Once authentication by the operating system authorization is the next level of security where the

user must be identified to Database management by using what is called SQL authorizations name in other word “Authid”. Similarly, this is what “American’s security agency used to trapped down Osama bi-ladi in his hide-out”. The authid can also be the same as the user ID and is normally used for proper identification at any moments in the surroundings and searching view. In essence, privileges are rights granted to users to work with objects within a database, such as a view object or search light.

Back-Up: Copies of attribute need to be made regular in case primary disk or the equipment fails. A period copy of attributes may also be created for a distant organization that cannot readily access the original. Database management systems usually provide utilities to facilitate the process of extracting and disseminating attribute sets. When data is replicated between databases servers, so that the information remains consistent throughout the database system and users cannot tell or even know which server in the DBMS they are using, the system is said to exhibit replication transparency.

Computation: Common computations requested on attributed are counting, summing, averaging, sorting, grouping, cross-referencing, and so on. Rather than to have each computer application implements that from scratch, which they rely on the DBMS to supply such calculations. These given Database management optional structures depend on the natural organization of the applications data, and on the application’s requirements, which include transaction rate, reliability, maintainability, scalability and cost. Database in the cause of system management, provide many facilities in addition to the control centre to aid in the management of a large, diverse database system. You can administer database client from one central location, perform database client from one central location, and perform database administration tasks remotely from a client workstation unite banks for fund transfer, monitor database activity, spread databases across multiple file systems, force users on the system, and diagnose problems.

A number of database administration management tasks can be performed while the database is still operations, “while users are still connected”. This provides for greater availability of data to users. Some management tasks that can be done online include loading data, backing up data, reorganization of data, creating table spaces, and altering tables or table spaces.

Managing Data in Table Space

Database that are very large, contain large objects such as photos, or require high performance, you need to use advance method to store your data. Database provides table spaces, containers, and buffer pools for you to define how data is store on your system. Databases are logically organized into table spaces consist of physical storage devices called containers. A single table space can span many containers. A buffer pool is an allocation in memory used to discover (cache) table and to index data pages as they are being read from disk or being modified. You aren’t required to create a table space, container, or buffer pool to create table in a database you can accept the defaults for each when you create a database and a table in a database. By default when a database is created in database, there default table spaces are created as follows:

Temp-space:This is a table space made temporary used to sort or reorganized tables, create indexes, and join tables

User-space: This is a regulation space used to store the tables data and indexes.

Syscat-space: A regular table space used to store the system catalog tables. Using table spaces to store your data gives you the flexibility to assign portions of a table such as data, indexes and long field data to different table spaces. This gives you the opportunity to assign different storage devices depending on the content of each table space. Table spaces can also be backed up and restored as a

unit. If you separate into spaces according to back-up the table space containing the more frequently updated data more often.

Steps to Create Table

- 1) Start the control center
- 2) Expand the folders until you see the CDLIB database.
- 3) Right-click the table spaces folder.
- 4) Select create/table space using wizard from the pop-up menu.
- 5) The create table space wizard appears.

Data Recovery Manager and Bank-up (wizard)

Data can develop problems caused by media and storage, power interruptions, and application failures. In the cause of managing the data file, the restore manager i.e. 'database wizard' helps deal with the basic database recovery. If you find out that, you have more complex problems to deal with, use the information covered later on the restore manager which is the database wizard to restore your data. Database recovering manager automatically recovers from system crashes. If your database crashes to a software problem or power failure. Database automatically restores your database to the state just after the last committed transaction, using a set of logs that recorded every transaction that had not been saved to the hard drive. All committed units of work not written to disk will be redone when the system comes back and the first application connects to a database managing recovering memory or when a database is restarted.

The restore data wizard helps you restore a database to the point in turn of the last database backup or the completed transaction occasionally, you may need to undo something that had happened to your database. For example, if an errant application program has damaged your data, you would want to put the database back to the usual point before that application will run against it. To do this, use the database wizard to perform at full database restore, but in the last step, specify a date and time to which you want to roll forward your database by using the logs. Database backup is one of the importance's to consider the database logs. If a database needs to be restored to a beyond the last back "either full or incremental" logs are required to roll the data forward to a point of consistency. Database allocates primary and secondary log files to each log created to support recovery operations. Primary log files establish a fixed, reallocated amount of storage to the recovery log files. Enough disk space for the primary log files must be allocated before the database the database is connected to secondary log files are used when the primary log files become full and are at a time when required.

Two Ways of Configuring Logging for Database Management

- 1) Circular logging
- 2) Archive logging

Circular logging: it is said to be only full, offline backups of the database are allowed to recognize. The database must be offline i.e. inaccessible to users "when full backup is taken. As the name suggests, circular logging uses a ring" of a online logs to crashes. The logs are used and retained only to the point of ensuring the integrity of current transactions only crash recovery and version recovery are supported using this type of logging.

Archive logging: is the support recoverable database by archiving logs after they have been written to that is to say, log files are not reused. Archive logging is used specifically for roll – forward recovering. This enable the log retain and/ or the use-exit database configuration parameter results in archiving logging. To archive logs, you can choose to have database leave the log files in the active

path and then manually archive them, or you can install a user exit program to automate the archiving. Archived logs are logs that were active but are no longer required for crash recovery. Log files can be characterized as one of the following Active-the log files written by DBM, supported crash recovery. They contain there in the files, information related to the units of works that have not yet been committed “or rolled back”. Archive-the log files that been written DBMS are no longer needed to support crash recovery. Online archive log files reside in the active log path directory. Offline archive log files do not reside in the active log path directory. They can be more manually or by an external storage management product.

The configure database logging wizard allows you to specify which logging scheme you want for each database. You can develop a user exit program to automate log file archiving and retrieval. Sample users are provided for all supported platforms. When a user exit program is involved, the database manager passes control to the executable files, the user exit sample programs for operating systems are found in the sqzzi/sample/c subdirectory. Although the samples provided are coded in c, your user exit program can be written in a different programming language.

Components

Database and its Products

If your organization has data spread across multiple database, remote relational access can represent an important advantage in the way data can be designed, managed, and used database makes it possible for organizations to distribute and access data across a network of systems. Users can query, delete, or update data in remote database, letting your focus on the design of your database and the problems to be solved rather than on the complexities of gaining access to the data. Data is requested at one location and provided by another. The database receiving the request maintains authorizations for remote requests in the same way as for local requests. To understand how data is distributed, you must understand the components that make up such an environment. The key components include a database server and one or more database clients. The server controls one or more database and handles requests from clients that want to access these databases.

Database has its different server editions, such as workgroup server edition, enterprise server edition, personal edition, and express edition. The database engine in each version is identical. The engine is a full-function, robust database management system that includes optimized SQL support based on actual database usage and tools to help manage the data. The difference between these products is the capability to support remote clients, the licensing consideration, and the number of database partition support. The workgroup server and enterprise edition include the functions that allow database to be accessed by local and remote clients. Remote clients must have the database run-time client component installed to access a database server. The workgroup server and enterprise server edition also include the database engine and the administration client that provides tools for performing administration tasks, as well as the database run-time client component for access to remote database servers. The personal edition includes the database engine plus the administration client that provides the tools for administrative tasks such as configuring the system, replicating data, timing performance, backing up and recovering the system, and managing media and the database is run-time client component for access to remote servers.

This environment is ideal if you want a simple stand alone system or if you perform database administration tasks and need to have local database to prototype applications. If you want to use an application development environment, you should consider the database developers editions. To accepting requests from remote clients, the enterprise server edition has the DRDA application server features built in. It accepts requests from z/OS, OS/400, VM, and the other DRDA clients (data request developers application).

The database partitioning feature provides the capability of partitioning the database across multiple, independent computers by a LAN (local area network). It is available to use with database enterprise server edition, can handle extremely large database, and can improve performance by adding more processing power to a given database operation. Database management (DBM), as well as providing a relational database to store your data, it lets you administer request to query, update, insert, or delete data from local or remote client applications. Database includes management and administration client provider, that provides graphical tools for you to time performance, access remote servers, manage all servers from a single site, develop powerful applications, and process SQL queries. These tools are described later in the area section called "Database (DB) tools for administering Database when a network is operational and protocols are functional on the workstations, LAN-to-LAN connections between the servers and clients require no additional software. For example, if you want to have a dedicated database administrator (DBA) system, which allows you to administer remote database, you can use the DB administration client or the personal edition in a windows workstation that connected to a LAN in Montreal and another sever on a Linux workstation which connected to a LAN located to direction. As long as a connection exists between two LANS, clients on either network can access either server.

Within a single transaction, database on both servers are accessed and updated, and integrity of the data on both servers is maintained. This commonly known as one bank account to another is a classic example of when two-phase commit is important. It is critical that the both debit from one account and the credit to the second account be completed as a single transaction. You can also perform database administration task locally or remotely with a database administration tools provided with the client. The general administration tools folder contains the control centre, journal, replication center, and task centre to help you administer the servers. These tools are described in the providing section called "Managing Databases Control Centre".

Types of Network

There are two types of networks: local area network (LAN) and wide area network (WAN). Local area network (LAN): this is a local area network that has number of computers connected to each other by a short distance cable in a single location. Usually a single floor of a building or sometimes connecting all the computers within the federal college of education (technical), Omoku campus for the purpose of sharing resources. LAN is usually owned and operated by one organization and as such may not be constrained by the need to conform to international standards. The proximity of computers in a local area network provides for greater speed of transmission and low error rate. Wide area network (WAN): as its implies this network "WAN" connects lots of computers within and outside the environment. It goes worldwide in communications through the server to link the user in operation.

WAN is very important in our dealings, it help running an academic programs from a distance, fund transactions, administration, employment and so many others. Its enable an application system to utilize several computers networks simultaneously thereby increasing the performance of the database management system in terms of output, and response time. WAN is also reliable in DBM, which the effects of a breakdown of one or more components can be reduced by connecting several computers in a network and therefore, cannot feel much the input of the other breakdown component.

Database Server in a Network

In database management what facilitate the information network is "server", this convene information and performing special tasks in support of other computers on the network to

get the desired direction. Balance is the peripheral servers which can be used to ascertain data information. Message servers: this server provide message services in a wide variety of communication methods that go beyond simple file farm. With message services, data can take the form of graphics, digitized video or audio, and text. Print services: print servers message and control printing on a network, multiple and simultaneous access to printing facilities. The network operating system achieves this by using printing management quells. When a computer prints to a quell it actually functions is though nit were printing to the printer.

The printed job is simply stored in the management quell and then forwarded to the printer when the printer has finished the job scheduled ahead of it. File servers: file servers other services that allow the network users to share files. File services are the network application that store, retrieve, and move data. This type of service is probably the most important reason why companies invest in a network. Data servers: this provides network powerful capabilities that are available for use on relatively weak pcs. It also transforms data through the computer to readable mean full information. Application servers: this servers allow client PCs to access and use extra computing power and expensive software application that on a shared computer.

CONCLUSION

With the help of Database management one can control the environment and profound solution to develop satisfactory individual needs in the net. This reviewed several ways in which it cannot be too complex in handling the software program to tackle a problem in your environment. Database management keep secret and also discovers secrets through a searching code, depends how the user wants it.

RECOMMENDATION

Looking at the important of Database management, there is need for enterprises, educations, companies, individuals, etc to adapt the use of data base management in there computer systems for the purpose of security and analysis.

1. In education sector: The administrative department, exams and records should use DBM for admission of students, computation of students result, employment of staff through the online processing where there will be no maneuvering and bribing to any one.
2. Security: It's recommended to use DB security in all organizations for checking un-authorize entrance permit and dangerous intruder, if it happened can easily locate the scene of the action.
3. Information: The major activity of the DBM is information compiler, it relates information from different sources to carry out a given task ie why is important to be used in the office.

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GEOGRAPHY, GENDER AND MONEY PROFITS IN SUDANESE GENERAL PRIVATE EDUCATION, THE EXAMPLE OF KHARTOUM STATE IN 2011

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Abstract

The objective of this paper was to investigate general private education in Sudan with the main focus on the geography, gender and money profits in Khartoum state based on fieldwork and data published by Administration of Non Governmental Education of Khartoum state in 2011. Results depict that private education contribute by 41.7% in the total number of schools in the state. In number of schools in basic education, private schools hold 35.7% while in secondary education it holds 58.1%. There are statistical significant difference into distribution of private secondary schools by locality and there is less dispersion into secondary schools compared to basic schools. There is no compliance into school numbering by locality in private basic and secondary education. the calculated value of chi-square for private secondary schools is less than the private basic schools indicating to less dispersion into secondary schools compared to basic schools. Rank Spearman's correlation value of -0.4 and Kendal's of -0.5 depict to distribution of number of private basic schools as not to be necessarily correlated with number of private secondary schools. From the total number of basic private students males constitute 53.7% and females 46.3% which gives 7.4% excess males. In gender concerns, there is 7.4% excess males. There is significant statistical difference between numbers of males and females in private basic education while there is no statistical significant difference between both sex in private secondary education. There appears to be close correspondence between number of schools and number of students in basic private education contrary to private secondary education. Private education employs 14.33% of teachers involved in basic education and 13.92% of teachers involved in secondary education. Male teachers dominate private secondary education and almost equal to female teachers in basic private education. The total net income of private education is estimated as 39.4% of the total annual income. The author suggests some strategies to recruit government free education to decelerate private schooling to exclude poor Sudanese to save payment on private education to meet the increasing basic life demands in situation of increasing inflation.

Key words: Private Education, Government Education, Geography, Gender, Urban Poor, Investment

INTRODUCTION

Societies are aware that scientific progress, socioeconomic and political achievements are products of educational systems. Therefore, demand for education is increasing worldwide where for example it is projected that higher education will expand from 97 million students in 2000 to 262 million students in 2025 (Apollogrp.2011). In sub Saharan Africa, a large number of children remain out of school and for those who do enroll, less than half complete the primary education (Johnson,2008). There are problems with access to education, quality of learning opportunities and

learning outcomes which are unevenly spread geographically, by economic status and by gender. However, efforts to expand secondary and tertiary education is a challenge for all countries in sub-Saharan region (Alain, et al.2010). Enrollments in primary schools grew more than six-fold between 1960 and 2000, and secondary education expanded even more rapidly. Between 1960 and 1989 the number of children in primary schools increased from 12 million to almost 61 million in Africa south of the Sahara and secondary enrolment jumped from almost 800,000 to 12 million (Encyclopedia of African History.2009). This trend continued where from 2000 through to 2008, the number of children enrolled in primary school in sub-Saharan Africa grew from 87 million in to 129 million which represents an increase by 48% (UNESCO, 2011). Overall, enrollment in secondary education is rising in sub-Saharan Africa from 20.6 million in 1999 to 32.6 million in 2006. However, despite this significant trend, the average secondary in sub-Saharan Africa was 25% in 2006. This implies that nearly 78 million of the region's secondary school-age children were not enrolled in secondary school (UNESCO, 2009).

Concerning gender in education, statistics show that for the school year ending in 2005, the median transition rate from primary to secondary was 62% which was noticeably lower for girls (57%) than for boys (66%) (UNESCO, 2009). Girls' limited access to school is of particular concern in sub-Saharan Africa where in 2006, they accounted for 54% of primary school-age children not in school in the region and 72% of them have never been enrolled compared with 55% for boys (OECD, 2011). In addition, the countries of sub-Saharan Africa combined spend 5.0 percent of their GDP on education, the second highest value after north America and western Europe, where 5.3 percent of the regional GDP is spent on the education sector (UNESCO, 2011).

In sub-Saharan Africa, including Sudan, education system reflect differences in geography, cultural heritage, colonial history, and economic development progress (State University, 2011). Generally, there are two main types of general education in sub-Saharan Africa, governmental and non-governmental or private education. Private school is defined as that school which is not administered by local, state or national [governments](#) and are funded in whole or in part by charging their students [tuition](#), rather than relying on [government](#) funding (Wikipedia, 2001). However, factors driving the growth in private education in sub-Saharan Africa include demography, unmet and imbalanced demand and supply of education and decline in public funding (Apollogrp.2011). On the contrary, Americans choose private education for their children because of quality academics, a safe and orderly environment, moral and ethical values, caring teachers, supportive communities (CAPE.2010).

The modern education system in Sudan was inherited from the British who governed Sudan from 1898 to 1956. When Gordon College opened in 1902 as the next step for the first intermediate and secondary schools (State University,2011). The general educational system spanned 12 schooling years distributed as 4 junior or primary school, 4 intermediate school and 4 secondary school. At independence in 1956, education accounted for only 15.5 percent of the Sudanese budget to support 1,778 primary schools, 108 intermediate schools and 49 government secondary schools with 22.9 percent adult literacy rate (U.S.Library.2011).

In 1969, Nimeiri government considered the education system as inadequate for the needs of social and economic development and largely reorganized the education system by the late 1970s. The basic system consisted of a six-year curriculum in primary schools and three-year curriculum in junior secondary schools and then qualified students could go on to one of three kinds of schools, the three-year upper secondary, which prepared students for higher education; commercial and agricultural technical schools; and teacher- training secondary schools designed to prepare primary-school teachers. In the early 1980s, the number of junior or general secondary schools was a little more than one-fifth the number of primary schools, a proportion roughly consistent with that of general secondary to primary-school population. There were only 190 upper-

secondary schools in the public system in 1980, but it was at this level that private schools of varying quality proliferated, particularly in the three cities of the Khartoum capital area (U.S.Library,2011). Elite schools could recruit students who had selected them as a first choice, but the others took students whose examination results at the end of junior secondary school did not gain them entry to the government's upper secondary schools. Schools tended to be clustered in the vicinity of Khartoum and to a lesser extent in other urban areas, although the population was predominantly rural. This concentration was found at all levels but was most marked for those in situations beyond the four-year primary schools.

By 1990, education system is further reorganized into 8 basic and 3 secondary schooling years. Private schooling has grown rapidly in Sudan following the new economic policies of lifting complete government subsidy to service sectors including education.

The main objective of this paper is to examine geographic distribution, gender and money profits of general private education by taking Khartoum state as an example in order to outline future prospects in lights of rising population and modernization trends. The paper recommends some suggestions some to enhance government education.

DATA AND METHODOLOGY

Khartoum state is located between $15^{\circ}47'$ N $32^{\circ}43'$ E and consists of the three major town in Sudan, Khartoum, Omdurman and Khartoum north. They are call altogether Greater Khartoum. Khartoum lies between the Blue Nile in the north & the White Nile in the west. Khartoum north started on the fringe of the right bank of the Blue Nile on a small strip (Gleichen 1905) and extended northwards and north-eastwards. Omdurman surrounded by the desert in the west & south, Sabalouqa mountains from the north, and the River Nile from the east, developed as a narrow strip along the River Nile centred on the Imam Mahadi Tomb (Abu Saliem 1970) and extended northwards, southwards, westwards and north-westwards. Such developments are related to population natural increase and rural- urban migration. Administratively, Khartoum state is divided into seven localities. Khartoum includes Khartoum and Jebel Awlia localities. Omdurman includes Omdurman, Umm Bedda and Karary localities while Khartoum north includes Bahri and East Nile localities (Fig.1). Localities are further subdivided into administrative units. Within these localities, government and private schools are distributed according to population density and demand for education.

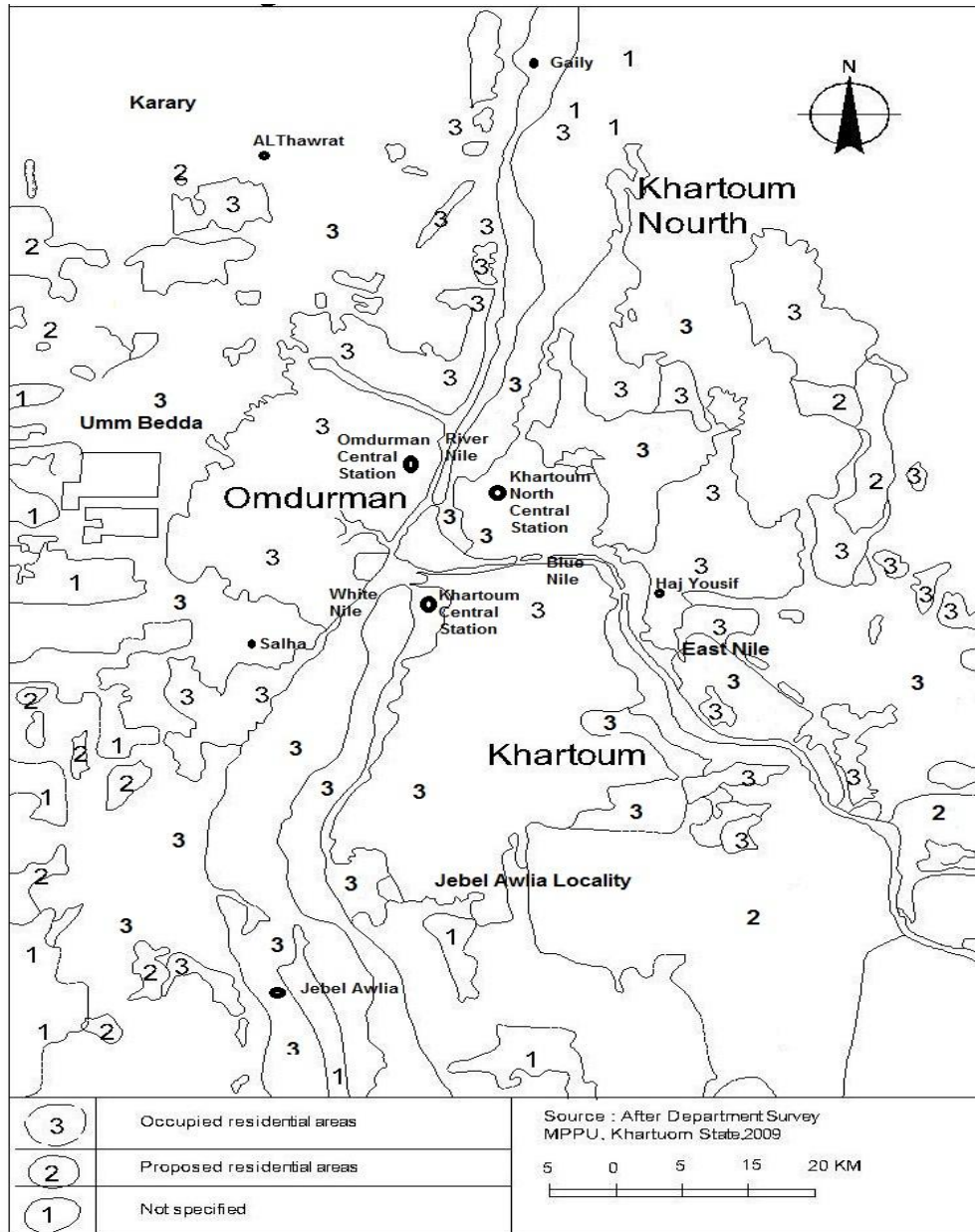


Fig.1. Khartoum state location and localities

Data on number of private schooling, students and teachers are collected from Administration of Private Schools, Ministry of Education, Khartoum state. The available data did not classify schools by gender. School academic tuitions, expenditure on teachers and supporting services as well as maintenance were collected through fieldwork during 2-9 June 2011 into the each locality of Khartoum state. Each locality is divided into three parts, northern, central and southern. Number of private schools were counted in each section. Putting into consideration differences into type of residential areas which consequently vary into peoples' income, selection of schools is done randomly. Field visits were executed while for remote private schools difficult to access, telephone is used.

The collected data was treated statistically. Percents, ranges and means measures are used where appropriate. Spearman's rank correlation is used where the formula $r = 1 - 6 \sum d^2 /$

$N(N^2 - 1)$ is applied. For Kendall's coefficient, the formula used $X/1/2 N(N-1)$ is used after following the procedure of ranking and summations. The T-test is used for comparison on mean number of males and females in private basic education. The formula : $T = \frac{\bar{x} - \bar{y}}{\text{Square root of } (\frac{\sum x^2}{N_x} - \bar{x}^2 / N_x - 1 + (\frac{\sum y^2}{N_y} - \bar{y}^2 / N_y - 1)}$ is used under two-tailed 0.05 significance level. If the calculated t - value is bigger than the critical value, the null hypothesis will be rejected under the specified significance level. The chi-square test formula : $\chi^2 = \sum (A-B)^2 / B$ is applied for measuring dispersion or concentration of some variables investigated

Share of teachers from total income by private schools is estimated by multiplying total number of teachers by 700 Sudanese Guinea (estimated monthly income per teacher) by 9 months (actual payment since private schools do not pay to teachers during school vacation). Government annual tax cut 2.5%. Expenditure for renting the building is estimated for 75% of private schools while the remaining 25% own their schools buildings. It is estimated as 5% from the total income. Expenditure on supporting services including water, electricity is estimated to cut 5% from total income and similarly annual maintenance cost of buildings, furniture and others relevant needs. Total net annual income by private education is calculated in USD based on 2.5 Sudanese Guinea exchange rate equivalent to USD.

RESULTS

1- Geographic distribution of private schools : The total number of basic and secondary schools in Khartoum state is 3516. There are 1651 government basic school (46.9%) ; 915 private basic school (26%); 398 government secondary school (11.3%) and 552 private secondary school (15.8%). This gives 2566 basic school (72.9%) and 950 secondary school (27.1%) in whole the state. Private education sector share is 1467 school representing 41.8% of the total number of schools in the state while government education sector share is 58.2%. This depicts that, difference between number of governmental and private schools is 16.6% confirming substantially contribution by private sector into schooling in Khartoum state. Private sector contribute into number of basic schools by 35.7% while government sector contribute by 64.3%. In secondary education, private sector contribute by 58.1% into number of secondary schools and government education sector by 41.9%. By that way, number of private secondary schools exceed governmental ones by 16.2%.

Government and private basic and secondary schools are distributed geographically by localities of the state (Fig.2). In Khartoum locality, out of 375 basic school, there are 195 private ones (52%) and in secondary schooling private sector share by 30.2% (51 out of 169). In Jebel Awlia locality, basic private schooling participate by 28.4% (108 out of 380) and private secondary schooling contribute by 67.2% (86 out of 128).

In Omdurman locality basic private schools contribute by 45% (135 out of 300) and private secondary schools by 50.7% (70 out of 138). Basic private schools contribute by 35% (121 out of 346) In Karary locality and private secondary schools by 56.6% (60 out of 106). In Umm Bedda locality, basic private schools contribute by 27.5% (94 out of 342) and private secondary schools by 73.6% (81 out of 110). Basic private schools contribute by 40.3% (146 out of 362) in Bahri locality and by 53.2% in secondary schools (83 out of 156). In east Nile locality, basic private schools contribute by 25.2% (116 out of 460) and in private secondary schools by 37.8% (54 out of 143).

Ranking localities by percent of basic private schooling puts Khartoum locality first then Omdurman, Bahri, Karary, Jebel Awlia, Umm Bedda and East Nile localities respectively. In private secondary schooling Umm Bedda locality ranks first and then Jebel Awlia, Karary, Bahri, Omdurman, East Nile and Khartoum localities respectively. There is no compliance into school

numbering by locality in private basic and secondary education. Rank correlation by Spearman's and Kendal's gave -0.4 for the first and -0.5 for the second (table 1). Distribution of number of private basic schools is not necessarily correlated with distribution of number of private secondary schools. That is to say, if there is excess number of private basic schools in one locality that does not necessarily mean there should be similar excess number in private secondary schools.

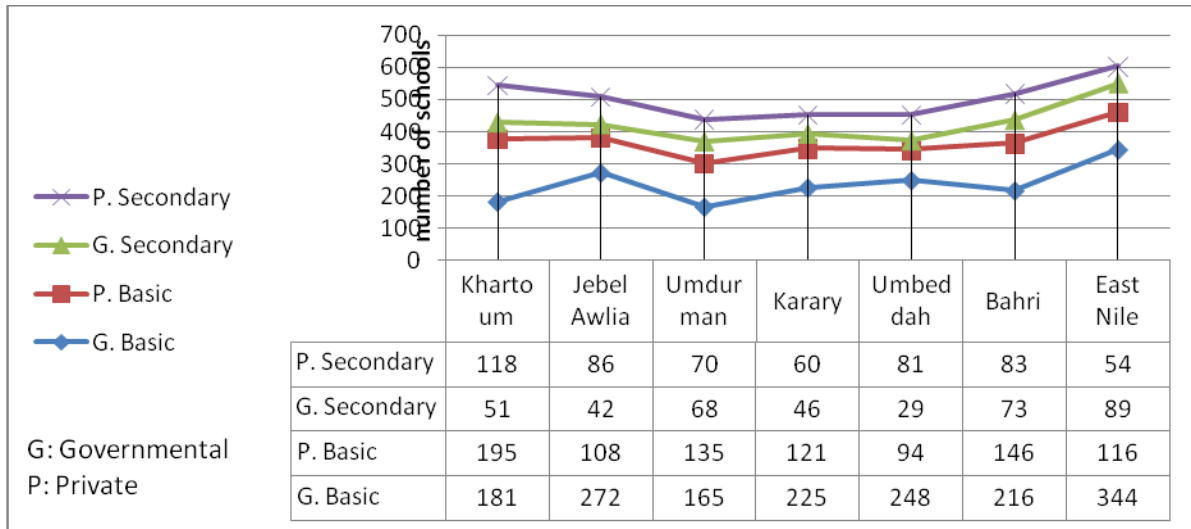


Fig. 2. Geographic distribution of Basic and secondary governmental and private schools by locality

The chi-square test is used to test degree of concentration or dispersion of private basic schools by the state's localities. The calculated value of chi-square is 50.15 and with 6 degrees of freedom under 0.01 significance level gives a critical value of 16.81 which is less than the calculated value. This means that there are statistical significant difference into distribution of private basic schools by localities of the state. There is more concentration of private basic schools in some localities than others. This is clearly shown by Khartoum locality which holds 195 private basic school while Umm Bedda holds 94 by excess of 101 school which is more than double. For private secondary schools, the calculated chi-square value is 33.61 and the critical value with 6 degree of freedom under 0.01 significance level is 16.81 which is less than the calculated value. This means that there are statistical significant difference into distribution of private secondary schools by locality. There is more concentration of private secondary schools in some localities than others. This is clearly shown by Khartoum locality which holds 118 private secondary school while East Nile holds 54 by excess of 64 school which is more than double. However, it is noticed that the calculated value of chi-square for private secondary schools is less than the private basic schools. This might indicate to less dispersion into secondary schools compared to basic schools.

Table 1. Rank Correlation by Spearman's and Kendal's for Private Basic and Secondary Schools by Locality in Khartoum State

locality	Ranking by number of private basic schools	Ranking by number of private secondary schools	Difference	Difference ²	Score due to ranking	\sum Scores
Khartoum	1	7	6	36	-6	-6
Omdurman	2	5	3	9	-4 + (+1)	-3
Bahri	3	4	1	1	-3 + (+1)	-2
Karary	4	3	1	1	-2 + (+1)	-1
Jebel Awlia	5	2	3	9	-1 + (+1)	0

Umm Bedda	6	1	5	25	+1	+1
East Nile	7	6	1	1	0	0
total				82	-	-11
Spearman's rank correlation: $r = 1 - \frac{6 \sum d^2}{7(7^2-1)} = 1 - \frac{492}{336} = 1 - 1.4 = -0.4$			Kendal's coefficient: $\frac{11}{1/2 \cdot 7(7-1)} = \frac{11}{21} = -0.5$			

2- Geographic distribution of private schools' students: General government and private education in Khartoum state enroll 1,002,556 student. They are distributed as 880,774 basic education students (79.9%) and 201,782 secondary education students (20.1%). Private schools students amount to 12.7% in basic schooling and 26% in secondary schooling. Taking the total number of students in private basic education by place (locality) distribution, Khartoum ranks first followed by Bahri; Omdurman; Jebel Awlia; Umm Bedda; East Nile and Karary respectively (Fig.3).

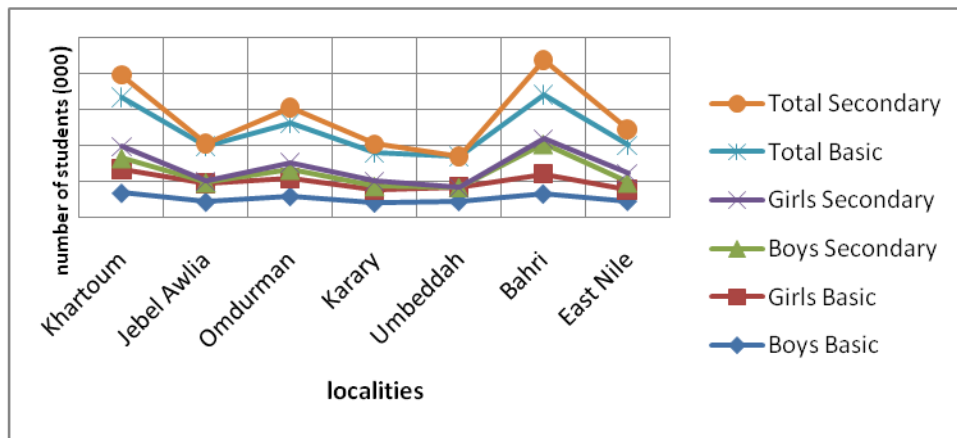


Fig. 3. Geographic distribution of private basic and secondary schools' students by locality

Concerning distribution of total number of students in private secondary schools, Bahri ranks first and followed by Khartoum; East Nile; Omdurman; Karary and then Jebel Awlia while no data is available for Umm Bedda (Fig.3). Ranking localities by number of basic private schools and by number of private basic students puts Khartoum locality first in both. Omdurman locality retreated from rank 2 to rank 3; Bahri advanced from rank 3 to rank 2; Karary retreated from rank 4 to rank 7 while Jebel Awlia advanced from rank 5 to rank 4 and similarly Umm Bedda from rank 6 to rank 5 and East Nile from rank 7 to rank 6. There is progress or retreat by only one rank which means that there might be close association between number of private basic schools and theirs' student (Fig.3).

Ranking localities by number of students in private secondary schools, Bahri comes first and then Khartoum; East Nile; Omdurman; Karary and Jebel Awlia while Umm Bedda locality has no relevant data. Although Khartoum ranks 7 into number of private secondary schools it progressed to the second rank into ranking private secondary schools by number of students. Omdurman stepped forward from rank 5 to rank 4; Bahri remarkably from rank 4 to the first rank; Karary lost two ranks by retreating from rank 3 to rank 5; Jebel Awlia sharply retreated from rank 2 to rank 6 and East Nile from rank 7 to rank 3 (Fig.3). This situation differs than that concerned with number of basic schools and their corresponding number of students. There appears to be no association between distribution of private secondary schools and distribution of their students by locality.

3- Gender in general private education: From the total number of basic private students which amounts to 140,179 there are 75,224 male (53.7%) and 64,955 female (46.3%) students which gives an excess by 7.4% for males. Distribution of basic private schools male students (Fig.3 and table 2) ranks Khartoum locality first then Bahri; Omdurman; East Nile; Umm Bedda; Jebel Awlia and Karary. On the other side, distribution of basic private female students, ranks Khartoum locality also first then Bahri; Jebel Awlia; Omdurman; Umm Bedda; Karary and East Nile localities. In private male secondary schools students, Bahri comes first then Khartoum; Omdurman; East Nile; Karary and Jebel Awlia. In distribution of private secondary female students, Khartoum locality comes first then East Nile, Omdurman, Karary, Bahri and Jebel Awlia localities.

The range value male students in private basic schools by locality is (7.3%) while for female it is (10.6%). This indicates to more dispersion among females by 3.3%. Using the same measure for private secondary education students, the range value for males is (46.5%) and for females it is (24.9%). This similarly depicts wide geographic dispersion among private secondary male students and big range difference by 21.6% between both sexes (table 2). There is much geographic concentration of private secondary male students in Bahri locality.

Table 2: Distribution of Students of Private Education by Percent, Locality and by Sex

locality	male basic	female basic	total basic	male secondary	female secondary	total secondary
Khartoum	13853 (18.4%)	13083 (20.1%)	16936 (12.1%)	6368 (18.3%)	6452 (29.0%)	12820 (22.5%)
Jebel Awlia	8907 (11.8%)	10135 (15.6%)	19042 (13.6%)	600 (1.7%)	905 (4.1%)	1505 (2.6%)
Omdurman	12035 (15.9%)	9895 (15.2%)	21930 (15.6%)	4788 (13.8%)	4011 (18.1%)	8799 (15.5%)
Karary	8397 (11.1%)	6966 (10.7%)	15363 (10.9%)	2149 (6.2%)	2996 (13.5%)	5145 (9.1%)
Umm Bedda	9224 (12.2%)	7735 (11.9%)	16959 (12.0%)	0	0	0
Bahri	13446 (17.9%)	10939 (16.8%)	24385 (17.4%)	16707 (48.2%)	2858 (12.9%)	19565 (34.5%)
East Nile	9362 (12.4%)	6202 (9.5%)	15564 (11.1%)	4037 (11.6%)	4961 (22.3%)	8998 (15.8%)
Total	75224 (100.0%)	64955 (100.0%)	140179(100.0%)	34,649 (100.0%)	22,183(100.0%)	56,832 (100.0)

Testing the difference between number of male and females in private basic and secondary education by locality is run in table (3). The t-test value depicts significant statistical difference between numbers of males and females in private basic education while there is no statistical significant difference between both sex in private secondary education (Table 3). Figure (4) depicts distribution of students of private basic schools by sex by class by locality. In all localities, the majority of students are concentrated in first year. In all localities, except Khartoum locality, males exceed females. Males exceed females in 1st and 2nd school year in all localities, except Jebel Awlia locality. In 3rd year the same situation is found but Karary locality is similar to Jebel Awlia. In 4th year Jebel Awlia keeps on the same position. In 5th year schooling, Jebel Awlia is similar to others while in Karary females exceed males. In 6th year Jebel Awlia comes again as females exceeding males. In 7th year, only Umm Bedda has excess females over males. In 8th year, only Jebel Awlia has excess females over males. There is always one locality found to have excess females over males and is characterized by being one of the dense populated parts in Khartoum state.

Table 3: T- Test for Comparison of Means of Male and Females in Private Basic and Private Secondary Education

locality	male basic (x)	female basic (y)	(x ²)	(y ²)	male secondary	female secondary	(x ²)	(y ²)
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					(x)	(y)		
Khartoum	13853	13083	191,905,60	171,164,88	6368	6452	40,551,424	41,628,30
Jebel Awlia	8907	10135	79,334,649	102,718,22	600	905	360,000	819,025
Omdurman	12035	9895	144,841,22	97,911,025	4788	4011	22,924,944	16,088,12
Karary	8397	6966	70,509,609	48,525,156	2149	2996	4,618,201	8,976,016
Umm Bedda	9224	7735	85,082,176	600,625	0	0	0	0
Bahri	13446	10939	180,794,91	119,661,72	16707	2858	279,123,84	8,168,164
East Nile	9362	6202	87,647,044	38,464,804	4037	4961	16,297,369	24,611,52
total	75224	64955	840,115,22	579,046,44	34,649	22,183	363,875,78	100,291,15
	$\bar{x}= 10,746$ N =7	$\bar{y}=9,276$ N =7	$N_x=7$	$N_y =7$	$\bar{x}= 5,774$ N =6	$\bar{y}=3,697$ N =6	$N_x = 6$	$N_y = 6$
$T = 10,746 - 9,276 / \text{sq} (840,115,228/7) - 115,476,516/ 7 - 1 + (579,046,445/7) - 86,044,176/ 7 - 1 = 1470/\text{sq}.180,227,473 = \underline{2.85}$					$T = 5,774 - 3,697 / \text{sq}.(363,875,787/6) - 33,339,076/6 - 1 + (100,291,151/6) - 13,667,908 / 6 - 1 = \underline{0.61}$			
DF= 12 , critical value = two tailed (0.05) = <u>2.18</u>					critical value= two tailed (0.05) = <u>2.23</u>			

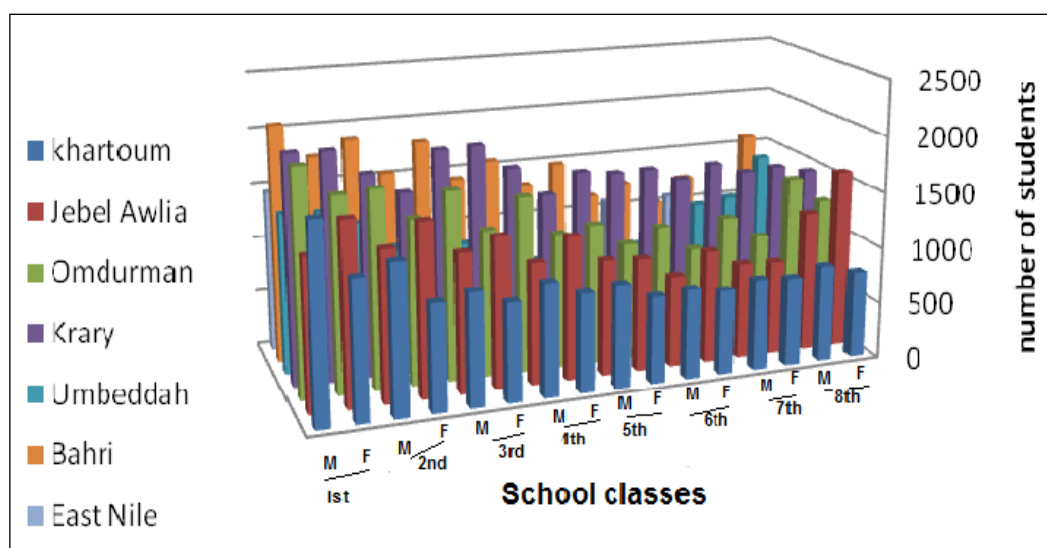


Fig. 4: Distribution of private basic students by sex by locality

5- Money profits, expenditure and net income: General basic and secondary education employ 44,611 teacher in Khartoum state. Basic education alone employs 30,644 (68.7%) teacher and secondary education 13,967 (31.3%) teacher. Private basic and secondary education employ 14,730 teacher which equals 33% of total employed teachers in general education in Khartoum state. They are distributed as 8516 (57.8 %) teacher in basic private schools and 6214 (42.2%) teacher in private secondary education. Female teachers represent 51% in basic private education and 18.3% in private secondary education. Male teachers represent 49% in private basic and 81.7% in private secondary schools.

There is very minor difference between male and female teachers in basic private education while male teachers remarkably exceed females in private secondary education. Bahri locality rank first into employing female teachers in basic and secondary private education while Khartoum locality rank first into employing male teachers in both basic and secondary private education. Few of private schools own the school's building, except old established well known private schools which are usually multistoried. Teachers are paid only during school year and according to the periods they teach while some other private schools pay monthly salary to a

teacher. The private schools provide relevant services such as water, electricity and supporting labor doing cleaning and security duties.

The estimated mean of school tuition paid by a student to a private school, including basic and secondary schools, is 1000 Sudanese Guinea which equals 400 USD. The old established well known private schools charge students up to 3000 Sudanese Guinea which is triple those newly established private ones. Such highly charged tuitions private schools are mostly found in first class residential areas and serve economically well off people and politicians. The low charging tuitions schools are mostly found on peripheral residential areas, old squatter areas and old downtown residential areas (Fig. 1) where the urban poor concentrate. So, the estimated mean tuitions value holds very big standard deviation value due to area and income differences within Khartoum state.

Calculation of total annual income, expenditures and net annual income are illustrated by figure (5). Total annual income by private education sector equals 197,011,000 Sudanese Guinea which equals 78,804,400 USD. Expenditure into teaching cuts 47% of total income. Government annual tax cut 2.5%. . Expenditure on renting buildings cut 5% and similarly maintenance and supporting services. The net total income equals 39.4% of the total annual income which amounts to 87,954,053 Sudanese Guinea or 35,181,621 USD. Net annual income per a private schools is estimated as 59,599,046 Sudanese Guinea. But, since there are differences between schools into number of students, expenditure into teaching, renting buildings, students' tuitions there will be expected income differences. Additional income sources by private education, that were not included here, include selling breakfast and snacks to students, students transportation and registration fees.

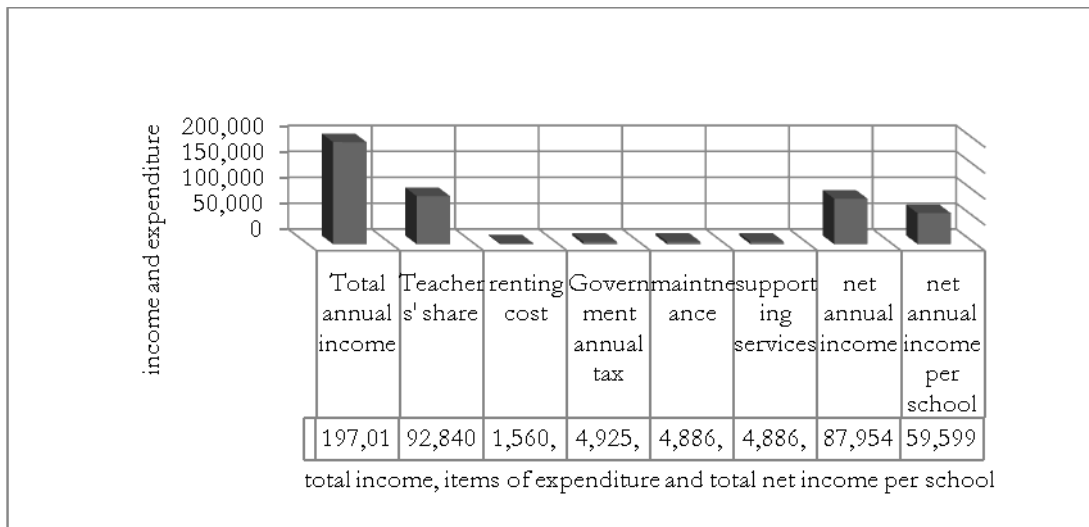


Fig. 5. Total income , expenditures and net income of private education in Khartoum state in 2011

DISCUSSION

Private sector substantially contribute into general education in Khartoum state. Although it was restricted to intermediate and secondary levels in the past and enrolls students who fail to compete into enrolment to government schools, it became acceptable among people to send their children to private education. Low quality of government school teaching environment such as classroom overcrowding is one of the main reasons. This is confirmed by the fact that although private schools represent 41.7% of the total number of schools in the state, they enroll 12.7% of the total number of students in basic education and 26% in secondary schooling. This also means that

one in two nation's schools in Khartoum state is a private school compared with one private school in four of the nation's schools in USA (Council for American Private Education.2010). This situation also contrasts the Singapore's experience where the private sector plays the complementary role of running continuing/supplementary education classes in commercial/business studies, computers, languages, fine arts and tuition (Ministry of Education, Singapore.2011).

The government policy of privatization and lift of complete subsidy to education sector are essential into spread of private schools. National Economic Salvation Program of the 1990th was basically built on open market economy and has lifted complete subsidy for education. However, decline into public expenditure for education started since World War II when the demand for education had exceeded Sudan's education resources. (U.S.Library.2011). From 1975 expenditure on education declined by percent from 49.52 to 41.78 in 1981m then to 27.76 in 1985 to 8.51 in 1990 and then increased slightly to 12.15 in 1996 (UNESCO, 2010). Consequently, governmental education was no longer equipped to meet increasing population and aspiration for better education. The market economy as based on taxes found a promising income source into private schooling. The appearance of economically well-off Sudanese who spent part of their life outside Sudan were enthusiastic for better schooling environs supported by excellent academic records into Sudanese Secondary Certificate, private education found good ground among Sudanese.

Population factor is also important into expansion, demand and supply of private education in Khartoum state where population growth rate was 4.92 % in 1956, increasing to 7.76 % in 1973 and to 8.75 % in 1983, reaching 13.7 % in 1993 (MFEP 1955–93). Mean population density (number of persons per square kilometer) was 55.6 in 1973, 85.5 in 1983, and 169 in 1993. Khartoum state received 39 % of internal migration in 1983 and 45 % in 1993 (MFEP 1955–93). Greater Khartoum's degree of urban primacy has changed: whereas in 1955 Khartoum had 4.7 times the population of Sudan's second-largest urban centre, by 1993 this had increased to 8.9 times (Davies 2001). This rapid urban population growth in Greater Khartoum is similar to other third world countries. Over the next three decades, Asia's urban population will rise from 1.36 billion to 2.64 billion, Africa's urban population will double from 294 million to 742 million, while Latin America and the Caribbean will face a slower rise from about 400 millions to 600 million (UNFPA, 2008).

Spatial expansion of private education have incorporated urban poor who generally occupy unplanned residential areas and squatter settlements where Greater Khartoum received between 50-70% of the total displaced population in Sudan in 1990, who occupied 50 locations in 1991 with a total number of 1570000 displaced persons (Banaga 2001). Gradually these concentrations began to be transferred into the old urban mass and old squatter settlements. However, their number reached to more than 2,500,000 persons in 2001 (Banaga 2001). Axes of squatter developments were westward, a south - westward & northward axes from the fringes of Omdurman central to the margins of Kordofan state & Nahr el Nil state (Alredaisy & Davies 2003) where Umm Bedda locality incorporate the majority of the squatter settlements . Another axis grew southward & south eastward from the fringes of Khartoum central to the border of the White Nile state & the Gezira state, dominating Jebel Awlia locality. A similar one directed northward from Khartoum north central to the margins of Nahr el Nil state and north eastwards to the direction of central Butana plain of eastern Sudan dominating East Nile locality. Occupants poor of these areas have to pay to educate their children as opinions and policies on the development of private education in Sub-Saharan Africa are changing (Kitaev, 1999) and poor African children benefit from private schools than government ones for a fraction of the cost and the poor parents know that private schools are the way forward (Sunday Times June 2006). This is in situations that 77.5% of the households surveyed in north Sudan were on or below the poverty line (MOL/ILO, 1997) and further the United Nations Development Program (2005) reported that 75% of north Sudan

population as poor and the majority (80%) is concentrating in rural areas where 30% of them suffered from extreme poverty.

Female students and teachers are prominent in private education in Khartoum state. Area differences by localities hold demographic indicators such as sex – age structure among population. Dominance of female education is the result of historical efforts to educate Sudanese females. Females have stepping from religious school "Khalwa" which did not prepare girls for the secular learning mainstream, from which they were virtually excluded to the world of competing with males. Due to the efforts of [Sheikh Babikr Badri](#), the government had provided five elementary schools for girls by 1920 and by 1940 the first intermediate school for girls was opened and by 1955, ten intermediate schools for girls were in existence. In 1956 the first Secondary School for Girls, with about 265 students, was the only girls' secondary school operated by the government. By 1960, 245 elementary schools for girls had been established, but only 25 junior secondary or general schools and 2 upper-secondary schools.

During the 1960s and 1970s, girls' education made considerable gains under the education reforms that provided 1,086 primary schools, 268 intermediate schools for girls by 1970, when girls' education claimed approximately one-third of the total school resources available. By the early 1990s the numbers had increased and the ratio had remained approximately the same. Modernization of Sudanese society have positively changed social attitudes towards girl's education which was viewed in the past as source of corrupting the morals of their daughters and no more preference was given to sons, who by education could advance themselves in society to the pride and profit of the family. Now, girls have excellently achieved academic success in Sudanese Secondary Certificate and constitute the majority of students in higher education institutions in Sudan. This situation contrasts many African countries where gender disparities against girls are highest in Benin, Ivory Coast, Ethiopia, Guinea, Mali, and [Togo](#), with fewer than 60 girls per 100 boys entering secondary education(Sutherland-Addy2008). For example, girls' access to school remains a big issue in Nigeria, where 69% of girls not in school are unlikely to enroll, compared with 31% for boys. Similar if somewhat smaller gender differences are found in Burundi and Guinea (OECD.2011). Educated women earn more, have smaller, healthier families, and are more likely to educate their girls (ESSA.2011).

Although private education in Khartoum state have contributed into enrolment of considerable number of students, employed many teachers who were mainly University graduate in situation of very few available job opportunities, in addition to providing job opportunities for the supporting cadres of labors, it also gave businessmen and some teachers the chance to invade education sector by investment into public education. Although, they have invested huge capital, their money revenue was higher enough to enable them move through social classes own houses or reside first class residential areas, owning fancy cars and spending school vacations in Europe and Turkey.

CONCLUSION AND RECOMMENDATIONS

The general findings of this study are as follows:-

- 1- Private education substantially contributes into general education in Khartoum state.
- 2- Private education have geographic and gender differences.
- 3- Urban poor have been incorporated to pay to educate their children.
- 4- Government privatization policy, modernization and accelerating population growth have increased demand for private education.
- 5- Female education ranks almost equal to male's.

6- Net annual income by private education exceeds one third of total income giving opportunity to new businessmen to step rapidly the social ladder.

The majority of Khartoum state population are poor. Private education is a financial burden on majority of the families. Poor people pay to educate their children on the expense of life basic needs. Therefore, efforts should be exerted to enhance government education. Government policy of economy privatization should exclude education sector. Private education should be offered as a complementary, not as an alternative to government education. Working towards education quality in government schools will encourage many families to send their children there. Government schools can ask for some financial support from these families. Strategy of expansion of government education to meet with population increase will actually reduce private education mainstream. Government can also support non-profit private education through provision of teachers, school books and necessary amenities. However, measures of intervention to charge reasonable students tuition will save part to families and obstruct the formation of a new social class of private schools landlords who tend to reside first class residential areas and spend school vacation abroad.

The experience of private education in Khartoum state is applicable in Sudanese and African urban settings. Most of African countries have their own experiences into private education. Working towards exchanging such experiences will definitely help improvement of this sector. However, African ruling authorities should understand that private education is not an alternative to government education when the majority of African are poor seeking to secure minimum basic life needs.

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REAPPRAISING THE WORK SKILL REQUIREMENTS FOR BUILDING TECHNOLOGY EDUCATION IN SENIOR SECONDARY SCHOOL FOR OPTIMUM PERFORMANCE IN NIGERIA

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Abstract

Effective handling of vocational technology education by all stakeholders pave way for sustainable development. Building construction which is one of the vocational electives in Senior Secondary School is poorly taught. It is regrettable to experience that a country crying for technological breakthroughs and emancipation cannot at this crucial time of technological age impart practical skills to the recipients of her technology education. Building construction which is an integral part of vocational technology is worst bit in this imbroglio. It is observed that the teaching of building construction is too theoretical to the detriment of the psychomotor aspect of the programme. The difficulties in imparting the practical skills in this subject is caused by the teachers not possessing adequate skills in the subject, inadequacy of teaching materials and facilities, curriculum invalidity in terms of teachability and learnability, poor teaching strategies to mention but a few. This paper, therefore, reappraise the state of affairs in the teaching of building construction and advance some strategies on how the subject can move forward.

INTRODUCTION

The importance of building technology which is an integral part of technical and vocational education cannot be over emphasized; since this field of study represent a core indices of national development. A major distinction between an advanced country and a developing one is to a large measure the difference between their levels of scientific and technological development in various areas of technology education, building technology inclusive. Thus, it is no exaggeration to assert that technology education is also the bedrock upon which advance nations are based (Egboh, 2009). Lack of technological capacity has made developing (Third World) nations to be relatively poor. Developing nations are poor because of their negligible investment in science and technological know-how and their people do not have the capacity to inform themselves in a competitive knowledge driven world. Increased competition in a global market place, adds to the need and urgency to get the right people, with the right skills, in the right place, at the right time (Odu, 2007).

The Senior Secondary School constitutes the beginning of what may be described as the finished product of a lower level of skill and aptitude. The level is expected to raise a generation of students who can think for themselves, respect the views and feelings of others, respect the dignity of labour, and live as good citizens. The curriculum in technology education has been well articulated with functionality and the integration of theory and practical/workshops as paramount aims. Creativity and improvisation are also highly rated.

Vocational Technical Education/Pre-Professional Education in Secondary Schools

At Senior Secondary Schools, technical colleges and vocational centres, vocational technology education is meant for either pre-professional training or for production of low-level manpower (skilled labour) i.e. artisans, craftsmen and master craftsmen for the labour market. Vocational technical education in this level requires a relatively low-cognitive and psychomotor abilities for mastery. Its curriculum is usually framed on the basis of 70% manual and 30% cognitive skills. It is education for doing rather than for knowing things.

Vocational technical subjects taught in Senior Secondary Schools are Building Construction, Woodwork, Metal work, Applied Electricity, Auto-Mechanics, Electronics, Technical Drawing, Agriculture, Book-keeping and Accounting, Commerce, Computer Education, Clothing and Textiles, food and Nutrition, Home Management, Shorthand, Typewriting, Fine Art and Music (FRN, 2004).

There is a great need for technological orientation of the Senior Secondary School students in Nigeria. In order to improve the pace of the nation's technological development, these students should be made to acquire relevant knowledge, skills and desirable work habits. They need to understand and manipulate processes and materials. Consequently, a curriculum is needed to facilitate the acquisition of such skills and knowledge in Building Construction so that they may gain employment in related industries, be self-employed or pursue higher technological education.

The Federal Ministry of Education, Science and Technology (1985) states the goals of the curriculum of the Senior Secondary School in Building Construction as follows: the Senior Secondary School students will achieve the following objectives:

- understand the processes, materials, tools and equipment used in building construction;
- construct or supervise the construction of a simple residential building;
- prepare for further studies in the construction or allied professions;
- earn a living through participation in building construction work;
- inculcate safe working habits in building construction.

The curriculum content has been carefully structured. Using the conceptual approach the two major concepts being construction and workmanship. The organisation of selected topics and contents into a teaching sequence has been achieved through the spiral approach. The course which covers the major operations and materials involved in the construction of buildings is organised around the sections of preliminaries, sub-structures, super-structures, services, finishes and external works. In order to achieve the objectives of this course, it is suggested that a teaching strategy that involves observation, field trips and active participation of learners in the construction of simple building works should be used. Since the course is intended to be practically oriented, less theory should be taught. Simple explanations, sketches and descriptions should form the basis of the cognitive activities of this course. Because of the high incidence of accidents common in building construction, it is important that when discussing each topic, the relevant safety requirements be emphasized. It is also recommended that a minimum of four periods of forty minutes each per week be provided for this course on the school time-table.

Evaluation is regarded as an important aspect of this curriculum plan. Therefore, periodic written tests and assessment of practical works should be embarked upon. This may be done at the end of every topic so as to ensure some form of consolidation before the next topic is taught. According to the Federal Ministry of Education, Science and Technology (1985), the content of the curriculum of Senior Secondary School in building construction is broken down into year one, two and three.

Topics in year one include:

- A. **Preliminaries** :Construction team, Building drawings, Site organisation and layout, Clearing,

levelling and setting out

- B. **Sub-structure:** Excavation, Foundation, Ground floor
- C. **Super-structure:** Walls, Manufacture of wall materials
- D. **Services:** Drainage, Plumbing, Electrical installation

Topics in year two include:

- A. **Sub-structure:** Excavation, Foundation, Ground floor
- B. **Super-structure:** Openings in walls, Roof
- C. **Services:** Drainage installation, Plumbing, Electrical installation

Topics in year three include:

- A. **Super-structure:** Roofs, Ceilings
- B. **Services:** Drainage installation, Plumbing
- C. **Finishes :** Wall finishes, Floor finishes
- D. **External works:** Fences and Fencing, Gates, Access roads, Landscaping work

Teaching of Building Technology Education

Education is the acquisition of needed competencies for life in the society. For a balanced education, such competencies should spread through the cognitive, affective and psychomotor domains. According to Igborgbor (2006), cognitive competencies include:

- Knowledge of certain facts either directly or indirectly usable in particular situation.
- Deeper understanding of phenomena in one's environment
- Enhanced reasoning ability which leads to a better understanding of situations.
- Creativity and motivation

Therefore, balanced education can be classified into the following domains

Table 1: Domains

Cognitive Domain	Affective Domain	Psychomotor Domain
Knowledge	Receiving	Imitation
Comprehension	Responding	Manipulation
Application	Valuing	Precision
Analysis	Organization	Actualization
Synthesis	Characterization	Naturalization
Evaluation		

Teaching methods refer to the ways and means which a teacher adopts to guide the students through learning activities in order to accomplish the desired goals. Effective teaching takes place when the teacher knows which method to use in a particular situation to meet specific goals. The following are methods of teaching of vocational technology education, building technology education inclusive:

- Demonstration, Discussion, Project, Guided discovery, Inquiry, Lecture, Questioning, Simulation, Field trips, Individualized instruction. However, each teaching method has its own pros and cons.

Current Situation in the Teaching and Learning of Building Technology Education in Nigerian Secondary Schools

The teaching and learning strategies as adopted in the National Policy on Education (FRN, 2004) ensure the integration of theory with practice. There are differences between policies, strategies and implementation. Amike (1988) observed that the well articulated curriculum content of building technology in secondary schools have not enjoyed the same level of confidence in implementation as in the curriculum designed.

Despite the gains in curriculum development and efforts at implementation, reports indicate poor students' achievements especially in the practical aspects of the course. In addition, there is low enrolment in this field of study in the secondary schools. It is discovered (Odu, 2005) that only few secondary schools in Nigeria offer building technology in secondary schools. Similarly, parents/guardians are reluctant to allow their children/wards to take the subject.

The difficulties in curriculum implementation in this course is attributable to the following:

- Overloading of content
- Inadequacy in pedagogically associated issues such as teacher competence and effectiveness
- Inadequacy of teaching materials such as equipment, tools and workshops
- Curriculum invalidity in terms of teachability and learnability, particularly with respect to the cognitive level of students (Ivowi, 2000).

It is the opinion of the author that building technology in secondary schools should be reappraised for optimum performance in work skill.

Challenges of Teaching Building Technology in Secondary Schools

The emerging world economy of the 21st century is not only knowledge based and science and technology driven, it is highly competitive and globalized. The human brain is now the number one resource and is re-affirming the fact that learning is a life-long process. Thus, skills certification is more relevant and critical to our nation's sustainable development and global competitiveness. The quality of teaching and learning of building technology in secondary schools leave much to be desired. Some of the challenges facing the teaching inhibit the full realization of the quality education outcome include:

Poor teaching strategies: The teaching of building technology has been too theoretical. There is no longer much emphasis on the learners' practical skill acquisition. Teachers in most cases use lecture method only in a programme that demands lecture method and demonstration. Odu (2006) maintained that appropriate teaching strategies should be employed in teaching technical education subjects of which building technology is a part so as to achieve the national goals as elucidated in the National Policy of Education.

Dearth in qualified vocational technical teachers in building technology education: There is inadequacy of qualified vocational technical teachers in building technology education that can actually impart the practical skills on the students. In 1997, a survey report by the Nigerian Educational Research and Development Council (NERDC) revealed the state of demand and supply of technical and vocational teachers nation wide and discovered that seventy four percent of the TVE teachers (about 270,000) were not available for 23 different subjects including building construction (Yakubu, 2001). Gang (1989) asserted that technical and vocational education in the secondary school has not been properly implemented because of dearth in TVE teachers.

The acquisition of building construction skills in secondary schools depends more on the teachers. Building construction teachers should be professionally qualified and occupationally competent so as to impart the required skills to the students. It is unfortunate that some building

construction teachers are not knowledgeable and skilled, and the wrong methods of teaching adopted do not promote skill acquisition since no student can claim to possess more knowledge and skill more than the teacher in any subject.

Alhassan (1990) in Anaele (2002) stated that the amount of knowledge and skill imparted to the students should meet the demand of industries and that the academic environment in technical colleges/secondary schools ought to be a replica of what is found in industries. This can be only achieved if the teachers are qualified, workshops/laboratories fully equipped for according to Ukwunna (1985) in Anaele (2002) no meaningful learning occurs in a void.

Inadequate facilities: Facilities like classrooms, workshops, laboratories, studios, equipment and materials are grossly inadequate in our secondary schools. The difficulty in the procurement of facilities does not give room for the practical acquisition of building technology skills by learners. Similarly, the reason why the facilities are not there is partly due to high cost of vocational and technology education and also high inflation rate in Nigeria (Imarhiagbe, 1992). The impact of inadequate educational facilities is that training of the students becomes impeded and they end up not acquiring skills to go to the labour market.

Administrators' misconception of the nature of vocational technical education: One of the greatest problems facing vocational and technology education in secondary schools is that many administrators of the programmes, at the policy making level are not trained in vocational technology education. They do not seem to understand the needs of the programme when it comes to distribution of funds, hence vocational and technology education is grossly under funded and so skill acquisition in schools especially in the area of building technology is difficult to implement. The under funding affects the supply of modern facilities and equipment needed to train building technology education students of the 21st century. Furthermore, there are few trained vocational and technology education teachers in all the fields of study dedicated to the programme.

Egboh (2009) stated the following challenges confronting vocational technology education which building technology is a part:

- Limited industrial experiences and opportunities for practical on course experience
- Inadequate guidance and counsellors to science, vocational and technology education subjects
- Shortage of books and materials including outdated literature
- Inadequate administration
- Inadequate evaluation of education outcome through continuous assessment
- Inability of teachers to make the subjects more attractive to students and more relevant to societal needs
- Poorly planned expansion and enrolment
- Inadequate policy and instability of education systems
- Absence of acceptable value and ethical systems.
- Inadequate political commitment to quality education

Strategies in Improving the Teaching and Learning of Building construction in Secondary Schools for Reappraising the Work Skill Requirements

Improvement on teaching strategies: Teaching methods used for teaching building construction leaves much to be desired. Arubayi, Nworgu, Akpochafo and Odu (2008) suggested the following

teaching strategies in vocational and technology education that will enhance skill acquisition among teachers and learners in Nigerian secondary schools:

- a. Concept Formation
- b. Real Life Application
- c. Job-related Skills acquired by the learners
- d. Demonstration
- e. Equipment, Care and maintenance
- f. Diagrams/Illustrations/Drawings

Sub-scales are further defined below:

- **Concept Formation:** This deals with all the ideas coming from the teacher and learners culminating in the formation of what the topic/object of discussion is.
- **Real Life Application:** This evaluates the ability of the teacher to make the learner relate what is learnt to everyday activities in the environment and beyond. Real life application makes reference to the implication of the concept to real life/possible future careers.
- **Job Related Skills Acquired by the Learners:** The topic of subject matter should offer various skills to learners which they can use in the world of work.
- **Demonstration:** This sub-scale explains all the teacher does in the class/laboratory/workshops or studio to engage the attention of the learners to him/her in order to replicate the procedure and process involved in an experiment/workshop practice, etc.
- **Diagrams/Illustrations/Drawings:** These sub-scales emphasize teacher's use of drawing/diagrams as it relates to the topic and stressing the importance of accuracy in spelling, labeling and neatness of diagrams.

Adequate supply of vocational and technology education teachers in building construction by the government: Vocational and Technology Education teachers specifically in building construction in secondary schools need to be trained and retrained in large numbers preferably through scholarship by government. To retrain them in the education industry, they should be highly remunerated by the government. Teaching allowances of between 35 and 40 percent of teachers' monthly salary should be paid to them in order to stem their exodus to the industries. This little encouragement will make many more technology education teachers including building construction teachers to stay on the job (Farrugia, 1985).

Acquisition of requisite skills by both teachers and students for economic production in vocational and technology education: For vocational and technology education curriculum to be useful, in the secondary schools, the right caliber of teachers should be used to implement the programmes especially in building construction. The benefits of a quality education programme are based on inculcating the skills for self-reliance. Agbai (1989) opined that the alarming rate of unemployment has forced the government to stress on self-employment and self-reliance as alternative to paid employment.

Skill acquisition for youth development in various areas of vocational and technology education including building construction is so important that National Economic Empowerment Development Strategies (NEEDS) (2004) makes it one of intervention strategies targeted at youth development and to reduce urban poverty. NEEDS also believes that poverty can be reduced, wealth can be created and quality of life improved when people are trained to acquire skill relevant for the world of work.

The rate at which skill is acquired is a function of knowledge of result i.e. feedback (Holding, 1965).

Attitudinal change towards vocational and technology education: Enlightenment campaign should be mounted in the mass media, radio, television, internets etc on the importance of vocational and technology education including building construction in the secondary schools. This campaign will improve Nigerian technological culture and national development. Vocational and Technology education should have separate planning, separate administrative and operating arrangement from general education (Okorie, 2001). There should be a changed attitude towards vocational and technology education by all stakeholders.

The use of workshop practical project: In the early experiences of children they learn both to do and to know better by doing things. Through practice learners, experience in the case of psychomotor activities becomes more skilled. At the same time, their knowledge grows and they also develop certain attitudes. Odu and Biose (2003) stressed that project is used to identify a wide variety of students' learning experiences which emphasizes the application of skills and knowledge that result in some type of product.

A project may be ceramic, moulding e.g. flower vase, simple construction of wood joints, casting of concrete foundation, laying of blocks/bricks, floor tiling, etc. With the above statement, the major purpose of using project is to provide an opportunity for practical application in a context that is meaningful to students. Ezeji and Okorie (1988) defined project as a whole hearted, purposeful activity planned and carried to completion by the students.

Practical project of students in building construction might be construction of a room measuring 3.0m by 3.0m. This task may include the building plan, setting out of the building, digging the trench, casting the foundation, setting out the first course of blocks on the foundation, laying other blocks up to D.P.C. level, marking out of doors, laying other courses of blocks up to window level, marking out the window, laying other courses of blocks up to lintel level, erecting formwork for lintel, placement of reinforcement bars in the formwork, casting the concrete in the lintel, laying the other course of blocks up to gable end.

Project method in learning help to motivate the students or the learners of technical facts and related knowledge in all spheres of learning and so it is highly recommended for students offering building construction in secondary schools.

The use of field trips: Fieldtrip could be a visit to dealers or manufacturers of technical equipments and materials, industries etc, so that students would be provided with information about processes of materials, their properties, use and costs. Ezeji (1987) emphasized that vocational skills acquired through classroom instruction must have industrial application. This means that school training programme must be geared towards understanding of industrial practices and production methods.

From this statement, it indicates that students can learn skills on building technology by carefully watching their teachers or others do something they want to do, since watching others perform helps to eliminate some of the trials and errors that would have been made. The methods used in classroom and workshop instruction supplement outside study and on the job training, hence, environmental approach (using the environment for practical activities) is the answer so that building technology education teachers can organize their teaching towards methods that will facilitate teaching and learning processes. This, then means that for a teacher to be able to identify relevant activities in the environment to be used by students for practical experience, he must select skills, method, procedure and processes that are similar to those used in real life situation but different in size and complexity.

Other strategies in moving the teaching of vocational technology education forward in building construction according to Egboh (2009) are:

- Re-designing of school curriculum using the thematic approach to content selection and retaining a spiral approach to content organization
- Greater community involvement in the management of schools especially Parents, Teachers Association
- Teachers should devise means to further make the subjects more relevant to societal needs and promote the entrepreneurial opportunities of skilled persons.
- Improving the standard of facilities through the provision of modern laboratories, workshops, equipment, etc.

CONCLUSION

Building construction is one of the vocational electives in the Senior Secondary School. It involves skill acquisition in building drawing, site organisation and layout, clearing, leveling and setting out, excavation, foundations, walls, roofs, ceilings, services, drainage, finishes, external works, etc. The teaching of these topics in the secondary school leaves much to be desired as the practical aspect of this programme is either partially or totally untouched. The reasons are due to poor teaching strategies, dearth in qualified building technology education teachers, inadequate facilities to mention but a few. Nonetheless, with the strategies suggested and implemented, the teaching and learning of building construction in secondary schools will be moved forward.

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POLITICAL SKILLS MODERATES THE RELATIONSHIP BETWEEN PERCEPTION OF ORGANIZATIONAL POLITICS AND JOB OUTCOMES

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Abstract

This research investigates the moderating effect of political skills and relationship between perception of organizational politics with job stress, affective commitment, intention to quit and contextual performance. This study analyzes the effect of perception of organizational politics on four types of job outcomes. Sample size of 300 employees from public and private sector organizations of Pakistan were used to examine the hypothesis and the results will be helpful for us to examine our entire hypothesis. This finding demonstrates the need to consider in different situations. Several future researches were recommended for further inquiry into perception of organizational politics with different other job outcomes.

Keywords: Perception of Organizational Politics, Job Stress, Affective Commitment, Intention to Quit, Contextual Performance, Public and Private Sector Organizations in Pakistan

INTRODUCTION

This background studies to analyze the concept and relationship of perception of organizational politics, political skills and job outcomes. This research study is based on the conceptual framework to analyze the relationship of perception of organizational politics, political skills and job outcomes. This study relates with the job outcomes of the employees in the organization. Employees are the back bone and assets for any organization. Organization will focus on the performance of the employees and the factors which will directly and indirectly affect the performance of the employees. The important factor which will affect the work outcome of any employee is perception of organizational politics.

The organizational politics is the severe problem which is facing by the human resource management now a day in both public and private sectors. Perception of organizational politics will directly effect the work outcomes like increase in job stress. Decrease in affective commitment, increase in turnover intension and decrease in contextual performance but if any employee possess efficient political skills then it will overcome all these problems. This is why, research on perception of organizational politics with job outcomes and moderating effect of political skills is very critical. In this research study we took perception of organizational politics as independent variable, political skills as moderator and job stress, affective commitment, turnover intension and contextual performance as dependent variable”.

Literature Review

High level of politics in the organization had not traditionally plagued the organization, employees in the organization aware of an increase in political behavior. Therefore our study not only helps line management also directly address the rising tide of organizational politics, but we also assisted the human resources group to improved selection system (Witt, Kacmar, Carlson, and Zivnuska, 2002). Politics is an important variable in organizational research which takes the attention of organizational psychologists and studied with different perspective in the organization (Sowmya and Panchanatham, 2011). According to Pfeffer (1981), the managers use politics as a functional tool in the organization to get the work done through political environment. But the others said, individuals involved in politics to achieving their self interest (Cropanzano, Howes, Grandey, and Toth, 1997). Some individuals who know that their organizational environment is highly political but do not leave organization because they play a role as a mechanism of control through which their situation is made under control. On the other hand, individuals who engage in political behaviors like to stay with organization and mostly safe their position in highly political environment (Harrell-Cook, Ferris, and Dulebohn, 1999).

In earliest Mintzberg (1983, p. 172) defined organizational politics as “individual or group behavior that is informal, ostensibly parochial, typically divisive, and above all in a technical sense, illegitimate-sanctioned neither by formal authority, accepted ideology, nor certified expertise” (Danaeefard, Balutbazeh, and Kashi, 2010). Another definition of organizational politics is “organizational politics involves actions by individuals, which are directed toward the goal of furthering their own self-interests without regard for the well-being of other or their organization” (Kacmar, Bozeman, Carlson, and Anthony, 1999). Gandz and Murray (1980) said “a subjective state in which organizational members perceive themselves or other as intentionally seeking selfish ends in an organizational context when such ends are opposed to those of other”.

Largely research on organizational politics were base on the idea of Lewin’s (1936) that measure the behavior using individual perception was better than “real” objective. More than 90 percent employee perceived that office politics is common in any organization (Gandz and Murray, 1980). After 30 years later if this study would be repeated the results would be almost same. Political behavior is an individual perception of what is political (Vredenburg and Maurer, 1984). In any organization perception of politics is a good measure of the political environment (Ferris and Kacmar, 1992). Vigoda-Gadot, Vinarski-Peretz, and Ben-Zion (2003) defined “perception of politics usually individual views about the level of power and influence used by other organizational members to gain advantages and secure their interests in conflicting situations”. Valle and Witt (2001) said “organizational politics can take on both negative and positive connotation”. Organizational effectiveness negatively affected by perception of politics (Byrne, 2005). People view their work environment as political in nature (Kacmar and Carlson, 1997).

Firstly “Ferris” developed perception of organizational politics model (Ferris, Russ, and Fandt, 1989). Ferris, Harrell-Cook, and Dulebohn (2000) defined perception of organizational politics as “it involves an individual attribution to behaviors of self-serving intent, and is defined as an individual’s subjective evaluation about the extent to which the work environment is characterized by co-workers and supervisors who demonstrate such self-serving behavior”. According to Farris et al, (1989), the perception of organizational politics is having three factors which are “General political behavior”, “Go along to get ahead” and “Pay and promotion”.

General political behavior includes act in self-serving manner to achieving their individual goals (Kacmar and Carlson, 1997). The second factor ‘go along to get ahead’ consists of lack of interest and remaining silent action showing by individual in order to secure one’s best interest (Byrne, 2005). The third factor ‘pay and promotion’ which involves politician in organizational promotion policies (Ferris et al, 1989). Thus perception of politics was always influence individual reward structure and when employees work in a political environment, they may not have confidence that their behavior will by contribute to organizational reward structure (Cropanzano et al, 1997).

The research on perception of organizational politics shows that it has a negative influence on numbers of job outcome including turnover intention (Byrne, 2005), job stress (Azeem, Mahmood,

Ul-Haq, Sharif, Qurashi, and Hijazi, 2010), workplace deviance (), interpersonal conflict (Bhowon, 1999) and contextual performance (Witt et al, 2002). Political skills is characterized as comprehensive pattern competitive with cognitive, effective and behavior manifestation that have both direct effect on outcome and moderating effect on predictors outcome relationship. Individual processing political skills are observer of other. They understand social interaction well and accurately temperate their behavior and behavior of others. They are keenly attuned to diverse social settings and have high self awareness. Pfeiffer (1992) referred to this characteristic as being sensitive to others and he argued that the ability to identify with others is critical to obtaining things for oneself. Socially attitude individuals are often seen as ingenious, even clever, in dealing with others. Political skilled individuals have an unassuming and convenience personal style that asserts a powerful influence on others around them. Interpersonal influences allow people to adopt and calibrate their behavior to different situations to elicit the desired responses from others. the interpersonal influence dimensions capture what Pfeiffer (1992), referred to as flexibility, which involves adopting ones behavior to different targets of influence in different contextual settings to achieve ones goals.

Individuals with political skills are adopting at identifying and developing diverse contacts and networks of the people. People in these networks tend to hold assets seen as valuable and accessory for successful personal and organizational gains. Because of their typical subtle style, political skilled individuals easily developed friendships and build, beneficial alliances and collisions. Furthermore individuals hi in networking ability ensures they are well optioned on both create and take advantage of opportunities politically skilled individual appeared to other as having high level integrity and as being authentic, sincere and genuine.. Be successful because it focuses on the perceived the intention of the behavior exhibited. Perceived intentions or motive are important and have been argued to modify the interpretation and labeling of behavior. As noted by Jones (1990), influence attempts will be successful when actors are perceived to posses no ulterior motives. Individuals high in patent sincerity inspired trust and confidence in and from those around them because their actions are not interpretive or coercive. The political perspective on organization has become an important one and as such we to be able to appropriately characterize the attitudes behavior and effectiveness of individuals working in such environments.

The string between perception, political behavior and some other major factors included turnover of intention, job stress of various organizations studied by multiple scholar's to bring out the vital part or collaboration between these all elements for better understanding plus results outcomes (Ferris, Frink, Gilmore and Kacmar, 1994; Bennett and Robinson, 1995). During their research they elaborate some other major factor to enhance the key performance indicators which directly affects the performance & relationship between employer and employee. These key performance indicators constrain different variable to produce some remarkable results. This research has been done back in the era of nineties (Ferris et al, 1994; Bennett and Robinson, 1995). The major reason of this study and investigation correlate perception of politics and job stress which is dominated by some external factors reference to the context of Pakistan. They found out that negative and positive or rational behaviors always persist in every organization having different man powers strengths or variety (Ferris, Russ and fandt, 1989; Drory, 1993; Cropanzano, Howes, Grandey, and Toth, 1997).

What brings our scholars to run this investigation & data compilation for getting the statistics to implement better policies, code of conducts, job securities and kicking out negative consequences and irrational behaviors? These statistics brings out better implementations of policies relationship between employer and employee's building some bonds to keep the outcomes stream line. These collected effort and results are important contribution to literature since study has been done to investigation this relationship (Vigoda, 2000; Gilmore, Ferris, Dulebohn and Harrell-Cook, 1996). While working in organization either small level or multinational direct or straight element which hits your responses is none as stress, which has been defined differently and some time similar by various scholars (Gilmore at el, 1996). As per investigation of Mattson and Ivancevich (1987) define stress as individual adaptive response influent by some individual this simulates and is consequences of multiple action or event that places extra demand on a person. "Job stress arises when demands exceed abilities, while job-related strains are reactions or outcomes resulting from the experience of stress". Job stress is something we all face as workers, and we all handle it differently. There is no getting around it. But, not

all stress is bad, and learning how to deal with and manage stress is critical to our maximizing our job performance, staying safe on the job, and maintaining our physical and mental health. This stress include different personal obligation or thinking from within the box which do not less us go out or stuck us for thinking out of the box such as overload, apathy ,negativism, anxiety, lack awareness for orders ,job descriptions, alienation , sacred from feedback & all the events taking in company.

Affective commitment is emotional attachment with the organization. A committed employee works for the organization and give his full efforts to his organization. The loyal employee has high level of effective commitment. Effective commitment is negatively related with perception of politics. If any employee who perceive politics in the organization and throughout the politics some specific employees are getting rewards so there will be decrease in effective commitment of that employee. Affective commitment had an indirect effect on turnover through intent to quit.(Meyer 2002) In a human resource context, turnover or staff turnover or labor turnover is the rate at which an employer gains and losses employees. Simple ways to describe it are "how long employees tend to stay" or "the rate of traffic through the revolving door”.

Whereas Farrel and Rusbult (1992) defined turnover as job replacement either within or across organization as well as variety of extra activities which open the door with other the leave. In some places stressor i.e. politics causes taking displeasure and in turn over intent to abscond the organization (McKenna, Oritt and Wolff, 1981). Turnover is measured for individual companies and for their industry as a whole. If an employer is said to have a high turnover relative to its competitors, it means that employees of that company have a shorter average tenure than those of other companies in the same industry. High turnover can be harmful to a company's productivity if skilled workers are often leaving and the worker population contains a high percentage of novice workers (Tett and Meyer, 1993). Job performance is a degree to which an individual achieves its goals to helps the organization. Borman and Motowidlo (1997) established a two-factor theory of job performance which consists of task performance and contextual performance. Task performance is when employees accomplished special task by using technical skills or produce goods or services that support organization. When employees are for instance involved with helping co-workers, putting their extra effort and extra hours to complete a task on tine, and so forth, the employees are said to be involved in contextual performance (Van Scotter, 2000). Contextual performance is “Behaviors supporting organizational social and psychological environment in which the technical core must function” (Kiker and Motowidlo, 1999).

Contextual performance is employees own judgmental activities that perform outside the core job such as voluntary participate in committees, helping co-workers in and other departments, putting the extra effort above the basic job requirements for promoting the organization. In short, contextual performance is not the core job performance; it is the largely invisible activities that contribute to the organizational performance (Michie and West, 2004).

Contextual performance is the outcomes of behaviors that are not unique to a specific job and support the social objectives of the organization (Witt et al, 2002). Contextual performance consists of two types of behaviors, job dedication and interpersonal facilitation. The first behavior interpersonal facilitation contributes to accomplishment of organizational goal and building relationships. The second behavior that is job dedication describes self–disciplined like working hard, motivated acts, and following polices to support organizational objectives (Van Scotter and Motowidlo, 1996).

Perception of Organizational Politics and Job stress

The persons who have the direct authority for executing the policies to generate end results, may face more or direct attack of stress and show irrational behavior and stress as per their designations from top level till bottom, which holds the control (Vigoda, 2002). They react as per defined designations which includes some their physical problems like headaches, stomach problems, anxiety, frustration and depression (Maslach and Jackson, 1981). Whereas organizational politics is also a direct source of stress in atmospheres which carries out unexpected damages, consequences, disturbances of stress (Ferris, Frink, Galang, Zhou and Kacmar, 1996).

Hypotheses

HO₁: Perception of organizational politics is positively related with job stress.

Perception of organizational politics and affective commitment: On the other side organizational politics in the organization will reduce the affective commitment of the employees. political environment in the organization will effect the commitment of employees towards the organization. (Greenberg & Scott, 1996). Studies suggest that perception of politics is negatively related with the affective commitment. increase in politics will decrease the affective commitment. (Meyer 2002)

HO₂: Perception of organizational politics is negatively related with affective commitment .

Perception of organizational politics and turnover intention: There are some suggestions that perception of organizational politics have indirectly proposal effects on turnover intention and shows through more instants outcomes (strain and morale) as which formal studies probing only the straight effects of perception of organization politics on job enrichment and turnover intention. May have miss specified these loopholes, thus biasing the study consequences (Dunham, 1977). Captivatingly the belongings of perceptions of company politics on yield intention an work job fortification via different or parallel path way in picky the psychosomatic strain elicited by perception of company/organizational politics was directly linked with decreased morale which was related or let a higher turnover objective. This format employee's that reaction of perception of politics on turnover intention may take extra to unfold and may involve additional rational process. Yield researchers have established or developed the typical voluntary turnover procedure as initialized by decrease self esteem and bringing various conclusion points (Griffeth, Hom, and Gartner, 2000).

HO₃: Perception of organizational politics is positively related with turnover intention.

Perceptions of organizational politics and contextual performance: The employee's natural tendency to engage in different behaviors is strongly influenced by the organizational context. If there are highly politics in organization then employees are including in self-promotional activities and these activities are against to behaviors that focus on improving the greater good. This political behavior generally focused on individual rather than group accomplishment (Witt et al, 2002).

Employees engage in behavioral self management, reducing their contextual performance when they believe that their economic or social contracts have been violated in the organization (Witt et al, 2002). Some individuals in political environment avoid the political activities and their behaviors are notice by the other persons (Ferris and Kacmar, 1992). Therefore they are not care about political environment and they do not cooperate with their coworkers to accomplish the takes. But the changing in schemas that existing in organizational political, no one can ignore them. Individuals who have low contextual performance might not be fulfilling skilled self-management and are unable to fit themselves is this environment. Employees have no sense of how to successfully interact with others with lack of self-management in a political environment (Witt et al, 2002).

High level of perceptions of organizational politics effect contextual performance in several ways, firstly in the political environment the employee feels that the social contract has been violating between the employer and employee (Cropanzano et al, 1997). Secondly, the employee behavior in political organization engaged in self-interest, they are unlike to want to go out to help others (Witt et al, 2002). Based on above literature this research hypothesis that:

HO₄: Perception of organizational politics is negatively related with contextual performance.

Political skills and job stress: Political skill is ability that increases the amount of employee control or responsibility. A political skill is characterized as comprehensive pattern competitive with cognitive, effective and behavior manifestation that have both direct efforts on outcomes.

Talking about political skills and job stress the higher the political skills will reduce the job stress of an employee. through efficient political skills any employee must reduce its stress on workplace (Layman 2003).

HO₅: A political skill is negatively related with job stress.

Political skills and affective commitment: Political skill is one of the most important competencies leaders can possess, contributing to effectiveness in organizations. Through political skills any employee can increase his affective commitment towards his organization. Affective commitment is emotional attachment with the organization. A committed employee works for the organization and give his full

efforts to his organization. The loyal employee has high level of effective commitment. High political skills will increase the organizational commitment of an employee (Treadway, Ferris, Kacmar 2004)

HO₆: Political skills is positively related with Affective Commitment

Political skills and turnover intention: Lack of political skills and high politics in the culture of organization will change the mind of employees and force to leave an organization (Miller and Wheeler 1992). Companies were able to improve their employee's retention rate by enhancing the political skills in the employees of their organization. Political skills and turnover intention are negatively related with each other, increase in political skills will reduce the rate of turnover intention. (Thomas 2010)

HO₇: A political skill is negatively related with turnover intention.

Political skills and contextual performance: Contextual performance is employees own judgmental activities that perform outside the core job such as voluntary participate in committees, helping co-workers in and other departments, putting the extra effort above the basic job requirements for promoting the organization. In short, contextual performance is not the core job performance; it is the largely invisible activities that contribute to the organizational performance (Michie and West, 2004).

There are links between political skills with contextual performance; through political skills employees perform better (Campion and McClelland, 1993).

According Umstot, Mitchell and Bell (1978) the relation between political skills and performance is positive.

HO₈: political skills is positively related with contextual performance

Perception of organizational politics and job stress by political skills: The persons who have the direct authority for executing the policies to generate end results, may face more or direct attack of stress and show irrational behavior and stress as per their designations from top level till bottom, which holds the control (Vigoda, 2002).

Whereas organizational politics is also a direct source of stress in atmospheres which carries out unexpected damages, consequences, disturbances of stress (Ferris, Frink, Galang, Zhou and Kacmar, 1996). In political environment where the politics will increase the job stress of the employees. In such environment a person who has efficient political skills will use its political skills to reduce its job stress effectively.

HO₉: political skills moderates the relationship between perception of organizational politics and job stress.

Perception of organizational politics and affective commitment by political skills: Effective commitment is negatively related with perception of politics. If any employee who perceive politics in the organization and throughout the politics some specific employees are getting rewards so there will be decrease in effective commitment of that employee. so if a person who use its political skills in political environment will increase its commitment through the organization. (Chang, Rosen, Levy 2009)

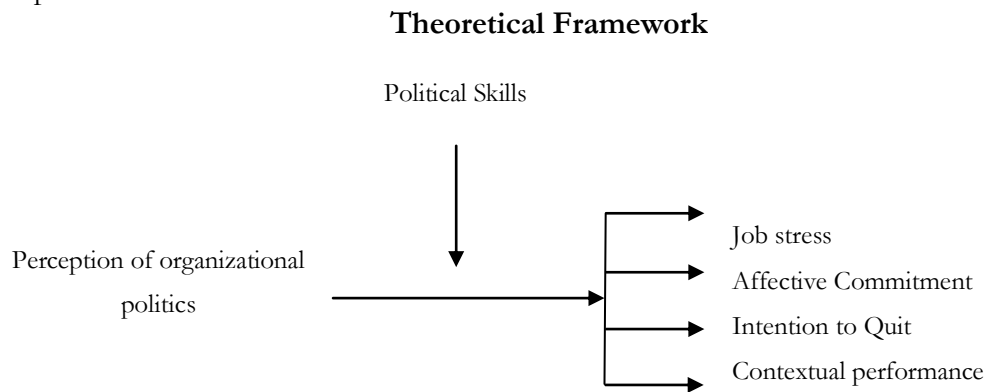
HO₁₀: political skills moderates the relationship between perception of organizational politics and affective commitment.

Perception of organizational politics and turnover by political skills: Concept of organizational politics as environment straight away effect on turn over intentions which can be observe or get studied as quicker results as which regular studies dig out direct effect as perception of politics on job improvement and turnover intentions. Political environment which may include sometimes leg pulling, accusations forces some individuals to get frustrated by not meeting their expected targets and that can causes terrible penalties (Dunham, 1977). Any person who has political skills will survive in the political environment with in the organizations. High political skills will reduce the rate of turnover in the political environment.

HO₁₁: political skills moderates the relationship between perception of organizational politics and turnover intention.

Perception of organizational politics and contextual performance by political skills: According to Borman and Motowidlo (1997) organization achieves its goal through employees' performance and these goals can achieve through voluntary help of co-workers. In highly political environment individuals act to achieve their own goals (Kacmar and Carlson, 1997). Employees engage in different behaviors due to impact of political environment in organization (Witt et al, 2002). High level of politics in organization affects the social contract between employees and employers (Cropanzano et al, 1997). As a result the employees engaged with their self interest and they are unlikely to help other (Witt et al, 2002)...*in highly political environment a person who posses high political skills then it will help him to increase its contextual performance*'.

HO₁₂: political skills moderates the relationship between perception of organizational politics and contextual performance.



METHODOLOGY

Sample and Data Collection

We take a sample of 300 employees from different public and private sectors in Pakistan. The average age of the respondent was from 22 to 50 years; 50 per cent had Graduation degrees, 28 per cent had Master degrees and 2 per cent had M. Phil / PHD degrees. The data was collected via questionnaire from private sector organizations in Pakistan. SPSS v.16 was used for data analysis and work on descriptive correlation and regression and moderation tools for analysis. Measures”

Perception of organizational politics: POP was measured with 15-item scale developed by Kacmar and Carlson (1997). The 15 items were” There has always been an influential group in this department that no one ever crosses. It is best not to rock the boat in this organization. Telling others what they want to hear is sometimes better than telling the truth.. A 5-point Likert scale “1= strongly disagree to 5 = strongly agree” is used and the alpha reliability is ($\alpha = 0.78$)”.

Political skills: Political skills were measured with 40 item scale developed by Ferris and Treadway (2005).the 40 items were” I size up situations before deciding how to present an idea to others. I am good at reading social situations, and determining the most appropriate behavior to demonstrate the proper impression. I understand people very well.” A 7-point Likert scale “1= strongly disagree to 7 = strongly agree” is used and the alpha reliability is ($\alpha = 0.87$).

Affective commitment: Affective commitment was measured with 8 item scale developed by Allen and Mayer (1990).the 8 items were” I don't think I could become as attached to another organization as I m to this organization. I feel like a part of the family at my organization” A 5-point Likert scale “1= strongly disagree to 5 = strongly agree” is used and the alpha reliability is ($\alpha = 0.87$).

Turnover intention: Turnover intention was measured with 3-item scale developed by Cammann et al (1979). The 3 items are “I often think about quitting.”. A 5-point Likert scale “1= strongly disagree to 5 = strongly agree” is used and the alpha reliability is ($\alpha =0.70$).

Job stress: JS was measured with 13-item scale developed by Kacmar Parker and Decotiis (1983). The 13 items were “I have too much work and too little time to do it. Too many people at my level in the organization get burned out by job demands.”. A 5-point Likert scale “1= strongly disagree to 5 = strongly agree is used and the Alpha reliability is ($\alpha =0.85$).

Contextual performance: CP was measured with 15-item scale developed by Motowidlo and Van Scotter (1994). The 15 items were” I praise my colleagues when they are successful and “I put in extra hours to get work done on time.” A 5-point Likert scale “1= strongly disagree to 5 = strongly agree” is used and the alpha reliability is ($\alpha =0.91$).

Control Variable

The results of ONEWAY ANOVA showed that the present study has two control variables which influenced dependent variables significantly.

1. Type of the organization.
2. Position in the organization.

RESULTS

Table 1 : Descriptive Statistics

Variables	N	Mean	Std. Deviation
Gender	300	1.30	.459
Age	300	1.36	.661
Qualification	300	3.63	.573
Type of organization	300	1.19	.393
Position	300	1.92	.673
Tenure	300	2.87	.898
TEXP	300	1.35	.768
POP	300	3.26	.438
PS	300	4.03	.633
JS	300	3.36	.406
AC	300	3.29	.438
TOI	300	3.30	.423
CP	300	3.34	.692

Descriptive Statistics:

The descriptive statistics are shown in table1 including the means and standard deviations were found in the data. The mean of gender was (M = 1.30) with standard deviation of (S.D = 0.45). The mean for age was (M =1.36) with standard deviation of (S.D = .661) . The mean of qualification was (M = 3.63) with standard deviation of (S.D = 0.57).The mean of type of organization was (M = 1.19) with standard deviation of (S.D = 0.39) .The mean of position was (M = 1.92) with standard deviation of (S.D = .673) .The mean of tenure was (M = 2.87) with standard deviation of (S.D = 0.89). The mean of total experience was (M = 1.35) and standard deviation of (S.D = 0.76). The mean of perception of organizational politics was (M = 3.26) with standard deviation (S.D = .438), mean of Political skill was (M = 4.03) with standard deviation (S.D = .633), mean of job stress was (M = 3.36) with standard deviation (S.D = .406), mean of affective commitment was (M = 3.29) with standard deviation (S.D = .438). The mean of turnover intension was (M = 3.30) with standard deviation (S.D = .423), contextual performance was (M = 3.34) with standard deviation (S.D = .692)".

The mean of perception of organizational politics was (M = 3.26) with standard deviation (S.D = .438), mean of Political skill was (M = 4.03) with standard deviation (S.D = .633), mean of job stress was (M = 3.36) with standard deviation (S.D = .406), mean of affective commitment was (M = 3.29) with standard deviation (S.D = .438). The mean of turnover intension was (M = 3.30) with standard deviation (S.D = .423), contextual performance was (M = 3.34) with standard deviation (S.D = .692)".

Correlations

Table 2 : Correlations

S. #	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Gender													
2	Age	.021												
3	Qualification	.046	.176**											
4	Type of organization	-.002	-.056	.108										
5	Position	.021	.212**	.481**	.017									
6	Tenure	.052	.566**	.220**	-.131*	.261**								
7	Texp	.049	.738**	.133*	-.079	.020	.705**							
8	Pop	-.023	.080	-.171**	-.234*	-.155*	.149**	.132*	(0.78)					
9	PS	.261**	.213**	.130*	.037	-1.17	.109	.345**	.113	(0.87)				
10	CP	-.068	-.138	-.021	-.160*	.007	.149**	.136*	.440**	.243**	(0.91)			
11	Ac	-.016	.180**	-.097	-.149*	-.055	.160**	.171**	.435**	.191**	.364**	.416	(0.87)	
12	TOI	-.025	.049	-.145*	-.146*	-.029	.116*	-.017	.403***	-.069	.345***	.402**	.274**	(0.70)
13	JS	-.055	.127*	-.193**	-.127*	-.123*	.215**	.128**	.440**	.081	.0349**	(0.85)		

“*** Correlation is significant at the 0.001 level ($p < 0.001$)” “** Correlation is significant at the 0.01 level ($p < 0.01$)”
 “* Correlation is significant at the 0.05 level ($p < 0.05$)”

The correlation results show that POP is positively related with JS, affective commitment, TOI and CP. While the political skills is negatively related with JS and TOI while it is positively related with affective commitment and CP.

Regression

Table 3 : Regression

Predictors	JS			AC			TOI			CP		
	β	R ²	ΔR^2	B	R ²	ΔR^2	β	R ²	ΔR	β	R ²	ΔR^2
POP	.425***	.197	.167***	.410***	.192	.167***	.624***	.166	.144***	.406***	.202	.177***
PS	.006	.031	.000	.129***	.062	.037***	-0.74	.026	0.04	.163***	.084	.063***

Note: N = 300, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

The regression table shows the variance, change in variance and significant level to test the hypothesis. The table shows regression analysis of POP and political skills with work outcomes. If u look at our first hypothesis that POP is positively related with JS. The table shows that it is highly significant between perception of politics and job stress (beta is .425***, $p < 0.001$).

As our second hypothesis is that POP is negatively related with affective commitment but result shows that it is also highly significant relationship between POP and affective commitment(beta is .410***, $p < 0.001$),As our third hypothesis is that POP is positively related with TOI and result also shows that it is also highly significant relationship between perception of politics and TOI (beta is .624***, $p < 0.001$), As our fourth hypothesis is that POP is negatively related with CP but result shows that it is also highly significant relationship between POP and CP (beta is .406***, $p < 0.001$),

Now in second step the regression analysis shows the relationship of political skills with job outcomes. Out fifth hypothesis that political skills is negatively related with job stress but result shows that it in significant(beta is .086)as our sixth hypothesis is that political skills is positively related with affective commitment but result shows its opposite and there must be a significant relation between

political skills and affective commitment t..(Beta is .129***.*** p < 0.001) Our seventh hypotheses is political skills is negatively related with turnover intention but result shows that it is not much significant as beta value is also in negative.

Our eight hypothesis is political skill is positively related with contextual performance and result show it is highly significant and beta value is also positive.

Table3: Moderation

Predictors	JS			AC			TOI			CP		
	β	R ²	ΔR^2	B	R ²	ΔR^2	β	R ²	ΔR	β	R ²	ΔR^2
Step : 1												
POP	.425***	.197	.167***	.410***	.192	.167***	.624***	.166	.144***	.406***	.202	.177***
PS	.006	.031	.000	.129***	.062	.037***	-0.74	.026	0.04	.163***	.084	.063***
Step : 2												
POPxPS	.175*	.213	.015*	-.287	.256	.042***	.054	.179	.001	-.092	.25	.005

Our ninth hypothesis is moderating effect of political skills between perception of politics and job stress. In table 4 political skills positively moderate between perception of politics and job stress. Beta is .175*and it is significant. Our tenth hypothesis is moderating effect of political skills between perception of politics and affective commitment. The result shows that political skills positively moderate between perception of politics and affective commitment and it are highly significant. Our 11th hypothesis is moderating effect of political skills between perception of politics and turnover intension.bt result shows that political skills not significantly moderate between perception of politics and turnover intension. Our 12^h hypothesis is moderating effect of political skills between POP and CP. But result shows that political skills are not significantly moderate between POP and CP even beta are also negative”.

DISCUSSION

The importance of this research is to provide knowledge of human resource management about the relationship of perception of organization politics and different outcomes like job stress, affective commitment, intention to quit and contextual performance. In this research political skills acts as moderator between perception of politics and job outcomes. This research will provide information to employee’s hat how efficient political skills will reduce job stress, increase affective commitment, and reduce turnover intension and contextual performance. We take 12 hypotheses in which we relate all variables with each other. And after our research and results we will easily understand the relationship of variables with each other.

In hypothesis H:1 we analyze the relationship between perception of politics and job stress. The results showed that the relationship is highly significant and positively related. So, Hypothesis H:1 is accepted. The relationship between perception of politics and affective commitment is significant and negative and we accept the hypothesis. The perception of politics and turnover intention showed a positive and significant relationship and the hypothesis H:3 is accepted. The results for hypothesis H:4 showed negative but significant results. So, this hypothesis is accepted. Relationship between political skills and job stress in not significant and the hypothesis H:5 is rejected. The hypothesis H:6 is accepted and it showed that the relationship between political skills and affective commitment is negative. The relationship between political skills and turnover intention is not significant and the hypothesis H:7 is rejected. The hypothesis H:8 is also accepted and showed the negatively relationship between political skills and contextual performance. The political skills act as a moderator between perception of politics and job stress. So, hypothesis H:9 is accepted. The hypothesis H:10 is accepted which showed that political skills moderate between perception of politics and affective commitment. The relationship between variables in H:11 is not significant and the hypothesis is rejected. The political skills not acts as a

moderator between perception of politics and contextual performance and the hypothesis H:12 is rejected.

CONCLUSION

The purpose of the project is to find out the moderating effect of political skills between perception of politics and job outcomes. In order to achieve the purpose the theoretical framework was constructed. This was divided into three parts independent variable, dependent variables and moderator. This study is employee oriented study in which the organizations must learn the attitude of employees towards politics in organization in this research we find the results between independent and dependent variables and how our moderator moderates between them. This research shows that politics in the organization will positively related with the job stress and turnover intention employees must overcome on politics within the firm by using their efficient political skills. But on the other hand perception of politics will negatively related with affective commitment and contextual performance it means increase in politics within the organization will decrease the commitment as well as the contextual performance of the employees.

This research also shows that how political skills will effect the job outcomes and how political skills moderates between perception of politics and work outcomes this research shows that political skills will have an moderating effect between perception of politics and job stress and affective commitment but in other case political skills have not an moderating effect between perception of politics and turnover intention and contextual performance. As for as the managers must take an advantage from this research they will know how politics within the organization will affect the employees overall performance within the firm and how efficient political skills will overcome the buffer of politics within the firm.

Future Research Direction

This study is focus on the moderating effect of political skills on perception of organization politics and work outcomes (job stress, affective commitment, intention to quit and contextual performance). This research only focused on public and private sector organizations. This research will give future direction to other scholars to work with different moderator and different work outcomes of the employee.

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CLIMATE CHANGE: THE BIGGEST CHALLENGE IN 21ST CENTURY

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Abstract

Climate change is the biggest challenge for the mankind in the present century. The world is speeding towards a climate catastrophe. Our foot is stuck on the accelerator and we are heading towards an abyss. It has far reaching effects, consequences and implication for entire globe in general and developing countries in particular. If sincere efforts are not made on war footing, then the life would become hell on this planet. These days, seasons are changing, temperature is rising of both earth and seawater and there is no end to it. The globe is entering in era wherein the environment would get intertwined in a spiral of decline and degradation affecting the availability and access to water, food, and energy in a big way. According to a study, world over people would consume 10 per cent more water per year than nature could replenish. Increase in global warming has been melting glaciers and receding snowlines. Accordingly, seventy rivers have stopped flowing into the sea and as a result, aquifers are depleting. Our foot is stuck on the accelerator and we are heading towards an abyss. It has far reaching effects, consequences and implication for entire globe in general and developing countries in particular. If sincere efforts are not made on war footing, then the life would become hell on this planet. These days, seasons are changing, temperature is rising of both earth and seawater and there is no end to it. Hence, it is high time that globe as a whole must come forward to formulate a collective strategy for meeting or facing the biggest challenge of 21st century. Both developed and developing nations are sailing in the same boat. Both must take lesson from Japanese disaster. Hence, it is high time that globe as a whole must come forward to formulate a collective strategy for meeting or facing the biggest challenge of 21st century.

Key words: Global Warming, Temperature, Phytoplankton, Rivers, Century,

INTRODUCTION

The climate change has been creating a hell on the landscape of the earth. The most unfortunate thing has been that major global players are not taking the issue more seriously and developing economies are also helpless because of the attitude and approach of the developed economies. The following are the three cases to have a lesson from them and become more serious in tackling the most dangerous and killing thing which is on the rise on this earth.

Disastrous Effects

Case 1: Normally, after an animal dies, energy reserves-in the form of 'glycogen'-are broken down into lactic acid. However, heat stressed pork acidifies more quickly. When, this happens, muscle proteins fall apart, and so does the meat's structure, rendering it soggy and bland. Veterinary scientists have pointed out that the world warms; slabs of meat will lose their juiciness, and become soggy, blander, leaner, darker and more prone to spoilage. According to a recent report 'this is all because the quality of meat depends upon whether or not animals experience heat stress during transport to abattoir. Cattle begin to suffer heat stress at 20 degrees Celsius, pigs at 31 degrees Celsius'⁸ The most noteworthy thing every one would be sure that cattle and pigs are experiencing those harmful temperatures more often with climate change.

An UK's veterinary scientist has spent over a decade studying how meat quality varies with the temperature at which farm animals are kept. According to him "unless farmers take protective steps, global warming will make pork soggy and paler and causing the carcass pH to fall from 7.0 to 5.5. What you are left with is meat that resembles soggy white blotting paper. Heat-stressed pork tends to be sold at a lower price than premium meat, as because meat, as because it is not what people expect on their plates.^{FRI} But in warmer future, soggy pork chops could become standard. As for beef, it would taste blander and look darker, almost mahogany, or umber, and in the worst case black.

Heat-stressed cows run out of glycogen before they die, and as a result produce very little lactic acid after death. As with pork, the pH of beef drops, but because there is less lactic acid in beef than pork, it stalls at 6.3. At this higher pH, proteins retain water, which prevents oxygen from penetrating the meat. This causes the meat's pigment to default to its darker, oxygen-free state having far reaching impact on the human beings who are the consumer of such meat.

Case II: Climate change making cassava toxic. Cassava, the staple of 750 million impoverished people in Africa, Asia and Latin America, is turning more toxic with much smaller yields and this is due to global warming and carbon levels. A Australian researcher tested cassava and sorghum under a series of climate change scenario to study the effect on plant nutritional quality and yield. Cassava and sorghum i.e. both the species belong to a group of plants that produce chemicals called gynogenic glycosides which break down to release lethal cyanide gas if the leaves are crushed or chewed. The Australian researcher grew cassava and sorghum at three different levels of CO₂, just below today's current atmospheric levels at 360 parts per million (ppm), at 550 ppm and double at 710 ppm. Current levels in the air are approximately 390 ppm. What the researcher found was the amount of cyanide relative to the amount of protein increased.

Case III: Today, it is being said that we are shrinking because of global warming. This is true you may not be able to tell, but fact is that we are shrinking. Not just human beings, but all living beings ranging from the invisible phytoplankton to giraffes. All of us are growing shorter because of warming brought on by climate change. Not you and me actually, but us as a human race, as living beings. The shrinking is happening over generation, not in lifetime.

Due to global warming the temperatures rising, organisms get smaller; from the scale of whole communities down to the individual. The areas with warmer climates tend to be dominated by smaller-sized species is known.

According to Martin, we used long-term survey to study essentially aquatic communities of phytoplankton and fish (of all kinds' large rivers, streams, and salt water). The scientists found that these communities did indeed get smaller in size as temperatures rose in their environments over time. For communities of fish in large French rivers, the team leader observed "a decrease on an average of something like more than 60 per cent of the mean size at the community scale over two decades".

Another Danger

Science could not tell or suggest politicians or legislators what to do; it can only give information. Therefore, it is up to the politicians or legislators to take logical or sensible decisions. Recently, a professor teaching at a university in Denmark, has pointed out a very serious issue relating to global warming and climate change that "surface ocean temperature are rising 50 per cent faster than realized at the last International Panel on Climate Change (IPCC) report". According to the IPCC, it is happening too quickly for evolution to firefight it. Some species might learn to cope but most will not. The oceans would soon reach a tipping point when they would no longer be able to support life. You would not take a flight that has only a 10 per cent chance of reaching its destination. Yet the human beings remain inactive even when the IPCC report tells that there is only a 10 per cent chance that climate change was not due to human activity, but that there is a 90 per cent chance that it is. The ocean covers two-thirds of the planet's surface and contains 71 per cent of all water. Yet human beings have only one-tenth of nature reserves in oceans of what is available on the earth namely the Great Barrier Reef and some of the coasts of Kenya,

Malaysia and South America. It is undisputed fact that ocean species are less important than those on the earth. Human beings should not forget all life began in the oceans. To build resilience in bio-systems the people have to realize or consider increasing nature reserves in oceans. It is really the

smaller organism in the oceans that are more significant; these produce calcium carbonate and help absorb carbon dioxide. The oceans are full of really tiny organisms. The plants in the ocean are older in terms of evolution; so these are more significant. But just 4 per cent of oceanic plants like plankton and algae are visible.

The ocean has a warm surface layer and a cold layer beneath that human beings need to sink carbon to the bottom of the bottom layer or into the seabed. There is biological mechanism when CO₂ sinks with plants. With iron fertilization, you stimulate plant growth, but would it go all the way down. Not sure, because fish eat up the plants before these could sink to the bottom. A lot of material gets degraded on the surface instead of sinking to the bottom; so these end up releasing more CO₂. We are in a mess, all right. We need to do whatever we can, should we play God and Engineer bio-systems? May be yes, to restore them to their original state is essential. What are our chances of survival? This all would depend on how soon politicians or legislators and others take action.

Representatives of 20 nations and the European Union called Friday on the air and maritime industries to act on global warming and address carbon emissions from the unregulated sector by year-end. Transport ministers and envoys from the nations, including the Group of Eight major economies, held two days of talks in Tokyo as part of efforts to meet a goal of drafting a new climate change treaty by December. In a joint statement, the nations said that while transport was "an important foundation of our society" it was responsible for "considerable emissions of carbon dioxide," affecting the climate and public health. "Urgent actions are required to address these issues while ensuring sustainable development," the statement said. They called on the International Maritime Organization to "deliver a package of appropriate mechanisms for reducing emissions, preferably by the end of 2009." The countries also said they would support the International Civil Aviation Organization (ICAO) to come up with technology, standards and market-based measures by the end of the year to reduce greenhouse gas emissions. The aviation industry group had agreed in 2007 to come up with ways to reduce the environmental impact of airplanes. But ICAO chief Roberto Kobeh Gonzalez, speaking afterwards to reporters, said he did not expect moves to slap a carbon tax on airlines to force them to curb emissions. The transport industry has been badly hit by the global economic crisis, with fewer people taking to the air, shipping merchandise or buying new cars.

Antonio Tajani, the European commissioner for transport, said the Tokyo declaration was "a very important signal of our common strategy for sustainable development." "We have to build a type of economic growth that does not put at risk health or the environment," Tajani told AFP. Transport accounts for some 23 percent of carbon emissions blamed for global warming, more than any other sector other than electricity generation and indoor heating, according to the International Energy Agency. Nations have been imposing stricter standards on automobile emissions. But the Kyoto Protocol makes no demands of the airline and shipping industries due to their international nature. A conference in December in Copenhagen is set to approve a new climate treaty for the period after 2012, when Kyoto's obligations on emission cuts expire. The Tokyo conference included ministers or officials from the Group of Eight and the 10-member Association of Southeast Asian Nations, along with Australia, India and South Korea. China was invited but did not come, while ASEAN member Malaysia took part as an observer as a senior official could not attend. Japan's transport minister, Kazuyoshi Kaneko, said it was "regrettable" that China did not take part but said its absence "did not prevent a fruitful discussion." Asked why China did not attend, Kaneko said Beijing "had wanted for there to be more consideration for developing countries." China, which by some estimates has surpassed the United States as the world's top polluter, last week unveiled a major bailout for its troubled aviation industry.

Major Risks to Business

Climate change or global warming may create three vital types of risks to businesses which are as under:

- 1) Physical risks;
- 2) Operational risks; and
- 3) Regulatory risks.

Physical risks is perceived to have direct bearing or impact on those things that are vulnerable to extreme weather events namely- droughts, floods and rising Sea level. On the other side of

it, operational risks deals with the availability of natural resources like fuel, water and land which are becoming more vulnerable to the bearing impacts of climate change. Hence, the paucity of such resources may lead to high energy costs affecting the degree of economic growth and development of an economy in a big way particularly in respect of developing or least developing economies. Regulatory risks consist of future regulations and policies which the regulators and Government bodies' world over may enforce to face the rising challenges of climate change or global warming. Both developing economies especially emerging economies like India (India's National Action Plan on Climate Change) have put down the needed basis for formulation a climate change regulations which would affect GHG emission intensive industries/units in their respective economies. Similarly, developed nations have also imposing carbon tax and permit systems on those economies that are exporting emission intensive goods to developed nations. International bodies namely- World Steel Association (WSA), Cement Sustainable Initiative (CSI) and Carbon Disclosure Project (CDP) have started putting considerable pressure on units to disclose their respective degree of risks and GHG managing plan, policies, programs and procedures.

Other side of Climate Change

The concern of climate change or global warming is under dispersal on a rapid rate in the fastest growing area of global business. This is not only a major problem, but has come up as an opportunity to businesses all over the world. Better reputation among customers, investors, operation efficiency and employee motivation are some of the benefits and opportunities coming up from climate change management plans. These benefits and opportunities may lead to rise in shareholders and the most vital component i.e. market value of businesses. Most significantly, there are a lot of opportunities in newly emerging businesses namely clean technology and trading of certified emission reduction (CER) and verified emission reduction (VER).

Some of the newly emerging business opportunities coming out from the climate change are as follows:

- 1) Employing CDM to generate CERs/VERs;
- 2) Carbon trading;
- 3) Green buildings;
- 4) Clean technologies;
- 5) Improvement in energy efficiency; and
- 6) Construction and building retrofit.

GREEN BUSINESS SURVEY

The major features of Green Business Survey that are being considered as a silver lining are as under:

- a) Most firms world over are becoming more aware in respect of climate change;
- b) Climate change or global warming would have a direct impact on global business;
- c) Climate change risk perception and opportunities vary significantly;
- d) Taking measures to mitigate climate change is good for reputation and shareholder value;
- e) Firms world wide are undertaking strategic and inevitable changes in their respective businesses to tackle the rising climate risks;
- f) Clean-tech is the best and fore most opportunity;
- g) Executive managements exert the highest pressure in risk management;
- h) Clear cut policies; programs; procedures, practices have to be laid down by the Governments of every country; and
- i) Governments world over must extend necessary incentives to meet the rising challenges of climate change or global warming.

Silver Lining

The most noteworthy silver lining is that the countries, states, cities and companies that have taken step is that smart policy choices not only cutting pollution but also lead to economic savings and growth and the creation of a new energy future. The results of steps undertaken by leaders of major

players' nations demonstrate the potential for significant net economic savings from new steps to bring desired improvement in energy efficiency and conservation.

New investments in clean and renewable energy could result into more employment, income, and local investment than conventional approaches. And steps to protect and conserve natural resources and create advanced technologies and industrial practices can provide significant co-benefits and opportunities for every nation's environment, energy future, and economy. Many nations' leaders view climate policies and programs as an increasingly desirable technique for engineering state of economic development.

Recent Development

Representatives of 20 nations and the European Union called Friday on the air and maritime industries to act on climate change or global warming and address carbon emissions from the unregulated sector by year-end. Transport ministers and envoys from the nations, including the Group of Eight major economies, held two days of talks in Tokyo as part of efforts to meet a goal of drafting a new climate change treaty by December. In a joint statement, the nations said that while transport was "an important foundation of our society" it was responsible for "considerable emissions of carbon dioxide," affecting the climate and public health. "Urgent actions are required to address these issues while ensuring sustainable development," the statement said. They called on the International Maritime Organization to "deliver a package of appropriate mechanisms for reducing emissions, preferably by the end of 2009." The countries also said they would support the International Civil Aviation Organization (ICAO) to come up with technology, standards and market-based measures by the end of the year to reduce greenhouse gas emissions.

The aviation industry group had agreed in 2007 to come up with ways to reduce the environmental impact of airplanes. But ICAO chief Roberto Kobe Gonzalez, speaking afterwards to reporters, said he did not expect moves to slap a carbon tax on airlines to force them to curb emissions. The transport industry has been badly hit by the global economic crisis, with fewer people taking to the air, shipping merchandise or buying new cars. Antonio Tajani, the European commissioner for transport, said the Tokyo declaration was "a very important signal of our common strategy for sustainable development." "We have to build a type of economic growth that does not put at risk health or the environment," Tajani told AFP. Transport accounts for some 23 percent of carbon emissions blamed for global warming, more than any other sector other than electricity generation and indoor heating, according to the International Energy Agency.

Nations have been imposing stricter standards on automobile emissions. But the Kyoto Protocol makes no demands of the airline and shipping industries due to their international nature. A conference in December in Copenhagen is set to approve a new climate treaty for the period after 2012, when Kyoto's obligations on emission cuts expire. The Tokyo conference included ministers or officials from the Group of Eight and the 10-member Association of Southeast Asian Nations, along with Australia, India and South Korea. China was invited but did not come, while ASEAN member Malaysia took part as an observer as a senior official could not attend. Japan's transport minister, Kazuyoshi Kaneko, said it was "regrettable" that China did not take part but said its absence "did not prevent a fruitful discussion." Asked why China did not attend, Kaneko said Beijing "had wanted for there to be more consideration for developing countries." China, which by some estimates has surpassed the United States as the world's top polluter, last week unveiled a major bailout for its troubled aviation industry.

A sense of fear

The most serious crisis of all crises is the climate change or global warming. The globes can "reserves poverty but not global warming or climate change". Once it's off the charts, it's off the charts. It is going to make the lives of poor people unbearable in large swathes of the world. This process is happening faster than scientists had predicted. The world community has not even begun to measure the impacts and consequences of climate change or global warming in reality. What ever measures are being taken they are more based on myth not reality.

CHALLENGE FOR INDIA

India is a low latitude tropical nation, and hence, greatly exposed to the effects and consequences of temperature rise. Weather variability, a major problem on growth and welfare of the country, would rise with global warming. Increase in temperature in the Tibetan Plateau, the Hindu Kush and Himalayas would affect the volume and timing of river flows in North India and may well become a security issue that rolls relations in South Asia far more than anything so far. Estimated prescription changes would also lead to increase the variability of water availability in peninsular India. Increase in sea level would directly affect all the costal areas as well as settlements. The Ganges and Brahmaputra delta has been enlisted as an exceptionally exposed area by the Intergovernmental Panel of Climate Change (IPCC). An early sign of the potential impact can already be observed in the Sunder bans and in Bangladesh and India faces a very serious possibility of climate migration.

Keeping in mind the above mentioned trends and situation; it is in India's national interest to come forward and to seek an immediate global commitment to limit the risk of temperature increase as much as possible. There is a saying that Indian negotiators agreed to the 2oC goal at the MEF meeting reluctantly and would have preferred silence. This is inexplicable. India should have been in the lead and must be demanding the said goal as a minimum.

Today, India has to require two inferential measures to move out from the issue of temperature to the issue of emission caps. Firstly, to examine the existing level of ambient green-house gases (GHGs) which is consistent with the world temperature issue. Secondly, to explore and spell out the world emission issue which would contain ambient GHGs to the needed level. On the existing basis of Science, it will come up that at 2oC issue implies a limit of 450pmm on GHG concentration in the atmosphere and this would lead to have at least a halving of global emissions by the ends of 2050. This conclusion may be the basis for the fear expressed that the acceptance of the temperature issue implies a commitment to take on obligations in terms of emission caps. But individual nation caps need a further political step regarding how the burden of effort would be distributed. On that, India has not given away anything and feeling more comfortable. India's demand for climate change remains on the table and is becoming more strengthened by the acceptance of 2oC issue. This more true that without an agreed global goal, the space available for sharing can not be defined and talk of climate justice make a little sense. Ban, who this week visited the Arctic to witness first hand the changes brought by global warming, warned that many of the "more distant scenarios" predicted by scientists were "happening now." Scientists have been accused for years of scaremongering. But the real scaremongers are those who say we cannot afford climate action -- that it will hold back economic growth." They are wrong. Climate change could spell widespread disaster. Visibly sobered by his Arctic visit; Ban warned that rising sea levels, partly generated by melting ice, would threaten major cities and potentially up to 130 million people. The melting was also triggering a rush for natural resources in the Arctic, "altering the geopolitical landscape," not just the environment. He urged action on the key areas of the Copenhagen negotiations that are raven by disagreements between rich, emerging and poor nations. They include measures to adapt to climate change and "fast-track funding" to help the most vulnerable and developing countries.

UN CONCERN

The developed countries should continue to take the lead in undertaking quantified emission reductions commitments, and the developing countries should make contributions as their ability permits. In India, a government-backed report pointed out that the country's per capita greenhouse gas emissions were expected to nearly triple in the next two decades. With its massive population, India is one of the top polluters in the world. It is also among countries that have long rejected binding carbon emission targets on the grounds that they would hinder economic development. The largely technical World Conference on Climate Change in Geneva approved the first steps in setting up a new global framework to share climate information and develop better long-term weather forecasting.

Common Strategy

Keeping in mind the unbearable and unimaginable effects, consequences and implications, the two emerging economies namely-India and China have come forward to evolve a common stand and strategy for meeting the biggest challenge of 21st century.

India and China have agreed in principle to jointly fight any attempt by West and North economies in respect of issues relating to global warming. There is total convergence of views between India and China on climate change. India and China have agreed to coordinate their views on different aspects of climate change before every major international meeting on the subject. Both India and China want to negotiate with West and North economies for higher levels of financial assistance and technology transfer in return for promises to their best to tackle environmental problems and issues. China remains committed to principal of common but differentiated responsibilities of developed and developing economies.

Both the nations (India and China) have also agreed that both the countries will not agree to any legal binding on reducing emission norms because, the same would come in the way of their respective development policies and plans. Both the countries would also not agree to the creation of any trade barriers on the excuse of climate change.

US VS EU

US, EU poles apart on climate negotiations. EU is not happy with American decision to keep aside the Kyoto Protocol. Europe as whole has confronted with the US in regard to view point on climate change in a potentially damaging split that comes ahead of crucial political negotiations on a new global deal to regulate and control greenhouse gas emissions. The major difference that has come out between the US and the EU is the structure of a new worldwide treaty on global warming. According to the Europe view point the US approach could undermine the new treaty and may also weaken the global ability to cut carbon emissions. The treaty would be discussed and negotiated in coming December i.e. December 2009 at a UN meeting in Copenhagen. The emerging confrontation between the EU and the US putting more pressure on the success of the Copenhagen meeting in coming December (2009) and may affect the necessary progress in regard to global warming efforts.

The main dispute between the EU and the US is in respect of the way national carbon reduction targets would be considered and counted. Europe has been pushing to retain structures and systems set up under Kyoto Protocol signed in Japan, the existing global treaty on climate change and warming. The negotiators from the US have communicated to the Europe negotiators that their country (USA) intends to sweep away almost all the structures and systems created under Kyoto Protocol and the same would be replaced with a new structure and system of its own design. The above mentioned issue is of critical, strategic and most sensitive and hence, negotiators from Europe are much reluctant to accept it and show any open criticism on it. They have a sense of fear in their minds that the US move may make efforts in fractious to agree a robust new treaty in Copenhagen.

The US has distanced itself from Kyoto Protocol under the administration of President Bush as the same made no demands on China, and the treaty remained political poison in Washington. European officials were knowing that the US would be reluctant to embrace Kyoto Protocol, but they were hoping that they will be able to use it as a foundation for a new agreement which the need of the hour. The most serious and sensitive issue is that if Kyoto Protocol is replaced by new structure and system, it would take many more years to deliberate, negotiate and finalized a new framework. Negotiators from other regions and countries believe that Europe is unlikely to stand up to the US.

Under the existing Kyoto Protocol, greenhouse gas reductions are subject to an international system that regulates and controls the essential calculation of emissions, the purchase of carbon credits and contribution of sectors such as forestry. The US is pushing instead for each country to set its own rules.

How do we get from Kyoto to Copenhagen?

Environmental Ministers from 190 countries are going to be gathered in the Danish capital at the end of the year 2009. The aim is to build on the existing Kyoto Protocol by ensuring developed

economies sign up to deeper emissions cuts while offering greater assistance to developing nations to help them curb greenhouse gas pollution.

What to expect?

Expect developed countries to make deeper emissions cuts by 2020 than under the current Kyoto Protocol. Also, expect improved funding mechanisms to pay for climate change adaptation and mitigation in poor economies, more effective transfer of affordable clean-energy technology and formal support for a scheme to pay developing nations to preserve rainforests in return for carbon credits or other incentives. Do not expect developing economies to agree to legally binding emissions cuts?

What is Kyoto Protocol?

The Kyoto Protocol is an international 'Environmental Treaty' signed among the countries aimed at reducing the emission of greenhouse gases into the atmosphere. More than 180 nations have ratified the treaty. Only 37 industrialized, however, have agreed to targets to reduce emissions by 2008-12, under a principle that developed economies are mostly to blame. The targets range from an 8 per cent cut from 1990 levels for the European Union to 10 per cent rise for Iceland. The US, long the world's biggest source of emissions, but now surpassed by China, came out against the pact in 2001.

What Next?

Two more rounds of formal negotiations are scheduled before the December 7-18 in Copenhagen; September 28 to October 9 in Bangkok; and November 2-6 2009 in Barcelona. In addition, G20 leaders meet in Pittsburg to discuss how developed economies could fund steps by poor nations to deal with climate change.

G-20 Meet

The outcome of G-20 meeting would help, guide negotiations during the two-week Bangkok, wherein more than 2000 delegates would be trying hard to shorten a draft negotiating text that would lay out broader global actions to fight change from 2013. The document would replace the Kyoto Protocol.

Why do we care?

Mankind has added enough greenhouse gases in the atmosphere to raise temperature to a dangerous level and emissions are set to keep rising, particularly from poorer economies for at least the short-term. We are already committed to what scientists believe would be serious impacts from rising temperatures such as more floods, droughts, heat waves and rising seas.

Global temperatures may be 4oC hotter by the mid-2050, if current greenhouse gas emissions trends continue. According to a UN Report 'climate changes were outpacing worst-case scenario forecast in 2007 by the UN's Intergovernmental Panel on Climate Change (IPCC)'.^{MO} In the words of another study 'results are showing similar patterns (to the IPCC) but also show the possibility that more extreme changes can happen'.

A global average increase of 4 degrees masked higher regional rise, including more than 15 degrees warmer temperature in parts of the Arctic; and up to 10 degrees higher in Western and Southern Africa. Rainfall may fall this Century by a 5th or more in parts of Africa, Central America, the Mediterranean, and coastal Australia, potentially more extreme than the IPCC finding released in 2007.

COST OF CLIMATE CHANGE

How much money is needed the most pertinent question that is a matter of concern for developed and developing nations. According to an estimate, the total cost involved into facing the chronic issue of climate change is US \$ 1.1 trillion. The classification of cost for different components of climate change is given in table I.

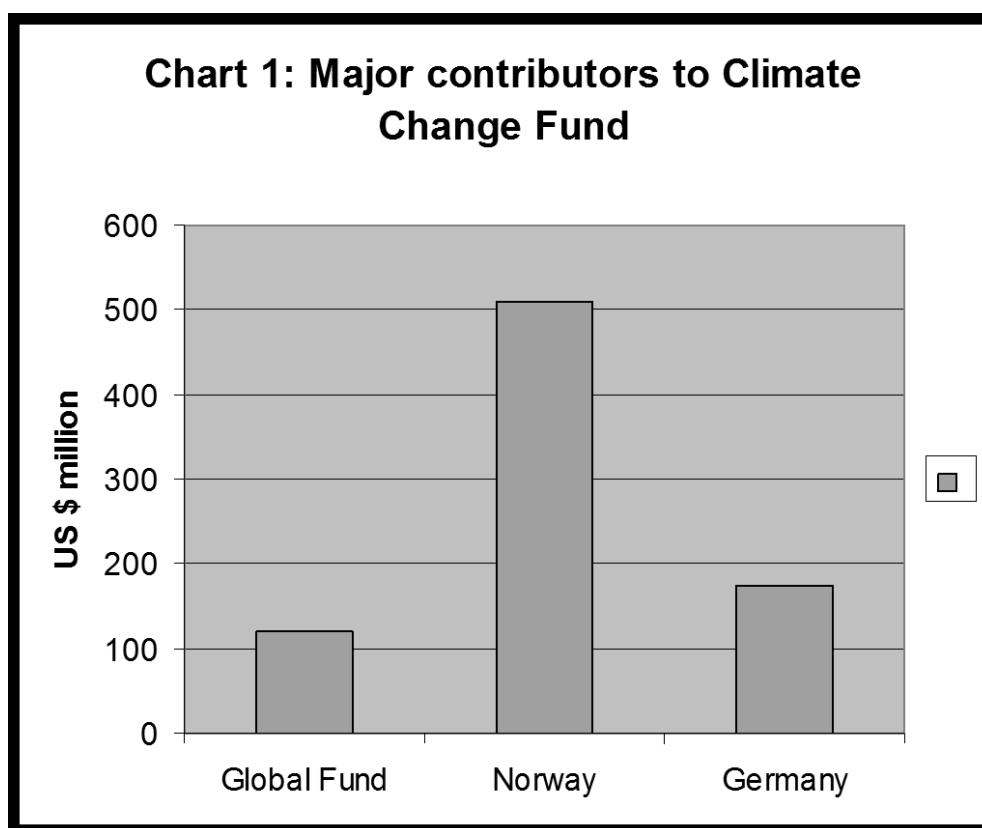
Table I: Money Needed for Different Components of Climate Change 2010 to 2050

Reduced to after fuel, efficiency savings	US \$ 53 billion
By 2030 for early weather warnings, flood prevention	US \$ 100-150 billion
Climate funds rich should pay developing countries by 2020	US 147 billion

Source: Reuters.

Contribution of Funds by Different Sources

Funds already available for meeting the challenge of climate change and global warming stood at US \$ 6.9 billion. The largest contribution has been made out by the World Bank amounting US \$ 5.1 billion. Funds already made available by different countries can be seen from Chart 1.



Source: prepared by the author

Delegates at the start of climate negotiations at Bangkok (Thailand) were told that the world expects action as they struggle to break the deadlock in talks for tougher pact to fight global warming. Agreement on climate funds and who will pay is an important or strategic segment to get a deal to fight climate change in Copenhagen (Denmark) in coming December 2009.

Proposal on How to Raise Funds

The following are the major proposals for agreement in coming climate change negotiations:

- US 4 15-25 (Norwegian) billion set quotas of greenhouse gas emissions permits for developed nations for 2013-2020 of which 2 per cent would be sold to them to raise funds.
- US \$ 10 billion (Mexican) international fund form all nations, based on their responsibility for causing climate change, national wealth and population.
- US \$ 55 billion (European Commission), expansion of carbon markets so rich earn rights to pollute by paying for emissions cuts in less developed countries.
- US \$ 28 billion (Least developed economies), Levy on international jet and shipping fuels.

CONCLUSION

Climate change is one of the biggest challenges for entire globe. But developing economies and especially emerging economies like India and China are greatly affected. Hence, the need of the hour is to tackle the challenge with “utmost sincerity”. The effects are of far reaching consequences. If human civilization is to be saved then there is no option before any country just to cooperate positively and constructively in save the earth from further decay. Cost-bearing should be logical keeping in mind the capacity of the every nation to contribute. Global decisions should strictly adhere to. The need of the day is to have collective approach to tackle the challenge. The possible replacement of the existing Kyoto Protocol by a new treaty suggested by the US must be deliberated, negotiated and finalized with all care and cautiousness as the same may have far reaching effects, consequences and implications for every country and continent. The decision should not be in haste. The future of Climate change issue is basically depending upon the out come of negotiations that have to be taken place in Durban, South Africa in December 2009.

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EFFECT OF CARRIER SENSING RANGE ON THE THROUGHPUT OF MULTI-HOP WIRELESS AD-HOC NETWORK

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Abstract

Carrier sensing is a fundamental mechanism in Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) protocols and it has been used as an effective way to reduce collisions and exploit spatial reuse in wireless networks. The size of the carrier sensing range has a great effect on the network performance. This paper investigates the effect of sensing range on the throughput of multi-hop wireless ad hoc network by considering two fundamental issues in Medium Access Control (MAC), i.e., collisions and spatial reuse, in terms of persistent probability, transmission range and Exponential Increase Exponential Decrease (EIED) back-off time. Markov chain models were used to derive the duration time, transmission probabilities, transition probabilities and steady-state probabilities of the states of node as well as the throughput. Simulation results show that throughput increases along with increase in sensing range R_s , but when it reach its maximum value, its start decreasing with increase in the sensing range. This means that the larger the sensing range, the smaller the possibility that a new transmission attempt to interferes with some ongoing transmissions. Furthermore, smaller sensing range with a larger transmission range means more nodes have to defer their transmissions when one node is transmitting, which leads to lower spatial reuse and consequently decreases throughput. Similarly, smaller sensing range means more transmission hops which leads to more collisions. In the other hand, throughput decreases with increase in transmission range, number of nodes and back-off time.

Keywords: Carrier Sense, Spatial Reuse, Mobile Ad hoc Networks, Medium Access Control, Back-off Mechanism, RTS/CTS Mechanism, Markov Chain.

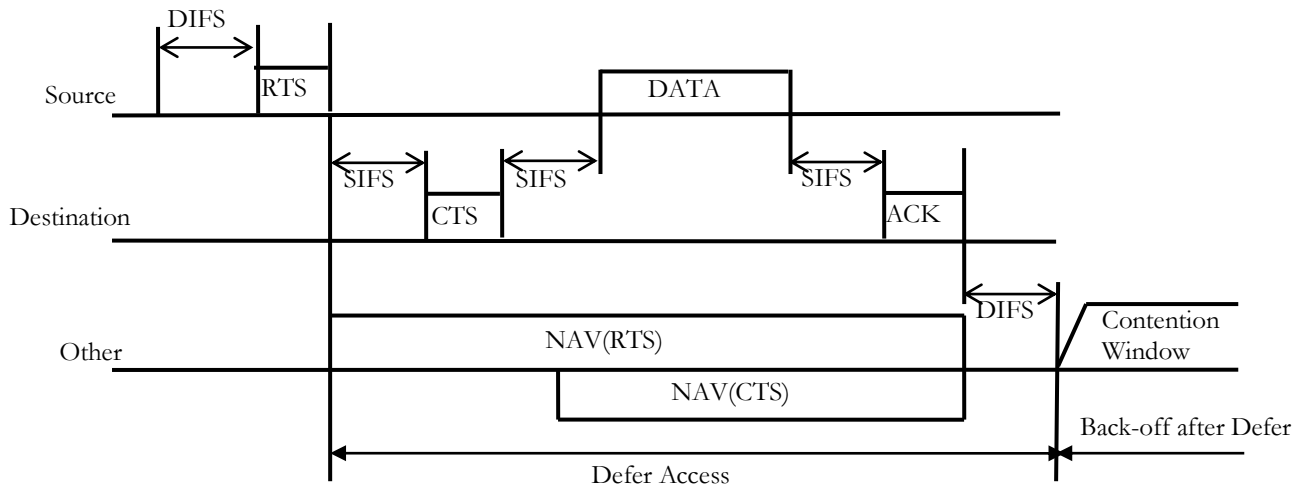
INTRODUCTION

The Past few years have seen enormous development in wireless technologies, which significantly boost the growth of diverse wireless networks, from single-hop wireless networks to multi-hop wireless networks. In single-hop wireless networks such as cellular networks and Wireless Local Area Networks (WLANs), every node is within one hop of a central controlled entity (e.g., base stations, access points, etc.), and only communicates with the entity through single hop transmission. Such networks require much infrastructure support, hence are expensive to deploy. In the other hand, multi-hop wireless networks such as Mobile Ad Hoc Networks (MANETs) are usually collection of nodes equipped with radio transmitters, which not only have the capability to communicate with each other in a multi-hop fashion, but also be able to route data packets as a relay from the source to the destination. Due to their inherently distributed nature, MANETs are more robust than their cellular counterparts against single-point failures, and have the flexibility to reroute around congested nodes. Furthermore, MANETs can conserve battery energy by delivering a packet over a multi-hop path that consists of short hop-by-hop links. Applications of MANETs include the battlefield applications, rescue work, as well as civilian applications like an outdoor meeting, or an ad-hoc classroom. In wireless ad hoc network, Medium Access Control (MAC) protocol is the main element that determines the efficiency in sharing the limited communication bandwidth of the wireless channel.

The IEEE 802.11 (IEEE Computer Society, 1999) protocol is a kind of Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) MAC protocols and it has been the standard for WLAN both in infrastructure and in ad hoc mode, although originally it was developed for a single access point scenario.

The 802.11 specification supports two fundamentally different MAC schemes, namely the Distributed Coordination Function (DCF), and the Point Coordination Function (PCF). The DCF protocol can be described as CSMA/CA and it has been widely studied in wireless multihop ad hoc networks due to its simple implementation and distributed nature. There are two access methods that are used under DCF, namely the basic access method and the (RequestToSend (RTS)/ ClearToSend (CTS) access method. The RTS/CTS access method uses a four-phase RTS-CTS-DATA-ACK handshake as shown in Fig 1. There are five timing intervals for the protocol. Two of them are considered to be basic ones that are determined by the physical layer: the Short Inter-frame Space (SIFS) and the slot time. The other three intervals are defined based on the two basic intervals: the Priority Inter-frame Space (PIFS), the Distributed Inter-frame Space (DIFS), and the Extended Inter-frame Space (EIFS).

Fig 1. The RTS/CTS Access Method.



Carrier Sensing Range

Carrier sensing is a fundamental mechanism in CSMA/CA protocols. It is usually determined by the antenna sensitivity. In this mechanism, a node senses the channel before transmission and defers the transmission if it senses a busy channel to reduce collision. This mechanism consists of physical carrier sensing and virtual carrier sensing. In the physical carrier sensing, the channel is determined busy if the sensed signal power exceeds a certain threshold, referred to as Carrier Sense Threshold (CST). Otherwise, the channel is determined idle. It is clear that the value of CST decides the sensing range and affects both the collision possibility and spatial reuse in MANETs, since a smaller CST means the node can sense the signal in a larger sensing range, and vice versa. Physical carrier sensing range, in which a transmission is heard but may not be decoded correctly, can be much larger than the transmission range and hence it can be more effective than the virtual carrier sensing in avoiding the interference especially in the multi-hop networks. Sensing range is the range within which a transmitter triggers carrier sense while transmission range represents the range within which a packet is successfully received if there is no interference from other radios. Fig. 2 shows both transmission and sensing ranges of a node. However, large carrier sensing range reduces the number of concurrent transmissions, which is referred to as “spatial reuse” and affects the aggregate throughput because any potential transmitters, which sense a busy channel, are required to keep silent. The size of the carrier sensing range has a great impact on the system performance. Although a smaller carrier sensing range allows more transmissions to happen concurrently, it introduces more interference that may lead failure to more transmissions.

Fig 2: Transmission and Sensing Ranges of a Node

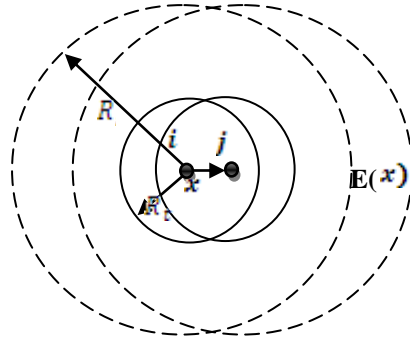


Fig 2: Transmission and Sensing Ranges of a Node. (The small and larger circle denote the transmission and sensing range, respectively)

Back-off Mechanisms

To reduce collision possibility, the DCF mechanism uses a back-off mechanism in which every node has a back-off counter and a back-off stage. The back-off counter value is initially chosen as described below. The back-off procedure selects a random number of time slots between 0 and the contention window CW , according to the following equation:

$$\text{Back - off Counter} = \text{Int}(CW * \text{Random}(\square) * \text{Slot Time}) \quad (1)$$

Where CW is an integer between CW_{\min} and CW_{\max} , typical values being 31 and 1023, respectively. $\text{Random}(\square)$ is a random number between 0 and 1. Slot time is fixed for a given physical transmission scheme (IEEE Computer Society, 1999). Although Binary Exponential Back-off (BEB) mechanism is widely used in many contention-based MAC protocols for its simplicity and good performance, it is not a perfect back-off mechanism in fairness and efficiency especially in multi-hop ad hoc networks. Because of the drawbacks of BEB, some new back-off mechanisms were proposed (Bharghavan et al, 1994; Song et al, 2003). A Multiplicative Increase and Linear Decrease (MILD) mechanism is adopted in the MACAW protocol (Bharghavan et al, 1994) to address the large variation of the contention window size and the unfairness problem of BEB. MILD performs well when the traffic load is steadily heavy. However, the “linear decrease” sometimes is too conservative, and it degrades the performance when the traffic load is light or the number of active nodes changes sharply (Song et al, 2003). To overcome these problems, the Exponential Increase Exponential Decrease (EIED) back-off algorithm has been studied in (Song et al, 2003). In the EIED algorithm, the contention window size is increased and decreased exponentially on every collision and successful transmission, respectively. As a result, EIED is not as conservative as the “linear decrease” of MILD and not as radical as the “reset” of BEB.

Persistent Probability

Persistent probability reduces the collisions caused by the propagation delay, because there is a small chance that just after a node begins sending, another node will become ready and sense the channel; if the first node’s signal has not yet reached the second one, the latter will sense an idle channel and will also begin sending, resulting in a collision. The longer the propagation delay the larger the possibility of the collision. Even if the propagation delay is zero, there will still be collisions. If two nodes become ready in the middle of a third node’s transmission, both will wait politely until the transmission ends. If they happen to have the same back-off timer, then both will begin transmitting exactly simultaneously, resulting in a collision. To address this problem, some MAC protocols introduce a persistent probability p (Ivan et al, 2007). When a node becomes ready to send, it senses the channel. If it

is idle, it transmits with a persistent probability p . With a probability $1 - p$, it defers until the next slot. If that slot is also idle, it either transmits or defers again, with probability p and $1 - p$.

This paper investigates the effect of sensing range on the throughput of multi-hop wireless ad hoc network by considering two fundamental issues in Medium Access Control (MAC), i.e., collisions and spatial reuse, in terms of persistent probability, transmission range and Exponential Increase Exponential Decrease (EIED) back-off time.

Related works

MANETs have particular features and complexity compared to conventional wireless networks. Several mechanisms have been proposed to improve network performance and to avoid collisions in MAC protocol for multi-hop wireless ad hoc networks, namely carrier sense, handshake, and back-off mechanism (Saikat et al, 2005; Jing et al, 2004). Many papers (Zhai and Yang,2008; Kim et al, 2006; Chongqing, 2010) have already attempted to optimize the system throughput by tuning carrier sensing range and transmit power. (Yang and Vaidya,2005) shows that the MAC overhead, bandwidth-independent and bandwidth-dependent, has a significant effect on the choice of carrier sensing range. (Zhai and Yang,2008) identify the optimum carrier sensing range for different data rates. (Chongqing, 2010) proposed a framework to determine the optimum carrier sensing range of a network using transmission relation graph (TRG), they used the framework to compute a precise optimum carrier sensing range for the given network they also investigated the changing rules of the optimum carrier sensing range of several types of wireless networks. (Shunyuan and Shivendra, 2009) derived an analytical model to calculate the successful transmission probability and throughput of routing protocols using different link metrics. They also investigate the impact of some other important factors, such as node density, average contention window size and packet length. It is shown in (Deng,2004; Guo, 2003) that the spatial reuse efficiency could be improved significantly by tuning the carrier sensing threshold. Based on a simplified interference model, an analytical model is presented in (Zhu, 2004) to demonstrate how to derive the optimal sensing threshold given reception power, data rate and network topology. In (Kim et al, 2006), similar model is adopted to study how to improve spatial reuse through tuning transmit power, carrier sensing threshold and data rate.

Throughput Analysis of a MANET

Throughput of a MANET is defined as the fraction of time the channel is used to successfully transmit payload bits (Bianchi, 2000). Since four-way RTS/CTS/DATA/ACK handshake is widely adopted in MANETs, such a handshake mechanism is assumed in this paper. In MANETs, it is assumed that all the nodes use the same sensing range of radius R_s and the same persistent probability p . The average back-off time of each node during a transmission is denoted by \bar{T}_b . During the transmission, it is assumed that each node has three states: a successful transmission state *success*, a wait state *wait*, and a failed transmission state *failure*. We use $s_i = (i = s, w, f, \text{respectively})$ to denote these states.

Let Q_{s_i} be the steady-state probability for state s_i of the node (Q_{s_j} equals the long run proportion of transitions which are into state s_j), T_{DATA} be the data transmission time, T_{s_i} be the time which the node spends on state s_i , the throughput of MANETs is equal to the limiting probability that the node is transmitting data and thus can be denoted by

$$Th = \frac{Q_{s_i} T_{DATA}}{\sum_{s_i} Q_{s_i} T_{s_i}} \quad (2)$$

A three-state Markov chain is used to model a channel around node i that is Idle, Busy-success and Busy-failure and their durations are denoted as T_i , T_{bs} and T_{bf} respectively (Mustapha et al, 2011). $T_i = \tau$, $T_{bs} = T_{RTS} + T_{CTS} + T_{DATA} + T_{ACK} + 4\tau$ and $T_{bf} = T_{RTS} + T_{CTS} + 2\tau$. The transition probabilities from idle to idle, from idle to busy1-success, and from idle to busy2-failure are denoted as P_{ii} , P_{is} and P_{if} respectively. Thus,

$$P_{ii} + P_{is} + P_{if} = 1$$

(3)

The idle channel around node i changes to the busy1-success state in three circumstances. First circumstance is that node i is exposed to at least one source node which performs a successful transmission. Here "expose" means that two nodes can sense each other. Second circumstance is that node i is not exposed to a source node but it is exposed to at least one destination node which performs a successful reception. The third circumstance is that node i itself transmits to a destination node successfully. Let P_{is1} and P_{is2} be the probability that there is at least one successful transmission in node i 's sensing area and probability that there is at least one successful reception in node i 's sensing area respectively. The probability that a node successfully transmits in a slot is P_s , and since on average \bar{N} nodes including node i itself participate in generating a busy slot,

$$P_{is1} = 1 - \sum_{n=1}^{\infty} (1 - P_s)^n \frac{\bar{N}^n}{n!} e^{-\bar{N}} \quad (4)$$

The probability that at least one of the transmissions from nodes in an area A has a destination node in the sensing range of node i , is given by

$$P_{is2} = 1 - \sum_{n=0}^{\infty} (1 - P_l)^n \frac{\bar{N}_A^n}{n!} e^{-\bar{N}_A} \quad (5)$$

Where P_l is the probability that any node in area A initiates a successful four-way handshake to a node in a sensing area of i . Therefore, the transition probability P_{is} is given by

$$P_{is} = P_{is1} + P_{is2} \quad (6)$$

The idle channel stays in idle state if none of the nodes in the sensing area of node i transmit in this slot. Thus P_{ii} is given by:

$$P_{ii} = \sum_{n=1}^{\infty} (1 - P_t)^n \frac{\bar{N}^n}{n!} \quad (7)$$

Therefore,

$$P_{if} = 1 - P_{ii} - P_{is} \quad (8)$$

Let π_{ii} , π_{is} and π_{if} denote the steady-state probabilities of states idle, busy1-success and busy2-failure, respectively. Thus, the following relationships exist: $\pi_i P_{is} = \pi_{bs}$; $\pi_i P_{if} = \pi_{bf}$

In collision avoidance MAC protocol, when the channel is sensed idle, in each time slot, a node intends to transmit a frame with the persistent probability p . Therefore, the probability that a node transmits in any time slot is called *transmission probability* P_t , which is given as: $P_t = p \cdot P_i$.

P_i is the limiting probability that the channel is in idle state. Note that even a node transmits; it still may fail due to collisions with other transmissions at the same time. The limiting probability P_i , i.e., the long run probability that the channel around node i is sensed idle, can be obtained by:

$$P_t = \frac{pT_i}{T_i + P_{is}T_{bs} + P_{if}T_{bf}} \quad (9)$$

A three-state Markov chain is used to model the states of node i (Mustapha et al, 2011). The three states of this Markov chain are *Wait*, *Success* and *Failure* and their durations are T_w , T_s and T_f respectively. $T_s = T_{RTS} + T_{CTS} + T_{DATA} + T_{ACK} + 4\tau$, $T_f = T_{RTS} + T_{CTS} + 2\tau$ and $T_w = \bar{T}_b + \bar{T}_d$. \bar{T}_b is the average back-off time and \bar{T}_d is the average deferring time. The transition probabilities from wait to wait, from wait to success and from wait to failure are denoted as P_{ww} , P_{ws} and P_{wf} , respectively. Thus,

$$P_{ww} + P_{ws} + P_{wf} = 1 \quad (10)$$

A parameter \bar{M} is defined to be the average number of nodes within the transmission range of node i . Since when the node density does not change, the number of nodes is proportional to the area size,

$$\bar{M} = \frac{\bar{N}\pi R_t^2}{\pi R_s^2} \quad (11)$$

The transition probability P_{ww} that node i continues to stay in *wait* state in a given slot, is the probability that node i does not initiate any transmission and there is no node within the transmission range of node i initiating a transmission.

$$P_{ww} = (1 - P_t) \sum_{n=1}^{\infty} (1 - P_t)^{n-1} \frac{\bar{M}^n}{n!} e^{-\bar{M}} \quad (12)$$

Given that each sending node chooses any one of its neighbors as the receiver with equal probability, x can be considered as a uniform random variable in the range $0 < x < R_t$. Then, the probability density function of the distance x between node i and j is

$$f(x) = \frac{1}{R_t} \quad (13)$$

From the total probability theorem (Ross, 1970) P_{ws} can be written as follows:

$$P_{ws} = \int_0^{R_t} f(x) P_{ws}(x) dx \quad (14)$$

$$P_{wf} = 1 - P_{ww} - P_{ws} \quad (15) \text{ Let}$$

π_w , π_s and π_f denote the steady-state probability of state wait, success, and failure, respectively. Then

$$\pi_w + \pi_s + \pi_f = 1 \quad (16)$$

The steady-state probability of wait state is given by $\pi_s = \pi_w P_{ws}$, $\pi_f = \pi_w P_{wf}$, $\pi_w = \frac{1}{2 - P_{ww}}$.

For EIED back-off mechanism the contention window size is decreased by a factor r_D upon a successful transmission, and increased by a factor r_L upon a collision. Simulation results in (Bharghavan et al, 1994) show that EIED with relatively smaller value of r_D compared to the value of r_L has higher performance gain. For example, let $r_L = 2$, and $r_D = 2^{\frac{1}{8}}$, Then the back-off time can be written as

$$\bar{T}_b = \frac{\frac{1}{2} \cdot \frac{r_L}{r_D} \bar{m} \tau}{p_i}, \quad \bar{T}_d \text{ is given by } \bar{T}_d = \frac{\tau}{2p_t} \quad \text{and } T_w = \bar{T}_b + \frac{\tau}{2p_t}$$

Therefore,

$$Th = \frac{\pi_s T_{DATA}}{\pi_w T_w + \pi_s T_s + \pi_f T_f} \quad (17)$$

SIMULATION RESULTS AND DISCUSSIONS

The simulation was carried out using MATLAB 7.1 release 14. The results show that sensing range has significant effect on the throughput of MANETs.

Fig. 3 illustrates the effect of sensing range on the throughput of MANETs by varying persistence probability p . The result show that for $R_s = 250m$, $550m$ and $750m$, the throughput always achieve a maximum value at some point of persistent probability P . It is observed that the throughput increases when R_s increases, for example, in Fig 3 if R_s increases from $250m$ to $750m$, the throughput increase by 45%. This means that the larger the sensing range, the smaller the possibility that a new transmission attempt interferes with some ongoing transmissions.

Fig 4 illustrates the effect of sensing range on the throughput of MANETs by varying transmission range. It is observed that the throughput of MANETs increases with increase in sensing range R_s . For example, in Fig 4 when R_s increases from 250m to 750m at a transmission range of $R_t = 250m$, the throughput increases by 26.4%. In the other hand, the throughput decreases with increase in the transmission range. This indicate that smaller sensing range with a larger transmission range means more nodes have to defer their transmissions when one node is transmitting, which leads to lower spatial reuse and consequently decreases throughput. It is also observed that for the same R_s , the smaller transmission range has a higher throughput. Also a smaller sensing range means more transmission hops which leads to more collisions.

Fig 5 illustrates the effect of sensing range R_s on the throughput of MANETs by varying number of nodes, The maximum throughput decreases with increase in number of nodes, because the more number of nodes, the more collisions may happen, and the more time is needed for a successful transmission. For instance, in Fig 5 when N is increase from 5 to 20 at a sensing range of $R_s = 750m$, the maximum throughput dropped by 42.2%. This illustrates that number of nodes has to increase along with the gain of the sensing range to obtain the maximum throughput.

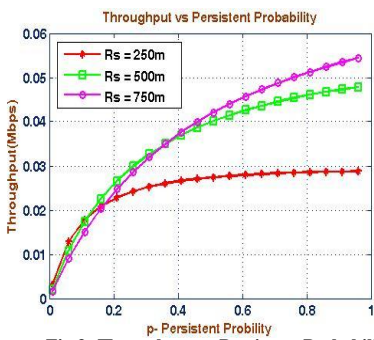


Fig 3: Throughput vs Persistent Probability

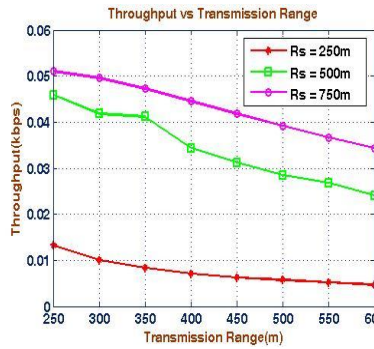


Fig 4: Throughput vs Transmission Range

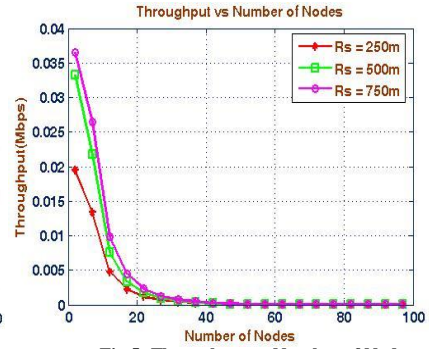


Fig 5: Throughput vs Number of Nodes

Fig. 6 shows the effect of sensing range on throughput by varying back-off time. It is observed that the throughput increases along with increase in the sensing range linearly. In the other hand, throughput decreases with increase in back-off time linearly. For example, when $R_s = 750m$, the throughput is around 0.051 Mbps, while for $R_s = 250m$ the throughput is about 0.028 Mbps, which is 45% lower than the former. Similarly, the back-time decreases with increase in sensing range.

Fig 7 revealed the relationship between the throughput and the sensing range. The result shows that throughput increases along with the increase of R_s , but when it reach its maximum value, it start decreasing with increase in sensing range.

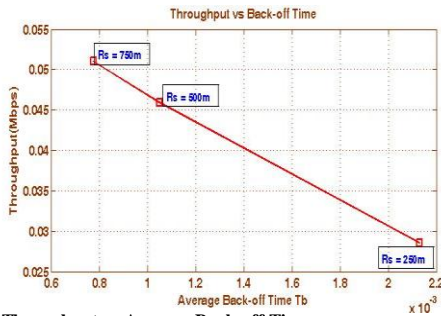


Fig 6: Throughput vs Average Back-off Time

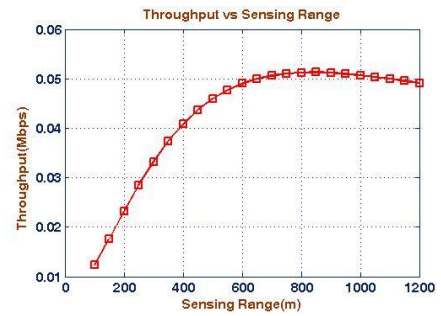


Fig 7: Throughput vs Average Back-off Time

CONCLUSIONS

MANETs have particular features and complexity compared to conventional wireless networks. One of the fundamental challenges in MANETs research is how to increase the overall network throughput while maintaining low energy consumption for packet processing and communications. Effect of sensing range on the throughput of multi-hop wireless ad hoc network was

investigated by considering two fundamental issues in MAC, i.e., collisions and spatial reuse, in terms of persistent probability, transmission range and back-off time

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CHALLENGES AND PROSPECTS OF USING INTERNET FACILITIES IN FEDERAL COLLEGE OF EDUCATION (TECHNICAL) LIBRARY OMOKU, RIVERS STATE

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Abstract

This study examined the challenges and prospects of using internet facilities in Federal College of Education (Technical) Omoku, Rivers State. A survey research design was used and a simple random sampling method was used to determine the 200 samples used for this study. Findings were analysed using descriptive statistics and the results indicated that the students make use of the internet facilities in the library at the time that is convenient to them morning, afternoon evening. Majority of the respondents can interact with the internet themselves with some challenges identified as being impediment to their using the internet facilities in the library. The paper finally make some recommendation in combating the challenges affecting the students use of internet facilities.

INTRODUCTION

Academic libraries generally are established to achieve the tripartite objectives of teaching, research and community service. The library serves as the primary source of providing information print, non-print and electronic for their various clientele use. Before the advent of digital, virtual and electronic library the only major source of information in most developing countries like Nigeria is mostly books found in conventional libraries. With recent development in information explosion the use of internet has revolutionised the ways existing and potential library users source and use information. According to Daly (2000) the internet is estimated to be growing at a rate of 10.15 per month with numbers rising from about 56 million internet users world wide in 1995 to about 200 million people in 1999. No wonder most tertiary institution libraries are already hooked to the internet to provide easy access to their users to get whatever information they wanted with ease and within the shortest possible time.

With the introduction of internet facilities in libraries, the various users can communicate with colleagues and download information needed and gotten to improve their academic pursuit. This is to say that every individual or students who wish to excel in his or her academic pursuit may therefore find the internet relevant to search and get vital information needed for his or her academic pursuit. Therefore, information sourcing and utilization through the internet in academic libraries is sine qua non if the students are to achieve the goals for which they are in the Institution.

FEDERAL COLLEGE OF EDUCATION (TECHNICAL), OMOKU

The Federal College of Education (Technical) Omoku, Rivers State, Nigeria, was set up by Decree 4 of 1986 as one of the Federal College of Education in Nigeria. Academic work actually commenced in 1988. On the other side the College library better known as Hamidu Alkali Library meets the standards as recommended by the National Commission for Colleges of Education in terms of services rendered. Apart from other conventional library services rendered, the library also has a virtual library section where the users staff and students come in to search for information electronically services and Resources Available on Internet.

Previous Studies

According to Ibegwam (2002) the internet has revolutionized communication globally in the last decade. It is the world's largest computer network, the network of networks scattered all over the world. The internet is special because it is the cheapest and fastest means to get information provide information and compile information (Leon and Leon, 1999). For Jensen (2001) the internet has grown rapidly in the African continent over the past few years. Studies on student use of internet as studied by Jagboro (2004) reveals that 38.24% and 22.06% of the university students use it on weekly or daily basis while 11.76% use it monthly and bi-monthly. Similarly, according to Lumande and Mutshewa (1999) 42.6% of their respondents indicated that they use the internet very often.

Ibegwam (2004) suggested that students' use of internet will improve if institutions should put in place training on the use of Internet, provided free Internet services, use VSAT to improve connectivity and increase workstations connected to the Internet. On problems associated with the use of internet facilities Bac (1998) observed that very little training is given to students in the use of internet facilities and where internet exists in an institution very little time allocation is made for students use of the internet while Chifewepa (2003) identified lack of guidance, inability of use and inadequate internet facilities were identified as problems associated with the use of Internet facilities.

Research Questions

The following research questions were asked.

1. When do students use the internet or library facilities to obtain academic information?
2. Do students use the internet more than the library to obtain academic information?
3. How do students access the internet?
4. What are the challenges to the students' use of internet?
5. What solutions would you recommend to solving the challenges?

METHODOLOGY

Research Design

The survey research design was adopted for this study because of the large number of respondents. According to Fraenke and Wallen (1993) the big advantage of survey research is that it has the potential to provide us with a lot of information obtained from quite a large sample of individuals' population of the study.

The population of the study is made up of all library registered students from part 1 to 3 in the 2009/2010 academic session. Record shows that for the period under review 403 users were registered, of this number 200 which represents about 50% of the respondents who were randomly selected as samples for this study.

Data Collection

The data collected for this study was collected between July and December 2010. Data was collected by giving questionnaires randomly to the students who visit the library between these periods. To ensure that a student does not complete two questionnaires the students were asked whether they have completed one before; to confirm this, they are to write their matriculation numbers only on the forms completed.

Analysis of Data

The data collected were analysed using the descriptive statistics to report the findings.

RESULTS AND DISCUSSION

Data analysis and findings were based on the research questions of the study.

Table 1: Distribution of Respondents by Demographic variable

Item	Classification	Frequency	%
Age range	16 – 20	29	14.5
	21 – 25	162	81
	26 – 30	9	4.5
	31 and above	-	0
Gender	Male	128	64
	Female	72	36
Level	100	32	16
	200	61	30.5
	300	107	53.5
School	Education	42	21
	Vocation	23	11.5
	Technical	24	12
	Business	71	35.5
	Science	30	15
Use of Internet	Yes	161	80.5
	No	39	19.5

Table 1 shows the demographic characteristics of the respondents. The results show that majority of the respondents which represents 162 (81%) of the respondents are in their twenties between age ranges of 21-25. Similarly 128 (64%) of the respondents are males while 72 (16%) are females. On the level of students 107 (53.5%) are in 300 level or their final year 61 or 30.5 in 200 level and 32 (16%) in 100 level. The number of students from the school of Business forms majority which represents 71 (35.5%) followed by schools of Vocation respectively. The number of respondents that uses the internet in the library is 161 (80.5%) which represents majority while 39 (19.5%) did not use the internet facilities at all.

Research Questions

1. When do students use the internet or library facilities to obtain academic information?

Table 2a: Frequency of Library and Internet Use

Time of the day	Library Freq.	%	Internet Freq.	%
Morning	73	36.5	61	30.5
Afternoon	46	23	35	17.5
Evening	81	40.5	65	32.5
Not Applicable	-	-	39	19.5
Total	200	100	200	100

Table 2 shows that while 73 (36.5%) of the respondents prefers using the library in the morning for academic work while only 61 (30.5%) prefer using the internet facilities, similarly while 46 (23) prefers using the library in the afternoon 35(17.5%) use the internet facility, 81 (40.5%) prefers using the library in the evening while 65 (32.5%) prefers using the internet at the evening and the other 39 (19.5%) did not use the internet facilities at all.

2. Do students use the internet more than the library to obtain academic information?

Table 2b: Frequency of Days Spent in Library and Internet Facility Per Week

Days	Library Freq.	%	Internet Freq.	%
0	0	0	39	30.5
1	20	10	11	5.5
2	81	40.5	74	37
3	69	34.5	49	24.5
4	16	8	15	7.5
5	09	4.5	07	3.5
6	05	2.5	05	2.5

Total	200	100	200	100
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Table 2b shows the results of the days of the week that the respondents spend in searching the library or the internet for academic work. The result show that 39 of the respondents did not make use of internet facilities at all while 20 (10%), 11 (5.5%) use a day, 81 (40.5) and 74 (37%) use 2 days in both the library and internet facilities in searching for information respectively while 69 (34.5%) and 49 (24.5%) use 3 days, 16 (8%) and 15 (7.5%), 9 (4.5%) and 7 (3.5%) and 5 (2.5%) and 5 (2.5%) uses 4 days, 5 days and 6 days respectively to search both the library and internet facilities for information for academic work.

3. How do students access the internet?

Table 3: Students Ways of Accessing the Internet

Options	Frequency	%
Personally	112	56
Help from library staff	28	14
Help from friends	21	10.5
No response	39	19.5
Total	200	100

Table 3 reveal that majority of the respondents which represents 112 (56%) of the respondents can access the internet themselves, 28 (14%) and 21 (10.5%) others opined that they get help from library staff and friends and the 39 (19.5%) did not try to access the net at all.

4. What are the challenges to the students use of the internet?

Table 4: Proportionate Response of Respondents to Challenges on the Use of Internet

Variables	Frequency	%
Slow speed of server	98	49
Distance tot eh library	42	21
Power failure	144	72
Attitude of library staff	23	11.5
System breakdown	118	59
Poor knowledge of usability	40	20
Insufficient work station	101	50.5
Time constraints	55	27.5

Table 4 identified the respondents responses to what they feel are the challenges to their using the library internet facilities. The challenges according to them reveals slow speed of server 49%, distance to the library 21%, power failure 72%, and attitude of library staff 11.5%, other challenges identified are system breakdown 59%, poor knowledge of usability 20%, insufficient workstations 50.5% and time constrains 27.5%.

5. What solutions would you recommend to solving the challenges?

Table 5: Solution to Challenges in Using Internet Facility

Variables	Frequency	%
Upgrading	121	60.5
Organizing internet training	144	72
Installation of generating set	181	90.5
Institutional subscription for some sites	83	41.5
Employing computer engineers	53	26.5
Increasing work stations	177	88.5
Continuous system maintenance	80	40

Installation of library dedicated server	169	84.5
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Suggestions recommended by the respondents on solutions to improving the challenges encountered in making use of the internet facilities in the library reveal that upgrading the speed of the server has (60.5%), organising internet use training (72%), installation of generating set (90.5%), institutional subscription to some sites (41.5%), employing computer engineers (26.5%), increasing work station (88.5%), continuous system maintenance (40%) and installation of a library dedicated server (84.5%).

DISCUSSION OF RESULT

The result of the study indicated that majority of the respondents use internet facilities in the library and that they also access the facilities themselves. This shows that they are knowledgeable in the use of internet facilities. The students prefer using the internet facilities in the morning and evening. This may be at the time when they have free lectures or completed their lectures for the day. The results further reveal some of the challenges in the use of internet facilities in the College libraries as slow speed of server, distance to the library, power failure, attitude of library system, system breakdown, poor knowledge of usability, insufficient work stations and time constrains while some suggestions were also preferred on how this challenges can be solved.

CONCLUSION

The purpose of this study is to investigate the challenges and prospects of using internet facilities in the library of the Federal College Of Education (Technical) Omoku. The study showed that the students makes use of internet facilities in the College Library and the time of usage differs while some prefer using it in the morning, some prefers the afternoon while others prefers evening. Some challenges were also identified as affecting their making use of the internet facilities in the library. These were identified and some solution were suggested by the respondents. The finding here will help both the College Management in taking some vital decisions in improving the internet services in the library and also the respondents to get improved services in the area of challenges identified.

RECOMMENDATIONS

There is need for more work stations to be provided considering the fact that majority of the respondents makes use of the internet facilities themselves. This will allow more users have access the use of the facilities and the time allocation can also be increased to users.

1. Use of internet should be added to the course outline of the introduction of library studies programme. In addition to this a training programme can be organized from time to time to library users on the use of the internet facilities in libraries.
2. The library should be provided with a big standby generator to be used whenever power is off.
3. The library should have its own dedicated bandwidth as against sharing its resources with other units of the College.
4. A computer engineer should be employed to help in the maintenance of the internet facilities in the library.

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ROLE MODELS AND LIFE HISTORIES OF TEACHER TRAINERS AS TOOLS FOR EFFECTIVE TEACHER EDUCATION. A CASE FOR GEOGRAPHY TEACHER TRAINERS, SCHOOL OF EDUCATION, MAKERERE UNIVERSITY, UGANDA

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Abstract

Two hundred (310) undergraduate and postgraduate students participated in this study. The participants were requested to write down the best and worst teachers in their life right from primary to high school which is 14 years of schooling. They had to identify qualities that made that teacher good/and role model and likely to influence their development as geography teachers. Results show that students value and love teachers that are intelligent and have good knowledge of the subject matter, approachable, morally upright, approachable/accessible, honest and guides the students, smartly dressed and presentable. They particularly liked geography teachers that used the environment round the school as a laboratory making the subject real and relevant, used fieldwork as a method of teaching, use of maps, pictures, graphs regularly in class. They particularly hated teachers who sexually abused students, discriminated against dull students, had no teaching aids, didn't mark books, consequently no feedback, no fieldwork in Geography. Through discussions and peer teaching teacher trainees demonstrated their creativity through the teaching methods and materials they used. They promised to continue developing alternative teaching methods and materials for their own professional career development

Key words; Life Histories, Role Models, Teacher Training, Geography

INTRODUCTION

Learning to teach is a matter of learning the technical skills which enable individuals to function effectively in the education system (Elliot 1993). Effective teaching requires knowledge and understanding of the subject the student teacher is going to teach, and learning the curriculum. Teaching students implies exposing the individuals to knowledge and skills as well as practical experience as a basis for professional learning. Training a teacher is collaboration between academics and practitioners in the field. People learn how to teach from watching and imitating others (observation). They learn from experience and reflection (Stuart et. al., 2009; Korthagen et.al., 2006; Taylor et. al., 1997). Teachers also learn through practice, acquiring knowledge and reflecting on their experience (Elliot, 1993; Taylor 1997). Learning about teaching is also enhanced through student teachers doing research on their own practice. This study was based on the constructionist theory of learning which involves students constructing knowledge and skills through the process of reflecting on their past experiences (life histories) and their past and present teachers whom they regard as role models (Vygotsky, 1986). The research focused on the training of Geography teachers in the Department of Humanities and Languages at the School of Education, Makerere University.

A role model, according to Kaahwa (2009), is a person who has qualities that one would like to have. The role model affects a person in such a way that one would be a better person. Role models may be people holding responsible positions in society or may be working people. Teachers acquire explicit images of what it means to be a teacher and use these guidelines to their own actions, often without realizing where the images come from (Stuart et. al., 2009). The society also looks up to the teacher as a role model, a good instructor, disciplinarian, an expert on everything or as a wise counselor (Stuart et. al., 2009). Some teacher trainees remember some teachers very clearly, both good and bad. Such memories may be part of the motivation for one to become a teacher - to copy an admired teacher

- role model (Calderhead and Sharrock (1997). Teachers in society provide leadership, are useful in explaining government policies and documents written in foreign and technical language. Teachers are also at times leaders of social movements like environmental activities, are formal and non formal educationists. These are attributes which make their students look up to them as role models. Pre-service teachers' first role models are their own teachers when they were pupils.

Life histories are experiences of family of learning and being in school. It is these experiences that mould the educational thinking of present teachers. This includes the many varied experiences the pre-service teachers come with to teacher education colleges (Knowles and Holt-Reynolds 1997, Stuart et. al., 2009). The concept "life histories" is sometimes referred to as biographies: "these are experiences of 12 years or more, observing and participating in their learning at school as well as in University classrooms introduce a tension unique to teacher education" page 88. Personal histories are an evidence of accumulation, integration, editing and synthesis across the actors, actions and consequences of multiple experiences to form a cohesive and coherent belief system (Knowles et.al 1997: Ozgun-Koca et.al 2006). Life histories provide an essential foundation for pre-service teachers' knowledge of classrooms, teachers, students and instructions which they use to think about the values of ideas they encounter as they develop knowledge about teaching (Godson 1989)

This study focused on the training of geography teachers for secondary schools. Ozgun – Koca et.al (2006) argues that teachers' pre-service beliefs about their subject area and its teaching is shaped by their experience as students. This means knowledge of the nature and scope of geography, in this case, the subject specific content knowledge. In the case of Uganda, pre-service teachers bring with them experiences as learners in geography classes from primary school where the subject is encountered as a component of social studies, through secondary school to University. As a result of this experience, strong beliefs about the subject are formed. These experiences influence the way they think through the teaching process, their choice of the teaching career and ways in which they are involved in professional development (Ozgun-Koca et.al 2006; Godson, 1989).

Values of Using Role Models and Life History in Training Teachers

Researchers in teacher education e.g. Knowles and Holt – Reynold 1997; Claderhead and Sharrock 1997; Godson 1989; Korthagen et.al 2006 have identified some of the values of using life histories and role models in training teachers. Below is a list of some the values that have been identified:-

- It is a window into pre-service teachers' perspectives about themselves. It exposes their needs about the process of becoming teachers.
- It reveals the difficulties that prospective teachers experience.
- It is a tool for gauging the effectiveness and relevance of the teacher trainers' instructions and programmes.
- It develops pre-service thinking and writing skills.
- By sharing their life histories, qualities of their role models , teamwork and trust, relationships are developed among the pre-service teachers.
- It is a foundation for action research among pre-service teachers and teacher educators.
- Pre-service teachers will develop a reflective approach to their own teaching based on well thought out personal theories.
- This approach is an essential tool for linking practice and theory (Oztal et al 2009, Tailor 1997)
- Life histories act as a filter by which pre-service teachers judge the work of new ideas, theories and practices as they are presented to them in class. Pre-service teachers lack contemporary classroom experiences as teachers and normally rely on former experiences as students. They use this to project how they will behave as teachers in future.
- It helps teacher educators identify individual differences in the teacher trainees. It helps teacher educators clarify teacher trainees' attitudes/ beliefs and what they bring with them to the class.

THEORETICAL FRAMEWORK

This study was based on the constructivist theory of learning as defined by the Vision project (2004):

“It emphasizes the importance of knowing the students’ cognitive level and misconceptions about what it is to be learnt. It is based on the view that learning is personal exploration and that the teacher must come to some understanding of observation, lines of enquiry and personal cognitive strategies by the students. Most approaches in cognitive of the individual determine how new information is systematically selected, interpreted and finally incorporated into the existing cognitive structure. Constructivist perspectives also suggest that students understand themselves and their surroundings, developing tentative models and individual strategies for problem solving. The recognition of existence of alternative frameworks suggest a conception of the learning process as a conceptual change in which the intuitive misconceptions of students must be replaced, say scientific formulations” (pp 20)

Ozgun-Koca et al (2006) and Tailor (1997) in a similar way emphasize the importance of the constructivist theory of learning in the training of teachers. They argue that it is a learner-centered environment in which past experience of the pre-service teacher is respected. The learners construct their own knowledge by anchoring new information to pre-existing knowledge. Stuart et al (2009) further states that some of this knowledge comes from their own personal life histories, the rest from formal training courses, the schools they teach at and from the wider social and cultural context in which they live. This construction of knowledge is interactive, inductive and collaborative. The teacher educator acts as a facilitator, provides pre-service teachers with a variety of experiences from which learning is built. The process maximizes social interactions between the learners so that they can negotiate meaning to what is exposed to them.

In constructivist teacher education programs there is less emphasis on skills and more on personal knowledge and on thinking skills. Constructivist teaching methods include role plays, debates, reflective journal writings, etc. which are most effective in influencing behaviour change (Mugimu 2009)

Context of Geography Teacher Education at the School of Education

Geography as a teaching subject in the School Education is offered to both Arts and Science students from the faculties of Arts, Science and Faculty of Economics & Management at Makerere University. The Geography department in the faculty of Arts is fully staffed and offers many courses in both human and physical geography. In the faculty of Arts, Education students are normally advised to study content courses which they are likely to teach in secondary schools likely geomorphology, climatology regional papers of Uganda, East Africa and others like Research and practical geography. Education students study geography along with another teaching subject such as Economics, History, Religious Studies, and Biology, in the faculties where they are offered.

In the School of Education, geography teacher trainees are offered professional education courses like: Education Psychology, Foundations of Education and Management and Curriculum and Teaching Media courses. Students in their second and third years of study undertake school practice at secondary schools in Uganda. It is important to note that the majority of professors and lecturers in the Geography department in the faculty of Arts are not necessarily professional teachers; some of them lack a teaching certificate. It is the School of Education which is staffed with lecturers and professors who as a requirement must have a teaching certificate.

As a result of liberalization and privatization of education in Uganda, the numbers of both day and evening students increased four times between 2000 and 2010. As a consequence of this, the classes became larger with typical class-sizes of 200 – 300 students for some courses. The School of Education infrastructure was built in the 1930s to accommodate 20 - 40 students (Kagoda 2011). This has resulted in congestion and lack of adequate teaching materials. Lectures are conducted in dining halls that have the capacity to accommodate such large classes. This uncontrolled expansion was not matched with adequate funding and well qualified teacher educators. Geography is a very dynamic practical subject which calls for a lot of teaching materials and use of a variety of teaching methods (Benoit, 1982). Large classes render it impossible to use a variety of teaching methods and subsequently

only the lecture method is used by lecturers. Teachers in secondary schools graduating from this kind of education system are likely to teach/imitate the way they were trained (Kagoda, 2011).

Statement of the Problem

A quality geography teacher is a product of quality theoretical and practical knowledge and skills the teacher gets exposed to as a trainee while at the University. The School of Education lecturers including geography lecturers still use the traditional methods of training teachers. This old paradigm assumes knowledge is transferred from the instructor to the student. The students are regarded as passive vessels to be filled with knowledge and skills. The instructors believe that their duty is to classify and sort out students. This results in an impersonal relationship between instructors and teacher trainees. Learning turns out to be individualistic and very competitive. Since the instructor is an “expert”, banking/teaching methods dominate in the lecture rooms. Teacher trainees have to memorize what is given to them and then reproduce it in tests/examinations.

This study critically explores how a new paradigm of teacher education can be integrated in the current geography teacher education. The new paradigm assumes that knowledge is constructed by both teacher trainees and instructors. Teacher trainees are constructors, discoverers and transformers of knowledge. The instructor’s role is to develop the competences and talents of teacher trainees: a paradigm that encourages the use of cooperative learning and team work among students and instructors; use of reflective journals/narratives, dialogue and constructivist approach to teacher education (Freire, 1972; Nevin et. al., 1995). This approach creates a learning environment which is diverse in culture and community. It develop self esteem making it relevant to the teacher trainees.

Purpose

The main purpose of this study was to explore the use of role models and life histories in the training of geography teachers.

Objectives

1. To explore the personal experiences and role models of the geography teacher trainees.
2. To discuss and think through teacher trainees attitudes and beliefs in light of the contemporary context of theory and practice of teaching.
3. To guide students try out new classroom practices and experiment with new behaviour and new methods.

METHODOLOGY

This study was carried in the School of Education, Makerere University in the years 2007 – 2009. Undergraduate and postgraduate geography teacher trainees participated in this study. The method employed to collect data was purely qualitative using narratives written by teacher trainees, class discussions, class presentations and peer teaching. The researcher taught two groups of undergraduate teacher trainees and two groups pursuing a postgraduate diploma in education. A total of 250 undergraduates and 60 postgraduate students participated in the study.

Students writing about their experiences (life history) provides a window into their perspectives about themselves and their needs. It revealed the Teacher Trainees’ (T.Ts) anxiety regarding the process of becoming teachers and the difficulties they face. The teachers were able to write down their memories, attitudes, beliefs, their personality and assumptions without fear. This helped the researcher to identify gaps and understand what needs to be done to help them become teachers. Class discussions were used to deliberately challenge the T.Ts to reflect on their attitudes, assumptions, beliefs and preconceptions about becoming a teacher and the teaching career as a whole. Class presentation helped me to identify individual students’ communication skills, public speaking skills, mannerism, the English language grammar etc. In peer teaching, the teacher trainees either worked as individuals or as a group of two. The T.Ts made lesson plans with objectives, teaching methods, teaching aids and references etc as instructed. Each T.T was given thirty minutes to present the lesson to their peers on a

topic of their choice. Other T.Ts pretended to be students of a class as instructed. Information was collected through observation of the lesson, discussion/critic of the lesson by peers, the T.Ts own narration of his/her experience as a teacher, her/his choices as decisions made in the preparation and presentation of the lesson. The researcher observed at least 10 lessons in each of the undergraduate groups (20 in total.) and at least 5 lessons (10 lessons), of the postgraduate classes which tended to be smaller.

PRESENTATION OF DATA AND DISCUSSIONS

The first objective focused on the personal experiences and the role models of teacher trainees (T.Ts). Listed below are what teacher trainees considered to be attributes of a good teacher (role models):

- Our teacher was knowledgeable, very intelligent in geography content. He used to give us notes.
- The teacher was honest, a guide and counselor. He was cheerful, friendly, kind and sympathetic; inspiring us to work hard.
- He was morally upright, showed authority, competence, decisiveness, energetic, creativity and integrity. He never got involved with mature students.
- He was smart, decently dressed with good shoes.
- He used descent language and commanded respect from the students.
- He interacted with parents which helped him deal with individual problems of students.
- He participated in community activities.
- He worked closely with parents when going for fieldwork.
- Used to work in a team with other teachers.

Since the teacher trainees were asked to reflect on their life from primary, secondary schools and university, the above attributes appear to be general in character. Teachers perform many functions; they are role models even in the community where they live. Teachers who are intelligent, honest, morally upright and approachable are loved by students. Stuart et. al. (2009), however, argues that students may not know why teachers behave the way they do. On that note, the good teacher is also prescribed by society. Society judges a teacher's character which also influences their children's attitude toward a particular teacher. A postgraduate student adds: "in the field of education a teacher is supposed to be a good role model in both eyes of his/her students and the society as a whole". Working closely with parents as well as teaming up with other teachers in the school is what Apple (1995) describes as democratic behaviour in schools. Democracy here means allowing all stakeholders in a school to participate in the running of schools and the children's learning. One of the most important functions of teachers is to be a counselor to the students they teach. They also have a duty to help parents understand the curriculum being followed in schools and how the students can be helped to learn right from their homes.

There were responses made specifically to geography teachers, considered to be their role models.

- The geography teacher used good teaching materials; maps, pictures, graphs, specimen, charts and many others to help us understand.
- He used fieldwork in senior five many times; this helped us develop skills like collecting data through interviewing, observing nature, and drawing sketches.
- She used to do extensive research to be up-to-date using the internet, attending workshops, and conferences.
- Used the environment as a geography laboratory to teach facts. This made geography real. We learnt about soils, swamps, forests and the water bodies.
- Encouraged us to form discussion groups and to carry out extensive research.
- The teacher used a variety of teaching methods, question and answer, chalk and talk, lecture method.

- The teacher encouraged us to join school clubs like environment protection clubs, geography club, wildlife club, debating clubs and many others.

Developing research skills, reading skills, observation skills, recording data and its analysis is very good for geography students. Working in groups is a foundation for cooperative learning where weak students are helped by the sharing of information (Nevin 1995). The T.Ts here experienced geography in its reality by using field work especially in the environment near the school. The T.Ts, however, do not mention geography text books which are up-to-date. Relevant geography text books are rare or unavailable from Ugandan schools even in university. Use of computer/e-learning is limited to a few top schools in the country. At university, there are computer labs but they are not yet used for teaching. It is also interesting to note that the “variety of methods” mentioned are “banking” methods, and this is what they have experienced throughout their life. The severe shortage of teaching materials including text books, the examination oriented systems of education and congestion in lecture rooms renders learner centered methods impossible and time wasting to both teacher educators and T.Ts.

Responses of teacher trainees of teachers regarded as poor role models include:-

- The teachers used to beat us in both primary and secondary schools.
- Inadequate illustrations and teaching aids; for map reading and photographic interpretation, lack of update text books, pamphlets are also outdated with many mistakes. This made geography difficult to us and many hated it.
- Teachers discriminated against dull students in favor of bright ones.
- Teachers were persistently absent; used old outdated notes. Notes were given without explanations.
- Geography teachers were poorly dressed, wore gumboots or bathroom sandals instead of shoes; used to make us clean the chalkboard with handkerchiefs.
- Sex abuse, drunkenness, dishonesty were some of the characteristics of the geography teachers in our schools.
- There are no good books in the book banks at the university. Students reproduce lecture notes in the examinations/tests.
- There are no geography rooms/laboratories in secondary schools. There are no newspapers for students, no computer labs which are easily accessible.
- No marking, no feedback, no corrections, geography teachers go ahead to discourage students about the mathematics in geography.
- The teaching profession is essentially service to the citizens and therefore calls for commitment if one is to be a good geography teacher.

Corporal punishments, although abolished in schools, is secretly used in schools especially if students are not performing to the expected standards. This sometimes makes teachers discriminate against dull students and move on with bright ones. Uganda being one of the poorest twenty five countries in the world, explains why teachers are busy looking for money elsewhere instead of regularly attending to their students (Kagoda, 2011). Geography as a subject of study is poorly conducted in both secondary schools and university as (as mentioned above). The image of a geography teacher and the language used in class also influences the attitudes of teachers toward the subject which appears to be difficult to students. The scientific aspect of geography if not well handled will discourage students. A post graduate diploma student offering geography at a post graduate diploma level adds on;

“most geography teachers in secondary schools are not qualified teachers. This causes students not to understand their teaching process. They lack proper handwriting on the blackboard, use lecture method, dress poorly which consequently causes students to fail”

Another postgraduate student added; *our teachers in secondary and at Makerere University teach their students in an environment which cannot win the attention of the learners. Teachers therefore need to consider the factor of environment when choosing places as classroom and such an environment should not have objects which can attract the attention of the learners.*

Those two graduate teacher trainees were already teaching in two different poorly resourced schools and not likely to have well qualified teachers who tend to expensive in terms of salary. Secondly remote schools (far from urban centers) do not normally attract well qualified teachers (Kagoda 2011)

The second objective was to guide teacher trainees discuss and think through their attitudes and beliefs in light of the contemporary contexts of theory and practice of teaching. Students were asked to read aloud their narratives in class after which a discussion of their presentation followed.

Issues Arising Out the Discussion Follow Below;

- Students were not aware of the value of learner centered teaching methods. They believed that a teacher who gives team marks to enable them pass examinations is a “good” teacher.
- Fieldwork projects were examinable at a national level (Uganda National Examinations Board UNEB). Some teacher trainees never experienced field work at school but their geography teachers provided them with facts to use in the external examinations. Teacher trainees therefore do not know the value of fieldwork in geography education.
- Teacher trainees believe a good geography teacher is one who completes the UNEB syllabus; that is the examination syllabus.
- Interdisciplinary approach to teaching where similar topics are taught together with teachers from other departments is not mentioned by students of mathematics in geography, chemical weathering, etc the scientific aspect of geography is difficult for students of geography.
- Use of computer in teaching geography is ignored by all secondary schools even at University.
- Use of role play, debates, drama, music, cross-word puzzles and a variety of teaching aids made by a teacher using local materials is not mentioned.
- The belief that a teacher is the authority in the subject content and not to be challenged by the students.
- To become a teacher, one needs to learn how to make a scheme of work and lesson plan.

The above may not be exhaustive but it indicates the gaps a teacher educator has to fill while training a geography teacher.

The third objective was to guide students try out new practices and experiment with new behaviour and new methods. The students (TTs) were asked either in a pair or as individuals to write a lesson plan and present it in class through peer teaching. They either pretended to teach O-level or A-Level (S.5 or S.6).

Issues Arising Out of the Peer-Teaching Classes

- Students (TTs) were authoritative in behavior in the sense that they would not allow their students to talk. They wanted complete silence while they dictated notes.
- Some were relaxed and tried out group discussion in teaching. Although it was not well done, at least they tried.
- Knowledge of geography content was just satisfactory, for example one was confused about the origin of the mountains of the East African region. She listed mountain Ruwenzori as a volcanic mountain and resisted criticism.
- Place names and location of places on maps was another weakness of the teacher trainees.
- Very few students developed lesson plans for paper I; Physical geography for A'Level. The reason given by T.Ts was that they were not confident in that area. Another paper they never felt comfortable to teach was the Regional Geography of Uganda.
- One third year undergraduate teacher trainee taught physical geography focusing on erosion using music. The T.Ts were amazed when their colleague went in front of the class with a guitar. He asked the class to repeat after him as he sung the song he composed; focusing on agents of erosion, giving examples of some places in Uganda with prominent features of erosion. He used photographs to show such places he was singing about.
- One teacher trainee used field work method of teaching. We were made to get out of the class and went round the university lecturers' residences to the play ground through the retail shops of

Kikoni outside the university fence. She made a survey of the place to be visited, noted features to be studied, and informed the shopkeepers about the visit. This was not the usual fieldwork trips normally carried out in some of the secondary schools.

The teaching materials – below are few examples of what happened in the peer teaching classes.

- Four students photocopied passages which the students read aloud in class and later answered questions developed by the teacher trainees.
- One teacher trainee brought a fishing basket used by fishermen in the swamps and other shallow waters in rivers and lakes of Uganda. I myself had never seen a fishing basket and so I had the opportunity to learn from my students. She eventually demonstrated how it is used.
- One teacher trainee made traditional canoes used in fishing by fishermen using banana fibers. It was amazing.
- One T.T made a soil profile using an empty water bottle.
- Another one made a cross-word puzzle to teach senior two about the farmers calendar in one of the regions of East Africa.
- Others used clay to teach about the river profile.

The researcher was overwhelmed by the creativity of the teacher trainees in the aspect of teaching aids. This is lacking in most of the secondary schools in Uganda. The teacher trainees promised to try out this kind of creativity and become facilitators in class instead of being authoritarians. After observing each class, the teacher trainees criticized the lesson and this improved on the subsequent presentation. They scrutinized the topics, the objectives, the references if any and the teaching aids. They also focused on the undesirable mannerism as the T.Ts presented. The introduction of the lesson and the conclusions were also discussed. By the end of the lesson the presenters gained confidence instead of loosing hope, they became empowered as more and better lessons were presented.

CONCLUSIONS

Teachers who are knowledgeable, confident, approachable, honest, morally upright are admired by students as well as the community where the school is situated. Teachers who are punctual at school, guide and counsel students, are hard working and enthusiastic about their job are also described as being good by the teacher trainees interviewed. Geography teachers who used a variety of teaching methods, many teaching materials, and used fieldwork were an inspiration to teacher trainees.

Use of corporal punishments, sexual abuse, drunkenness, absenteeism, refusal to mark tests, lack of feed back etc were attributes of a poor role model according to teacher trainees. Discussions with teacher trainees reveal that they are not aware of alternative methods of teaching apart from the teacher-centred methods of lecture, question and answer and chalk and talk.

The teachers believed that fieldwork in geography was good as it allowed them to see places as an excursion exercise.

Networking with other subject teachers, teamwork and other interdisciplinary activities like joint debates, fieldwork are considered not of value.

Use of computer in teaching geography has not been practiced in their learning experience in secondary schools up to university. None of the students placed any value to it.

The belief that a teacher is an authority and not to be challenged by the students is strongly embedded in the teachers beliefs.

The Teacher Trainees Teaching Practices in Class (Peer Teaching)

It was revealed in the exercise that:

- Teacher trainees have positive attitude towards “new” practices they were exposed to. They were creative and confidently tried out new methods of teaching like use of music, fieldwork, cross-word puzzles, and debates; methods not normally used by geography teachers. Teacher trainees confidently made a variety of teaching materials.

- It was revealed that some students were not confident in teaching physical geography, map work, photograph interpretation and the regional geography of Uganda. Reasons given were lack of textbooks which are up to date, lack of teachers who confidently teach in schools and fear to fail.

RECOMMENDATIONS

There are gaps in the teacher training perception of becoming a teacher. Teacher Trainees have attitudes and beliefs that need to be explored by teacher educators in all subject areas for purposes of demystifying the process of becoming a professional teacher. Teacher educators need to try out alternative methods of training teachers which are more learner-centered. Such methods should enable teacher trainees create their own knowledge like construction, cooperative learning and teaching. Teacher trainees have the potential to become good and empowered teachers if they are given the opportunity to do peer teaching and made to develop their own teaching aids. This will stop the usual lamentation that there are no teaching aids in schools.

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OPTIMAL PLACEMENT AND SIZING OF A DISTRIBUTED GENERATOR IN A POWER DISTRIBUTION SYSTEM USING DIFFERENTIAL EVOLUTION

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Abstract

Centralized generation of electricity based on bulk power planning pose many economical and environmental challenges, the best alternatives to overcome these challenges is to introduce distributed and dispersed generation, which can be conveniently located closer to load centers. There have been many studies, to define the optimal locations of distributed generation. In this paper, Differential Evolution approach is used to find the optimal location and size of a Distributed Generation (DG) unit. The DG sources are added to the network to mainly reduce the power losses and improve the voltage profile by supplying a net amount of power. The feasibility and effectiveness of the tool has been demonstrated on IEEE 33 bus radial distribution system consisting of 32 sections. MATPOWER and MATLAB software were used for simulation. The result revealed that the system losses have been reduced by 47.3934 percent for the installation of one DG. The nodes violating the voltage limits reduced to 3 from 18 and the sum of square of voltage error dropped to 0.02968 from 0.1369 p.u.

Keywords: Distributed Generation, Real Power, Loses, Reactive Power, Optimization, Voltage, Nodes.

INTRODUCTION

Centralized generation of electricity based on bulk power planning methodology require large facilities, including land and personnel needed to operate and high capital cost. Moreover, since these big power stations cannot be constructed closer to load centers for some obvious reasons, there was a need for long extra high voltage or ultra high voltage transmission line, including transmission sub stations. Similar to power station, these transmission lines and sub stations need an ample amount of money in design, construction, operation and maintenance. The lengthy structure of the transmission line makes them vulnerable to natural hazards such as heavy wind, rain storms and lightning. These natural hazards, in some case become the major reason for partial or full black out of the power system triggered by some line outages. These conditions added with economical and environmental pressures have in the recent past, been changing the generation approaches of traditional electric power utilities. Some of the economical and environment factors associated with large power plants are environmental impacts, transmission right of way problems, high investment and long term planning, land requirement for power plant construction and resettlement, to overcome the economical and environmental factors associated with large power plants, one of the best alternatives for change in the traditional way of generation and delivery arrangement is to introduce distributed and dispersed generation, which can be conveniently located closer to load centers (Mithulananthan et al, 2004).

Distributed generation is not a new concept. If one looks back on the evolution of the electric power industry, electricity was introduced as an alternative for steam, hydraulics, direct heating and cooling which were produced near the point of consumption in a small scale. The main idea behind the Distributed Generation is that generation is small scale, which can be easily placed closer to the point of consumption. Various advantages and the climate of the current electricity business, strongly favour the application of DGs. However, there are many issues that need to be considered before allowing the Distributed generators to operate in power systems, in large numbers.

Given the choices, where would the DG be placed in the system to enjoy maximum technical benefits such as low losses, higher reliability, increase in load ability, and better voltage profile. Climate change has thrust energy production to the top of the political agenda. The developed and developing world is currently dominated by centralized electricity generating system, which is the embodiment of technological inertia, performing little better today than it did in the 1970s. This centralized system is wasteful and environmentally damaging (NPO, 2007). Nigeria, like every other developing country, most of its power plants are more than 20 – 35 years old and will need to be replaced in the nearest decade or so, offering an opportunity to move towards a more suitable system which protects the climate and provide future generations with secure energy. The trends, globally is towards ‘Distributed Generation’ DG.

This paper proposed a Differential Evolution technique for the optimum placement and sizing of a DG in a distribution network the technique will minimize real power losses and improve system voltage profile.

Problem Formulation

This paper intend to explore decision making techniques to determine the optimum sitting and sizing of distributed generation in an established distribution power network. The decision making technique is to be based on meta-heuristics optimization technique employing differential evolution. A real power loss and voltage profile analysis is to be evaluated for the system with and without DG. The real power loss reduction in a distribution system is required for efficient power system operation. The loss in the system can be calculated using eqn. (1) (Witchit and Ongasakul, 2007), called the ‘exact loss formula (Elgerd et al, 1971) given the system operating conditions. Mathematically, the objective function can be written as (Edward et al, 2004)

$$\text{Minimize } P_L = \sum_{i=1}^N \sum_{j=1}^N \{ [\alpha_{ij}] (P_i P_j + Q_i Q_j) + \beta_{ij} (Q_i P_j + P_i Q_j) \} \quad (1)$$

Where,

$$\left. \begin{aligned} \alpha_{ij} &= \frac{R_{ij} \cos(\delta_i - \delta_j)}{V_i V_j} \\ \beta_{ij} &= \frac{R_{ij} \sin(\delta_i - \delta_j)}{V_i V_j} \end{aligned} \right\} \quad (2)$$

P_i and Q_i are net real and reactive power injection in bus ‘i’, respectively

R_{ij} is the resistance between buses ‘i’ and ‘j’

V_i and δ_i are the voltage and angle at bus ‘i’ respectively

Subject to power balance constraints:

$$\sum_{i=1}^N P_{DG_i} = \sum_{i=1}^N P_{Di} + P_L \quad (3)$$

$$\text{Voltage constraints: } |V_i|^{\min} \leq V_i \leq |V_i|^{\max} \quad (4)$$

$$\text{Currents Limits: } |I_{ij}| \leq |I_{ij}|^{\max} \quad (5)$$

Where,

P_L is the real power loss in the system

P_{DG_i} is the real power generation of DG at bus i

P_{D_i} is the power demand at bus i

I_{ij} is the current between buses i and j

Related Works

A survey of the literature shows that there is no consensus in the definition of DG (Pepermas et al., 2003; Zareipour et al., 2004; Mahat et al., 2006; Sedighizdeh and Rezazadeh, 2008). For the integration of distributed generation into distribution network, several literatures have proposed the use of different optimization techniques. The optimum placement and sizing is done to achieve different objectives. In (Benemar et al., 2006), evolutionary programming with the objective of maximizing the reduction on the load supply costs was used. In (Witchit and Ongsakul, 2006), Particles Swarm Optimization (PSO) was used for optimal placement of multi-DGs, with the aim of minimizing the total real power loss. Similarly, (Jahanbani et al., 2007) proposed a PSO technique with the same objective as above. The improvement in the voltage profile with this technique was presented. (Siano et al., 2007) proposed the combination of Genetic Algorithm (GA) and Optimal Power Flow (OPF) to efficiently site and size a predefined number of DGs. This differs with other proposed methods that only define the optimal locations and capacities of DG as a means of ensuring that the maximum amount of DG can be connected to existing and future networks. Other literature sources on GA optimization technique with the aim of reduction of losses and improve voltage profile are proposed in (Sedighizadeh and Rezazadeh, 2008; Deependra et al., 2007; Mithulanathan et al., 2004; Hasesen et al., 2005). In (Devi and subranmanyam, 2007), the use of Fuzzy Logic for optimal DG unit placement for loss reduction was proposed. The use of analytical approach was presented in (Mahat et al., 2006).

In (Kumar and Goswami, 2009) a Genetic Algorithm based approach was used for optimal allocation of distributed generations in power systems for voltage sensitive loads. (Ajay et al., 2008) used analytical approach for sizing of DG unit operated at optimal power factor to reduce losses in radial distribution. DE has been applied in a number of engineering problems. In power engineering DE has been used to solve generation planning problems (Kannan et al., 2003); capacitor placement problems (Chiou et al., 2004); distribution network reconfiguration problems, (Chiou, et al., 2005); and induction motor identification problems, (Ursem and Vadstrup, 2003), etc. In this particular research, the application of DE for optimal placement and sizing of DG in a power distribution system was carried out.

Modelling of DG Units

DGs can be divided into two parts from the energy source view point. One is non renewable energy including cogeneration, fuel cells and micro turbine systems and the other is renewable energy including photovoltaic, wind, geothermal, biomass and so on.

A constraint for DG source, similar to central generation, is active power constraint. It can be formulated as:

$$P_G^{\min} \leq P_G \leq P_G^{\max} \quad (6)$$

The reactive power output of DG units is also important and must be considered. Small and medium sized DG units mostly use asynchronous generators that are not capable of providing reactive power. Several options are available to solve this problem. On the other hand, DG units with a power electronic interface are sometimes capable of delivering a certain amount of reactive power (Pepermans et al, 2003). These interfaces or power converters can generate and inject reactive power (Q) to the network, but ratings of elements increase. The reactive power generation of DG units which use synchronous generators, depends on reactive power control strategy. There are two control strategies for this group. Constant Q/ constant power factor mode, Voltage regulated mode.

Considering this point, the bus connected to the DG can be modeled as PQ or PV bus, depending on control strategy.

DG Type 1

Certain type of DGs like photovoltaic will produce real power only. To find the optimal DG size at bus 'i', when it supplies only real power, the necessary condition for minimum loss is given by:

$$P_i = P_{DG_i} - P_{D_i} = - \frac{1}{A_{ij}} \sum_{\substack{j=1 \\ j \neq i}}^n [(A_{ij}]P_j - B_{ij} Q_j) \quad (7)$$

From equation (7), we obtain the following relationship:

$$P_{DG_i} = P_{D_i} - \frac{1}{A_{ij}} \sum_{\substack{j=1 \\ j \neq i}}^n [(A_{ij}]P_j - B_{ij} Q_j) \quad (8)$$

Equation (8) gives the optimal DG size for each bus so as to minimize the total real power loss. Any size of DG other than P_{DG_i} placed at bus i , will lead to a higher loss. This loss however is function of loss coefficient A_{ij} and B_{ij} . When DG is installed in the system, the values of loss coefficients will change as it depends on the state variable voltage and angle.

DG Type 2

For synchronous condenser DG, it provides only reactive power to improve voltage profile. To determine the optimal DG placement, we again differentiate the loss equation on either side with respect to Q_i . The optimal DG size for every bus in the system is given by equation (9)

$$Q_{DG_i} = Q_{D_i} - \frac{1}{A_{ij}} \sum_{\substack{j=1 \\ j \neq i}}^n [(A_{ij}]Q_j - B_{ij} P_j) \quad (9)$$

DG Type 3

Here we consider that the DG will supply real power and in turn will absorb reactive power. In the case of the wind turbines, induction generator is used to produce real power and the reactive power will be consumed in the process (Ermis et al, 1992). The amount of reactive power they require is an ever increasing function of the active power output. The reactive power consumed by the DG wind generation in simple form can be given as in equation (10), (Mahat et al., 2006).

$$Q_{i,DG_i} = - (0.5 + [0.004P]_{i,DG_i}^2) \quad (10)$$

The loss equation will be modified. After following the similar methodology of the two types, optimal DG size can be found by solving (11)

$$0.003 A_{ij} P_{DG_i}^3 + P_{DG_i} [1.004 A_{ij} + 0.08 A_{ij} Q_{D_i} - 0.08 Y_i] + (X_i - A_{ij} P_{D_i}) = 0 \quad (11)$$

Equation (12) gives the amount of real power that a DG should produce when located at bus 'i', so as to obtain the minimum system loss whereas the amount of reactive power that it consumes can be calculated from equation (12).

Load and Feeder Model

The distribution feeder model adopted is shown in Fig.1, as suggested in (Siano et al., 2007) , which allows the installation of loads and generation in all buses. Each branch has the following properties: origin bus, destiny bus, impedance per unit length, apparent power installed, and load power factor. The model chosen is the constant power one. There can be a load ($\mathbf{P_L + jQ_L}$) and a power generation ($\mathbf{P_G + jQ_G}$) in any bus. The substation is the feeder swing bus, while all the others, including those where generators are found, are PQ buses, with active and reactive powers specified and voltage to be determined. The reactive power generated by the unit installed at the i^{th} bus must be such that:

$$(12) \quad Q_G^{\min} \leq Q_G \leq Q_G^{\max}$$

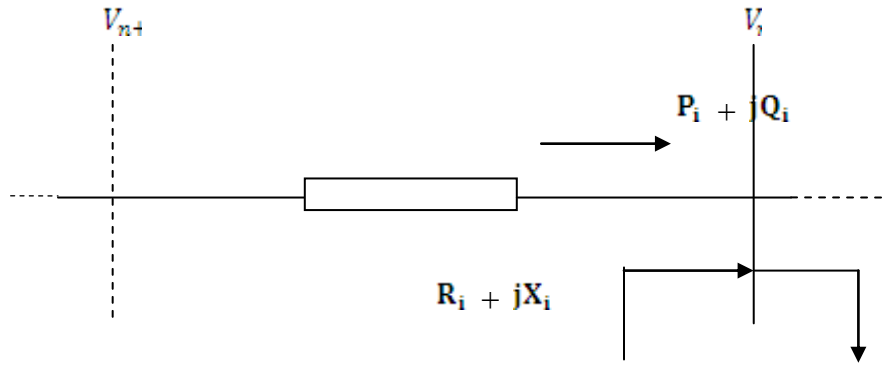


Fig 1: Feeder model

Realization of DG Based DG Placement And Sizing

The optimal placement and sizing of distributed generators in a power distribution system can be achieved using the following procedure:

Step i: At the initialization stage, relevant DE parameters such as maximum generation, gen^{\max} number of control, D, population size, np, scaling factor for mutation, F, and cross over rate, CR, are defined. Also, power distribution system data required for computation process are actualized from the database.

Step ii: Run the base case Newton Raphson load flow using MATPOWER package version 3.0 to determine the initial bus voltage, and active power losses respectively.

Step iii: Each control device of the possible location and the active power are treated as parameters for optimization. Then randomly generate initial population comprising the parameters within the parameter space. The objective function for each vector of the population is computed using equation (13);

$$f_{obj}^n = 1 + P_{loss} + \sum |(v_i - v^{lim})^2| \quad (13)$$

Where

$$v^{lim} = \begin{cases} V_i^{\max} & \text{if } V_i > V_i^{\max} \\ V_i^{\min} & \text{if } V_i < V_i^{\min} \end{cases}$$

Step iv: Update the generation count.

Step v: Perform mutation, cross over, selection and evaluation of the objective function as described in iii.

Step vi: If the generation count is less than the preset maximum number of generations, go to step IV otherwise.

Step vii: With the optimal size and location of DGs, run the final load flow to obtain the final voltage profile and the corresponding system active power loss

SIMULATION RESULTS AND DISCUSSIONS

In order to see the best location of DG in the distribution system with the view of minimizing the total real power losses, the differential evolution algorithm was used. Also, an IEEE 33 bus radial distribution system consisting of 32 sections shown in Fig. 2 is used in order to demonstrate the effectiveness and feasibility of the techniques.

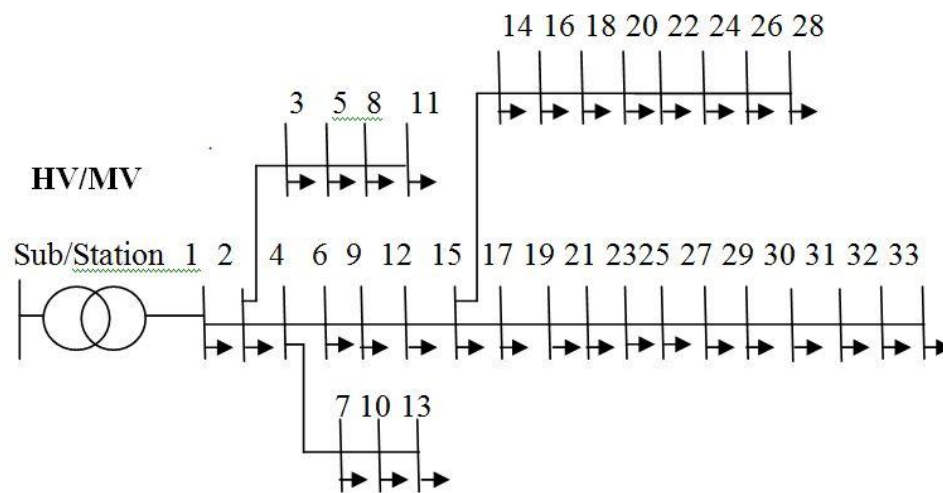


Fig 2: Single line diagram of the 33-Bus Radial Distribution System

The DE parameters were varied according to the scenarios in Table 1 to see which scenario is the best. The algorithm reached a stable (optimum) solution with 30 iterations as depicted in Figures 3 – 8 below, and the corresponding detailed outputs are given in Table 2.

Table 1: Different DE Parameters Setting.

Scenario	Number of population members (np)	Iteration maximum (itermax)	DE-Step size (F)	Cross over probability constant (CR)
1	20	30	0.4	0.5
2	30	40	0.5	0.6
3	40	50	0.6	0.7
4	50	60	0.7	0.8
5	60	70	0.8	0.9
6	70	80	0.9	1.0

Table 2: Best Placement, Size and Power Losses

Scenario	Best location	DG size (MW)	Initial power loss(kW)	Final power loss(kW)	%Power loss reduction
1	NODE	2.6022	221.4346	116.4912	47.3925

	12				
2	NODE 12	2.5778	221.4346	116.4919	47.3922
3	NODE 12	2.5984	221.4346	116.4901	47.3930
4	NODE 12	2.6109	221.4346	116.4948	47.3908
5	NODE 12	2.5903	221.4346	116.4892	47.3934
6	NODE 12	2.6017	221.4346	116.4910	47.3926

Table 3: Ssve and Number of Nodes Violating Limits

Scenario	Initial	Initial	Final	Final
	Ssve (p.u)	No of nodes Violating limits	Ssve (p.u)	No of nodes Violating limits
1	0.1369	18	0.02968	3
2	0.1369	18	0.02968	3
3	0.1369	18	0.02968	3
4	0.1369	18	0.02968	3
5	0.1369	18	0.02968	3
6	0.1369	18	0.02968	3

According to the outputs of the six scenarios, which are presented in table 2 and 3, the initial power loss of the test system which is 221.4346 kW reduced to 116.4892 kW which is 47.39% percent of the initial loss. The nodes that violate the voltage limit dropped from 18 to 3 signifying the voltage profile has fall within the maximum and minimum limits. The sum of square of voltage error also reduced to 0.02968 from 0.1369 p.u. The corresponding DG size is 2.5903 MW to be located at node 12. Compared with the remaining five scenarios, scenario 5 is the best in terms of the power loss. For the sum of square of voltage error and the number of nodes violating voltage error, it is the same for all the scenarios. The convergence characteristics and the voltage profile before and after allocation of DG for the above scenarios are shown in the figures 5 - 10.

Fig 2b: Convergence Characteristics for Case 1

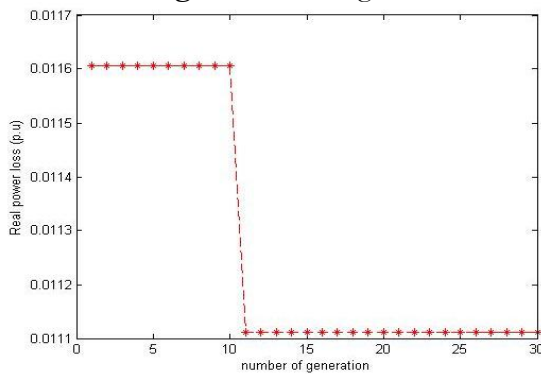


Fig 2b: Convergence characteristics for case 1,

Fig 3: Convergence Characteristics for Case 1, Scenario 2 of the 33bus Test System

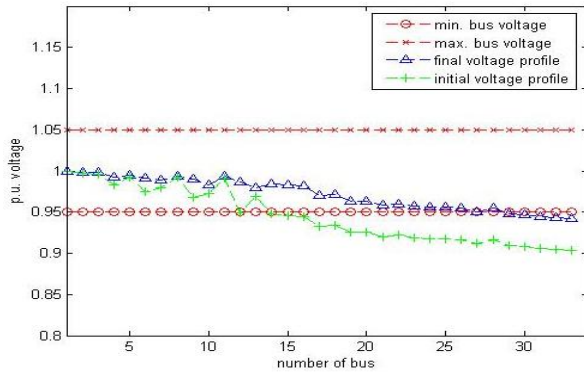


Fig 4: Voage Profile for Case1, Scenario 2 of the 33bus System

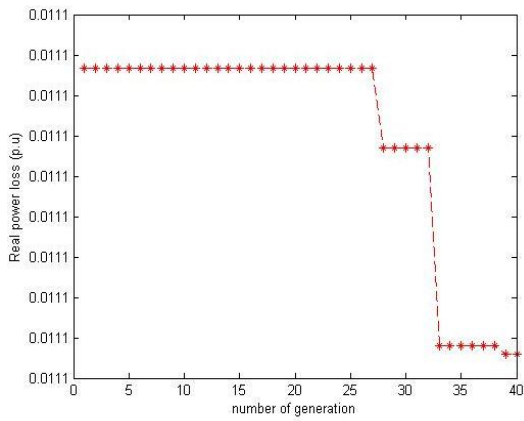


Fig 5: Convergence Characteristics for Case 1, Scenario 3 of the 33bus Test

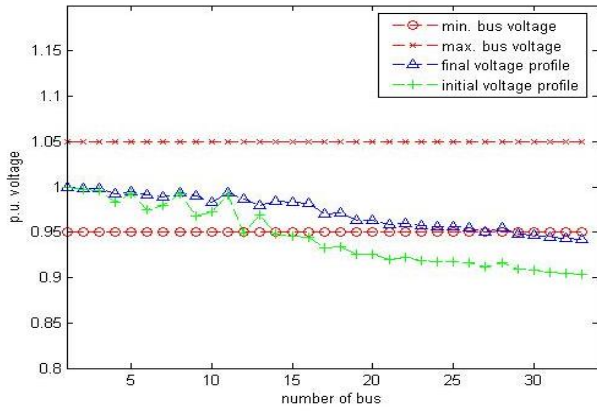


Fig 6: Voltage for Case1, Scenario 3 of the 33bus System

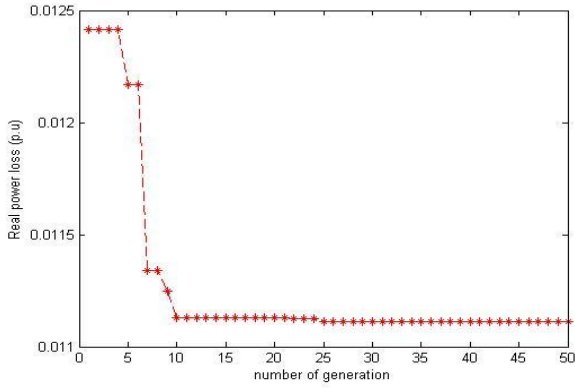


Fig 7: Convergence Characteristics For Case 1, Scenario 4 of the 33bus Test System

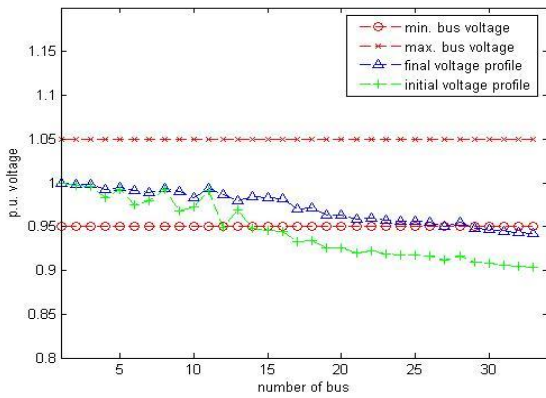


Fig 8: Voltage Profile For Case1, Scenario 4 of the 33bus System

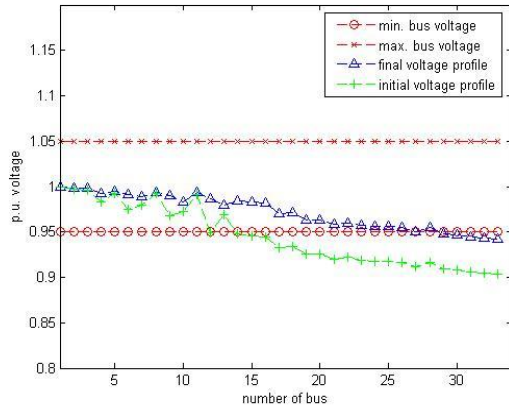
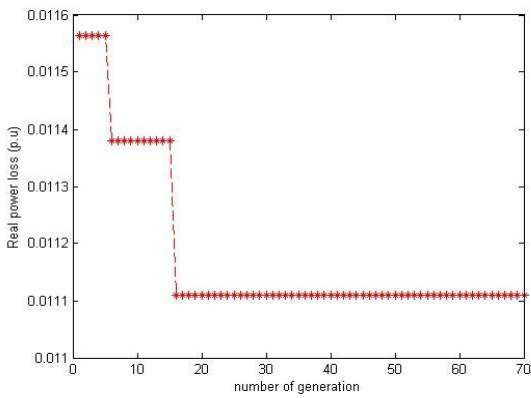
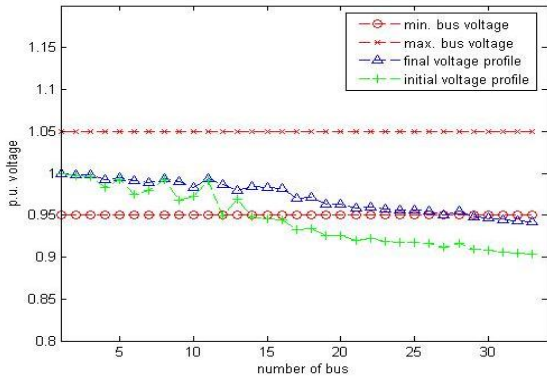
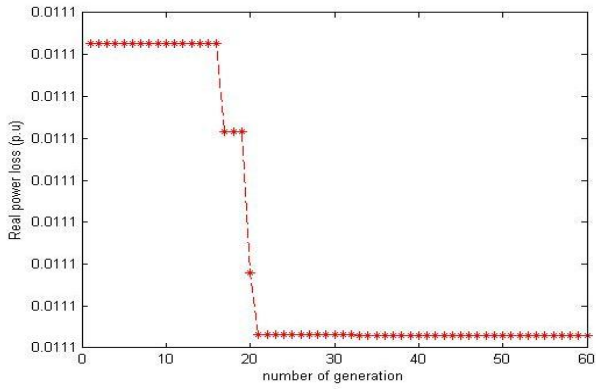


Fig 10: Convergence characteristics for case 1, scenario 5 of the 33bus test system

Fig 11: Voltage profile for case1, scenario5of the 33 bus system

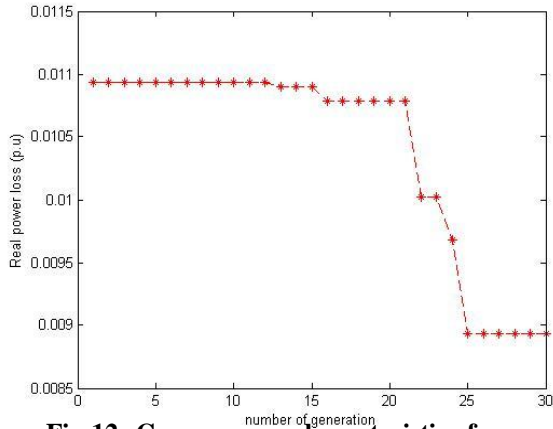


Fig 12: Convergence characteristics for case 1, scenario 6 of the 33bus test system

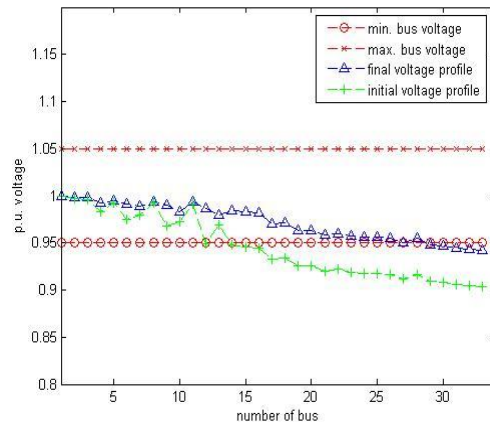


Fig 13: Voltage profile for case1, scenario 6 of the 33 bus system

CONCLUSIONS

An extensive review of the DG technologies and their placement and sizing in a power distribution system using differential evolution with the view to reduce real power loss and improvement of voltage profile was carried out. The advantages and disadvantages of the differential evolution algorithm have been reviewed. The feasibility and effectiveness of the developed tool has been demonstrated on IEEE 33 bus radial distribution system consisting of 32 sections. The study revealed that the proper placement and size of DG units can have a significant impact on system loss reduction and voltage profile improvement. It also revealed how improper choice of size would lead to higher losses

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INTERNATIONALISATION OF HIGHER EDUCATION IN EUROPE: ITS MEANING AND APPROACHES

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Abstract

Since the European unification project started in the 1950s, rules, regulations and policies have been formulated by the European Union (and its predecessors) to facilitate the mobility of products and people; internationalisation are examined, along with its relationship to terms such as globalisation .Sometimes, the terms are used interchangeable and are related but not the same thing. There is fundamental difference and at the same time dialectical link between them. This paper analyses the meaning, definition, rationales, and approaches of internationalization based on relationships between nations and their institutions. It outlined the different road internationalisation has taken.

Keywords: internationalization, globalization, *mobility*, nations, institutions

Introduction

Massification of the student flow and its bipolar nature (the dominance of the United states in the Western bloc and of the Soviet Union in the Communist bloc) were the main characteristics of international dimension of Higher Education in europe in the 1960s and 1970s. The open door and *laisser-faire* policy and the one way dimension were the other characteristics of the process of internationalisation of higher education, at a global level and and in europe in particular. However, the 1980s produced four distinct changes, first in the open door mobility of individual students, second in the development of a research and development policy for the EC , third in student mobility as an intergrated part of study, and fourth in the widening of scope to other regions: third countries in western europe, central and eastern europe, third countries outside europe, and development co-operation.

European universities have always had a wide range of international contacts and academic collaboration with partner institutions around the world. However, in the past decade the development of a European Higher Education Area (EHEA) has led to an accelerated ‘Europeanisation’ characterised by strategic and more structured networking and cooperation among European universities. With the consolidation of the EHEA came the realisation that Europe is increasingly attractive globally, both as a study destination and a partner for exchange. Today, ‘internationalisation’ beyond Europe has become a strategic goal of European governments and universities, and practically all institutions and countries provide offers for international students and reflect on their interaction with the wider global academic community.

In order to support these developments, in 2006 EUA launched its International Agenda, which puts high emphasis on policy dialogue and partnership. It considers the international perceptions of European higher education, and strives to ensure that international academic cooperation is based upon a community of interests that respects and fosters academic values and cultural diversity.

Under this strategy, EUA seeks to:

- create opportunities for dialogue with international partners in order to promote the attractiveness of Europe and to keep abreast of international developments affecting higher education institutions worldwide
- undertake project work with members and international partners to explore critical global issues in higher education
- relate the European experience in higher education integration to other regions
- promote inter-university cooperation by providing a forum to members for forging institutional alliances and partnerships, supporting universities to respond to global challenges and position themselves internationally.

Ever since, EUA has closely monitored European and international policy processes linked to internationalisation, and has also fostered dialogue and cooperation relations with its sister organisations, i.e. national and regional university and rector associations and networks in other parts of the world.

Internationalisation: Policy Framework

One of the core objectives of the Bologna Process was to render Europe more attractive internationally. This has, in many ways, been accomplished, as the EHEA has drawn considerable attention from the rest of the world. Simultaneously, countries and institutions in Europe have increasingly promoted themselves as study destinations and academic partners with high quality offers. In recent years, EUA has been active in explaining and promoting the European reforms to partners in other parts of the world, and has also contributed to the discussions on European internationalisation.

In addition, EUA is part of the BFUG (Bologna-Follow-Up-Group) working group on the Global Dimension/ International Openness, particularly with regards to the objectives of policy dialogue and cooperation with other world regions. As a result of this work, in 2007 at their London meeting European Ministers launched the “strategy of the Bologna process in a global setting”

In the late 1960s the internationalisation of higher education was still a rather restricted phenomenon in Europe. Although, since those days, the transnationalisation of higher education has become one of the priorities in educational policy, in particular but not exclusively thanks to ERASMUS and other EC programs, internationalisation in the sense of institutional change is still in an initial phase. And the changes are taking place in an uneven and piecemeal way. Internationalisation of higher education in Europe will still have to overcome enormous obstacles in reaching a stage in which it is no longer an ad hoc phenomenon imposed upon higher education from the outside, but a natural and integral part of its mission, its plans, and its academic programs.

In general terms, we define internationalisation as the complex of processes whose combined effect, whether planned or not, is to enhance the international dimension of the experience of higher education in universities and similar educational institutions (Teichler,1986). Formal definitions aside, the perception and definition of internationalisation is influenced and to a large extent constructed by the role and viewpoint of the various stakeholders in education: the European Commission, government, the private sector, institution, faculty, and student.

For an understanding of the European situation, it is important to recognize the diversity of routes through which the concept of "inter-nationalisation" is emerging and coming to be recognized as an accepted goal for institutions, governments, and national or regional academic structures. The process is far from uniform

or consistent; and in some national systems of higher education the idea of internationalisation as a process does not fit easily or naturally. The emergence of explicit strategies for internationalisation, visibly supported by policy statements and the commitment of resources, is only part of the picture and takes place under many different circumstances and imperatives.

Research on internationalisation of higher education in Europe is even more recent and fragmented than internationalisation in itself. Much existing research focuses on student mobility as the most accessible and quantifiable index of internationalisation, at the expense of less readily researchable but equally significant indicators such as curricular and organizational change. While the tradition of research into academic mobility and international education is longer and more established in the United States, much of it is of limited relevance to Europe. As Teichler notes: In European countries, research on academic mobility was undertaken only on a very small scale prior to the 1970s and addressed almost exclusively issues of students and staff from developing countries. Later on a substantial amount of the research available addresses pragmatically the driving rationale of the programs for international cooperation and mobility, initiated by the European Community. Irrespective of the countries involved, most of the research available on academic mobility and international education seems to be occasional, 0zaczidental, sporadic or episodic.

Consequently much of the research material available on Europe has characteristics of an emergent discipline in its 'preparadigmatic phase': by which is meant a stage of development at which many excellent single studies are being conducted.

The Historical Context

To understand the European situation, it is essential to place current developments in a historical dimension. Many authors have commented on macrohistorical changes affecting educational mobility and cooperation: the creation of nation-states in the nineteenth century and earlier; Europe's historical role in the world, in particular its role in colonialization and in the process of decolonialization; the impact of higher education in France, Germany, and the United Kingdom on higher education in the rest of the world; recent trends in European integration; the collapse of the former Soviet Union and associated East-West rapprochement; recession and financial constraint; "massification" of higher education; the dissolution of some structures and blocs and the emergence of others. Institutions, as they participate in these events, bring with them their own microhistories-their individual biographies, which may stretch back many centuries or reflect a far more recent foundation. An institution's response to the 'push' and 'pull' factors for internationalisation will always reflect the intersection of these micro- and macrolevel histories.

Confining discussion to the macrolevel, the 1960s in Europe are not seen today as a period of internationalisation-more reference is made to the Renaissance times of the Dutch philosopher Erasmus. But it would be entirely wrong to believe that international student mobility was absent then.

In general, the period 1950-1970 was, according to Baron, characterized by a "foreign policy" among receiving countries of "benevolent laissez-faire": of open doors to foreign students-students, who to a large extent, came from the former and, at that time, still existing French and British colonies. Some elements of this are still seen in the pattern of student flow to these countries, although (in the British case especially) the impact of more recent policies has largely transformed the picture. According to Baron, in the period 1950-1970 promoting academic mobility was predominantly seen as an element of foreign policy. From the point of view of the receiving countries, provision and care for foreign students were perceived as

connected to foreign policy objectives, such as maintaining political influence with future elites in other countries and preparing useful contacts for international relations in commerce and industry.

Guy Neave (1990), Director of Research of the International Association of Universities (IAU), sees massification of the student flow and its bipolar nature (the dominance of the United States in the Western bloc and of the former Soviet Union in the communist bloc) as the main characteristics of internationalisation in the 1960s and 1970s. The open door and laissez-faire policy and the one-way dimension were the other characteristics of the process of internationalisation of higher education, at a global level and in Europe in particular.

The universities themselves played a mainly passive role as receivers of foreign students. Gisela Baumgratz-Gangl (1992), gives the following characteristics of internationalisation in Europe before the introduction of the European programs: historical ties with former colonies (usually combined with cultural and linguistic ties); political considerations; presence of political refugees; economic considerations; educational demands; research cooperation in the natural sciences; top-level postgraduate study; migration of "guest workers"; increasing foreign language competence at school level; traditional links between disciplines (mainly philology); traditional mobility of elites; improvement of transport and communication and expansion of tourism; cooperation at postgraduate level between Western Europe and the United States; mobility of Third world students and staff to Western Europe (brain drain).

Although this list looks impressive, the effects of these factors on higher education cooperation within Europe were marginal. International activity was mainly oriented toward the cooperation of European higher education with the United States (outward mobility) and with the Third World (inward mobility). A European policy for internationalisation did not exist. The 1980s produced two distinct changes: first, in the open door mobility of individual students; and second, in student mobility as an integrated part of the study at home.

With respect to the individual mobility of students, the European nations and universities began changing their benevolent laissez-faire policy to a more controlled reception and in some cases the active recruitment of fee-paying foreign students. Alice Chandler, in a study in 1989 published by the Institute for International Education, stated: What has changed in recent years is the balance of motives. Humanitarianism and internationalism still exist as rationales for foreign student enrolments. But they have been overshadowed in both rhetoric and reality during the 1980s by the increased emphasis on pragmatics: by the monies to be derived from foreign student tuitions, by the purchases and expenditures made by foreign student tuitions, by the purchases and expenditures made by foreign students as tourists, and by the less measurable but ultimately even more important contribution to be made by foreign graduates as future financial and diplomatic allies.

The best example of that change was the British decision in 1979 to introduce "full-cost fees" for foreign students. Higher education as an export commodity quickly became dominant in the United Kingdom, as it already was in the United States.

For most people on the European continent, to consider the education of foreign students as an export commodity is still an anathema. On the European continent, the reception of foreign students is still based more on foreign policy arguments than on considerations of export policy. Often, it can fairly be claimed that foreign students cost more money, owing to the subsidy of higher education, than they generate. This was also the case in the former communist countries such as the Soviet Union, where students were

received for ideological reasons but now are no longer welcome because of the high costs to their hosts' faltering economies.

It is not unlikely that, in the coming decade, the international movement of students as an export commodity will also spread over the European continent and will become a more important element of higher education policy than it has been in the past, both at the national and at the institutional levels. Examples of this new focus can already be seen, for instance, in the Netherlands. A recent policy document of the Dutch government declares the recruitment of foreign students to be a policy issue and announces the introduction of full-cost fees for non-European Union students. This is a remarkable change away from the past two decades, when national policy aimed at discouraging foreign students from study in the Netherlands.

Other examples can be seen in Central and Eastern Europe, where universities develop programs for foreign students, in order to attract the foreign currency that is so important for their infrastructure because of lack of sufficient national support. An important market is the children of former emigrants to the United States, who see the relatively cheap training in their countries of origin as an alternative to the high costs of academic training in the United States.

In the late 1970s and early 1980s the notion of "study abroad", in the sense of sending students to foreign institutions of higher education as part of their home degree program, became an issue that overshadowed the developments in individual mobility of students. From the 1980s to the present student mobility as a one-way, individual process stimulated by political and/or economic considerations has (with the exception of the United Kingdom) lost prominence as a policy issue. It has been marginalized by the greater attention given to student mobility in the framework of exchange programs, which have been among the top priorities in higher education policies in the 1980s and 1990s.

Before this period, managed programs for exchanges of students and staff did exist, such as the Fulbright program in the United States and the bilateral cultural and academic agreements of European countries. But these programs were limited in both funding and scope, stimulating mainly unrelated exchanges at postgraduate level. In the 1970s, more structural exchange stimulating programs were established, first in Sweden and the Federal Republic of Germany. These programs were inspired by the development of study abroad programs of American universities in Europe in the same period, but the German and Swedish schemes distinguished themselves from their American examples by the fact that they were much more focused on integration of their own students in the foreign host universities, where the American programs were more isolated satellites of the American home institution.

In 1976, the Council of the European Communities adopted an action program for education. This was the first such move, since the Treaty of Rome did not mention education as an area for community action. The Commission had to justify its action program by non-educational, mainly economic criteria. But the action program of 1976 was the basis for future activities in academic cooperation and exchange within the European Community. And, ironically, the lack of a legal basis for action in the field of higher education gave the European Commission a great deal of freedom for creative action: a freedom and creativity that would have been less within a more formal structure.

In 1976, the Joint Study programs scheme was established by the Commission, aimed at "the promotion of joint programs of study and research between institutions in several member states". The focus of this experimental program was primarily the stimulation of academic mobility within the EC. The program grew

gradually from thirty-two projects in 1976-1977 to two hundred in 1983-1984, with a budget of 700.000 ECU. In 1984, the Commission added a budget line for student grants into the Joint Study programs Scheme. This scheme was replaced in 1987 by its successor, the "European Action Scheme for the Mobility of University Students": ERASMUS.

The rationale behind ERASMUS was primarily political and economic: to stimulate a European identity; and to develop international competitiveness through education. Thus ERASMUS and the other educational programs as such are a logical addition to the Research and Development programs launched by the European Community to keep up with Japan and the United States in the technological race.

These programs have gradually been opened to the countries of the European Free Trade Association (EFTA Norway, Sweden, Finland, and Austria-and to Switzerland. The Scandinavians created their own mobility program, Nordplus, to stimulate inter-Scandinavian mobility and cooperation in higher education. With the coming inclusion in the European Union of the first three of these countries, the educational programs will become even more European.

Since the implementation of the ERASMUS program in 1987, significant results have been achieved in cooperation and exchange within higher education and between higher education and industry in the European Union.

Antonio Ruberti (1993) commissioner for education and research, published a new discussion paper, in which he stressed the importance of a more coherent continuation of the existing programs (combining ERASMUS and LINGUA into one program) and a closer link between these and the Research and Development programs of the European Union. Based on that document, on 4 January 1994 the European Commission presented a new program, called SOCRATES. This is an umbrella program covering three areas: higher education, school education and other transverse measures (promotion of linguistic skills, open and distance learning, information promotion).

In addition to SOCRATES, Commissioner Ruberti also announced a five-year program for action in the field of vocational training, called LEONARDO (after Leonardo da Vinci). Characteristic of this new approach is the extension of educational policy from higher education to secondary and vocational education (although some smaller programs in the latter field already existed, such as PETRA, FORCE and IRIS, now incorporated in LEONARDO). LEONARDO will include many aspects of the former COMETT program, such as internships for students in higher vocational training; but its main focus is on innovation in secondary vocational training.

Within SOCRATES, for the area of school teaching, a budget is set aside to encourage the setting up of partnerships between secondary schools for carrying out joint educational projects, in particular in the area of languages, cultural heritage, and environmental protection. The promotion of schooling of immigrant and gypsy children and the skills updating of educational staff will be part of the "Europe at School" program in SOCRATES.

The role of the European Commission in higher education has not been limited to educational mobility and exchange. The EC has played an important part in stimulating internationalisation of higher education.

- The Research and Development Programs

Internationalisation of research is a phenomenon that is already generally accepted. International joint ventures of research groups are no longer exceptional, and there is a long tradition of conferences, seminars, work-shops, and congresses for academic exchange of ideas and findings. On the other hand the technological needs of modern society demand very expensive research projects that individual research groups, institutions of higher education, companies, or even national governments cannot.

- Cooperation with Central and Eastern Europe

The opening up of Central and Eastern Europe has had an enormous impact on higher education in this region and on cooperation between institutions of higher education in Western, Central, and Eastern Europe. As Denis Kallen makes clear, academic cooperation and exchange already existed before this opening up and was developing rapidly in the 1980s, in particular with Poland and Hungary. Cooperation concentrated mainly on staff exchanges and far less on student exchanges. From the point of view of the regimes in these countries, academic cooperation was mainly a political issue and little institutional or personal autonomy was possible.

Although, as Ladislav Cerych (1989) states, the opening up of Central and Eastern Europe had a global effect, the increase in academic mobility with Western Europe was quantitatively greater than with any other area. Regional proximity and the political push by national governments and the European Commission formed the basis for this strong inner-European academic cooperation.

The European Commission, through its so-called PHARE program, opened the way for several forms of cooperation, both in R&D and in education. The best-known example is the Trans European Mobility Program for University Studies (TEMPUS), which provides support for the development of education by way of mobility grants for students and faculty and infrastructural support.

TEMPUS covers ten countries in Central and Eastern Europe, excluding the republics of the former Soviet Union, for which region in 1993 a new scheme, TEMPUS-TACIS, has been established. The impact has been enormous. In TEMPUS, some 750 projects have been implemented since the program's start in 1990, including more than 1.800 institutions of higher education, companies, and organizations. Up to 1993 around 6.500 students had been granted the opportunity to study in Western Europe, and some 10.000 staff members have gone to Central and Eastern Europe.

Thanks to TEMPUS and other programs supported by national governments and other international private and public organizations, a rapid improvement in the educational infrastructure and of the quality of education has been achieved. One of the main problems still to be solved is the brain drain of qualified faculty and students. But although this and many other large problems remain to be solved, an important step forward in bridging the gap between higher education in Western and Central and Eastern Europe has been made. In the field of R&D, also, thanks to the support of the EC and national governments, the situation in Central and Eastern Europe is better than it was ten years ago.

There is ground for some concern in the lack of cooperation among the institutions of higher education in the Central and Eastern European countries themselves, and, related to that problem, a tendency toward nationalist instead of regional approaches. Another cause of concern is the growing tendency in programs for Central and Eastern Europe to give almost exclusive priority to the hard disciplines, seen as directly related to economic development, at the expense of the "vulnerable sector" and disciplines in higher

education. Further concern lies in the one-way direction of mobility and cooperation. Only recently has a small but growing stream of students begun to move from West to East.

If higher education in Central and Eastern Europe is to escape from its dependence on support from Western Europe, then a relationship of two-way exchange and cooperation must prevail. The extension of the ERASMUS scheme and other EC programs for higher education to Poland and Hungary, and gradually to the other ten countries participating in the TEMPUS scheme, would be an important contribution to the autonomous development of higher education in that region, and (as was the case with the EFTA countries) an excellent case study for their future participation in the European Union as a whole.

Development Aid Programs

Support to the Third World in general, and to higher education in the South in particular, has received much attention in Western Europe. In the Netherlands, for example, in the 1970s and 1980s, internationalisation of higher education was almost exclusively oriented to cooperation with higher education in the developing countries, with financial support from both the national government and the institutions themselves.

This situation changed in the course of the 1980s. As Alan Smith states: When it comes to the role of the academic community in the context of providing development aid, however, the current situation appears to be much less encouraging. In so far as figures are available, it would appear that support for such activities has tended to stagnate or even recede, and even in the more positive cases growth-rates have tended not to keep pace with those in the area of cooperation between industrialized countries.

The new orientation toward support for higher education in Central and Eastern Europe, and the policy shift of major education funders like the World Bank away from higher education and toward the primary education sector, are among the factors that explain this development. For some parts of the developing world, notably countries of sub-Saharan Africa, the picture is exacerbated by the displacement effect of the transformations in the former Soviet Union and the consequent loss of formerly available study opportunities there.

There are, however, signals that development aid to higher education in the Third World is receiving new attention. At the Annual Conference of the EAIE in December 1993 in The Hague, Colin Power, assistant director for education of UNESCO, reconfirmed the need for international cooperation and assistance by stating that existing statistics indicate the ever widening gap between the developed and the developing countries in the field of science and technology. He was supported in his appeal by Ismail Serageldin, vice president of the World Bank, who stated: Europe, which has given so much to the world, both good and bad, must remain engaged with the rest of the world at this time when the end of the cold war brings both crises and opportunities. It is important that the next generation of Europeans should continue to look beyond their own frontiers, not motivated by dreams of empire or domination, but by the individual and collective enrichment that will come to Europe and the Europeans in recognizing our common humanity in the billions of the poor beyond their borders as well as in the peoples of the competing industrial economies across the world.

The European universities have an important role in this process, as the defender of core values of humanism, tolerance, rationality and reason. The European Commission has become one of the important international funding organizations for development cooperation in the educational field, alongside national

governments. One fact already becoming clear is that institutions of higher education in Europe wishing to be active in development cooperation will increasingly need to work together in European consortia, instead of acting alone.

The General Impact of the EC Programs

The European programs for exchange and cooperation described above have transformed international mobility from a purely one-way flow, involving very small numbers of unrelated movers, to managed flows involving large numbers under directly related multilateral exchanges at all levels of higher education. One could call this development the external democratization of the international mobility of students, giving students from lower and middle classes and of middle-level qualifications access to study abroad that had once been restricted to the upper classes and a limited number of highly qualified students. To paraphrase Peter Scott in his keynote address given at the third Annual Conference of the EAIE in Montpellier in December 1991: "Student exchanges and international education must be conceived in terms of peoples talking to peoples, not elites talking to elites.... (Student exchange) must become routine, mundane, part of the fabric of everyday academic life" instead of being "exceptional or a privileged process".

Gisela Baumgratz stresses the different road internationalisation has taken, thanks to European programs: Compared with traditional mobility patterns in Europe and the United States, the programs have introduced a new pattern: limited periods of study abroad forming part of the study course at undergraduate level; educational cooperation and staff exchange alongside the traditional research cooperation: and highly selective postgraduate programs for freemovers.

The response of the institutions of higher education to the EC initiatives was positive but at first rather reactive: "as long as Brussels is giving us money, why should we oppose the idea". As Ladislav Cerych has said, Community funds are not and never will be available to European higher education to solve its financial problems; they will never cover more than a very small proportion of needs. Misunderstandings and over-expectations in this respect have been and probably remain common among European universities, their staff and their students.

Soon this became clear. Participation in the European programs did not generate income but demanded active involvement and investment on the part of the institutions and departments. This involvement in turn, however, has created a shift from passive response to active involvement. Institutions of higher education, departments, faculty, and students have had to decide what would be the positive effects of participation in the ERASMUS and other schemes and what price they were prepared to pay. Such decisions were traditionally made from the point of view of academic and personal experience. Now, under the schemes, instead of something extra and exceptional, a study abroad experience had to be an integral part of the curriculum. For that reason, exchange of information on the course offerings and levels of study became crucial, as was the development of mechanisms of recognition of courses taken abroad through systems of credit transfer.

For varying reasons and to differing extents, the sending of students and faculty abroad was generally seen as the most important aspect of the exchange programs. That this also entailed the reception of foreign students and faculty was at first seen by many institutions more as a drawback than an advantage. The reception of foreign students in large numbers confronted institutions of higher education with unforeseen problems, both in the classrooms and in support facilities. Language barriers, different academic backgrounds and academic calendars, housing, and insurance were among the many problems to be solved.

The problems that institutions of higher education are faced with differ by country and type of institution. For example, the United Kingdom is confronted with a high demand of students wishing to spend their study abroad period there, mainly for language reasons. In a recent survey, students of the different countries of the European Union, when asked for their first preference of study abroad-with the exception of U.K. and Irish students (first preference: France) and students from Luxembourg (first preference: Germany mentioned the United Kingdom as their first place of preference. At the same time, higher education in the United Kingdom, for financial reasons, is less keen to receive large numbers of non-fee students from the Continent and also has problems stimulating their own students to participate in the exchange programs with the continent.

Despite these problems, we can now say that ERASMUS and the other EC programs have placed internationalisation high on the priority lists of national, institutional, and departmental strategic plans. Several national governments, private funds, and regional entities have established funds alongside the EC programs to stimulate international cooperation and exchange. Seven years after the creation of ERASMUS, one may say that institutions of higher education in Europe have largely learned to cope with its demands and those of the other EC programs.

In many institutions of higher education smaller or larger offices of international relations have been established at the institutional, and frequently also at the departmental, level. With due regard to variation and exceptions, the trend is for institutions to give internationalisation a central place in their mission statements, strategic plans, and budgets. From a move imposed by the outside world, internationalisation is becoming an integral part of higher education policy. Institutions of higher education, faculty, and students are increasingly placing international education at the center of their strategies.

Because of the complexity and diversity of the European situation with regard to higher education, and the systemic changes in progress at all levels, some of whose long-term effects are hard to predict, it is not possible to draw for Europe a simple model of uniform progress toward internationalisation. Some broad trends, however, can be discerned.

A broad tendency for strategies for internationalisation that have in the past been tacit, fragmented, and ad hoc to become explicit, managed, and coordinated. This tendency is more marked in Northern than in Southern Europe. In Central and Eastern Europe, this process manifests itself more in a reform of the old highly centralized and controlled central policies and their transformation into a more open and autonomous structure.

- The gradual development of a more interactive model of internationalisation, with policy decisions, support systems, and organizational structures located at both central and decentralized levels, and with flexible connections between these levels.
- A gradual change from a reactive response to EC and national programs and funds for internationalisation to a more autonomous, proactive policy of internationalisation at both the institutional and the departmental levels.
- Alongside the above, a gradual diversification of resources for internationalisation, combining EC and national with institutional and private funds.
- More attention to networking on a multilateral and structural basis, in research, curriculum development, and delivery.

- An increasing professionalization of those with responsibility for international activities in institutions. This again is more marked in the North than the South of Europe, and may have negative as well as positive results, since there is a danger that international activity may become 'ghettoised' rather than integral to the life of the institution.
- An increasing priority being given by Western European institutions to strategies for cooperation with Eastern and Central Europe and the rest of the world: globalization of international cooperation, in response and in addition to the process of (Western) Europeanization, as stimulated by the European Commission.
- A growing awareness of the importance of the academic aspects of internationalisation, such as curriculum development, credit transfer, and research training.
- A growing recognition of the value of effective procedures for evaluation, monitoring, and quality assurance with respect to international activity.

Set against these trends, certain counter pressures and tensions need also to be noted, among them the following:

- The tension between incentives to internationalize, and the rationales for cultivating a distinctive institutional and national identity; resistance to what has been called the 'denationalizing' effect of internationalisation.
- Linked to the above, the emergence within Europe of a new 'localism: an assertion of local and regional identities in other spheres as well as education. Cross-border cooperation at institutional level, which is an emerging pattern in some areas, combines elements of 'internationalism' and 'regionalism'. At present it is impossible to predict what accommodations there will be between these new groupings and the centralizing forces in Europe, such as the competencies of the EU.
- The cost-benefit balance of international activity, with regard to both the institution and the individual.
- The proliferation of different types of institutions, the expansion of new sectors and specialisms, and the growth in numbers of private-sector institutions seeking an international presence in Europe. These developments present challenges to the more established institutions, authorities and policy-making structures, whose outcome cannot at present be clearly foreseen.

The European Commission, confronted with the fast-growing interest in its educational programs, conscious of the new role of education under the Maastricht Treaty and aware of a positive change of attitude in the institutions of higher education toward its educational programs, has finalized the necessary preparations for the follow up of the mobility programs, since 31 December 1994 was the expiry date of the present phase.

In 1991, the European Commission published the white paper mentioned above, the "Memorandum on Higher Education in the European community". This document was the basis for an intensive debate on the role of the European Union in education and on the future of the educational programs. Although in general it was well received, critical comments were made by the educational sector on the one-sided focus by the European Commission on economic and political criteria at the expense of a broader cultural and academic approach.

The stimulus for internationalisation in Europe has come in particular from the European Commission, the main original reason being a fear on the part of the European Commission that Europe would lose the

technological race with the United States and in particular Japan, unless science and technology were stimulated at a European level.

The European Commission now stresses the importance of international cooperation and exchange in higher education from a political and cultural point of view, and emphasizes the need for the creation of a European identity: a 'citizenship of Europe'. While the Commission has played an active role in stimulating and supporting intra-Community educational mobility and cooperation for a number of years, its legal competence in the educational field dates only from the adoption of the Treaty of Maastricht in 1993.

One may say that the intention of the European Commission is to stimulate internationalisation of higher education in Europe in order to contribute to European economic growth and to spread a European unity through cooperation in research and education. The "added value" of Community action in the sphere of education is according to the Commission, in the words of its president, Jacques Delors, the mutual integration and opening up to each other of general education and professional training systems are an economic issue, in terms of maintaining competitiveness, and a political issue, in terms of defending democracy and human rights.

The European Association for International Education (EAIE), in a comment on the Memorandum on Higher Education in the European Community, acknowledges the positive role of the European Commission in stimulating internationalisation of higher education within Europe, but at the same time questions the confusion of internationalisation with Europeanization.

For the European Commission, the main focus of internationalisation is Europeanization: achievement of European excellence; strengthening of Europe's position in the global economy; safe guarding and strengthening Europe's cultural heritage; strengthening the basis for further political development and for European Political Union; a European Community dimension in higher education; the European dimension of curricula.

The EAIE points to the danger of an Eurocentric view of internationalisation and (citing Peter Scott) sees a potential contradiction between Europeanization and internationalisation: Intra-European exchanges cannot be regarded as fully 'international'. Indeed, as the European Community deepens and widens, they will increasingly be seen as 'internal' rather than 'external' exchanges. Nor can they be regarded as a substitute for wider global relations.

Although, as we shall see, the EC is playing an important part in the globalization of academic cooperation and exchange, it does not altogether escape this criticism of a disproportionate Eurocentrism in its view of international education. The European Commission, despite its crucial and dominant role, is not the only stakeholder influencing the development of internationalisation in Europe. In general, there lacks any common view among stakeholders about the 'what', the 'why', and the 'how' of internationalisation. Within Europe, a great diversity of arguments, social, economic, and educational, are deployed to support the internationalisation of education. Some of these arguments have their origin in the needs of society and/or the economy, some in the needs of education itself. Together they constitute a set of overlapping rationales for the process and activities of internationalisation. In turn, they form the basis of the incentives for internationalisation that are perceived by stakeholders, and the justifications that are made internally and externally. And, as has been said before, there is potential coincidence, but also conflict, between the interests of the different stakeholders: international governments, the private sector, institutions, departments, faculty, and students.

In the Berlin communiqué of 19 September 2003 the Ministers of the Bologna Process signatory States invited the European Network for Quality Assurance in higher Education (ENQA) through its members, in cooperation with the EUA, EURASHE, and ESIB to develop “an agreed set of standards, procedures and guidelines on quality assurance and to explore ways of ensuring an adequate peer review system for quality assurance and or accreditation agencies or bodies, and to report back through the Bologna Follow-up Group to ministers in 2005. The Ministers also asked ENQA to take due account of the expertise of other quality assurance associations and networks.

All across Europe, countries and universities are engaged in a process of modernization. From an EU perspective, these reforms are part of the Lisbon Strategy for Growth and Jobs, which also encompasses reinforced cooperation in vocational education and training (Copenhagen Process). To establish synergies between Copenhagen and Bologna, the Commission has brought forward its proposal for the European Qualifications Framework for lifelong learning (EQF). This is linked to and supported by other initiatives in the fields of transparency of qualifications (EUROPASS), credit transfer (ECTS -ECVET) and quality assurance (ENQA -ENQAVET). Of similar importance is the link between the European Higher Education Area and the European Research Area (EHEA and ERA)

The European Commission aims to support these efforts with the help of programmes like [Erasmus](#), [Tempus](#) in respect of neighbouring countries, and more globally through [Erasmus Mundus](#). The Commission also works to support the modernization agenda through the implementation of the [7th EU Framework Programme for Research](#) and the [Competitiveness and Innovation Programme](#), as well as the [Structural Funds](#) and the [European Investment Bank](#). All across Europe, countries and universities are engaged in a process of modernisation. From an EU perspective, these reforms are part of the Lisbon Strategy for Growth and Jobs, which also encompasses reinforced cooperation in vocational education and training (Copenhagen Process). To establish synergies between Copenhagen and Bologna, the Commission has brought forward its proposal for the European Qualifications Framework for lifelong learning (EQF). This is linked to and supported by other initiatives in the fields of transparency of qualifications (EUROPASS), credit transfer (ECTS -ECVET) and quality assurance (ENQA -ENQAVET). Of similar importance is the link between the European Higher Education Area and the European Research Area (EHEA and ERA).

Conclusion

Internationalisation being based on relationships between nations and their institutions, takes differences as a starting point for linkages, where *Globalization ignores the existence of nations and their differences and looks more for similarities than for differences*. Though, Internationalisation of Higher Education and *Globalization are linked phenomena, because institutions of Higher Education- privatised, deregulated and more entrepreneurial- become active players in the global market place, but trying to maintain their autonomous position as academic institutions, holding strong to diversification more than harmonisation*. *Specific initiatives such as branch campuses, cross-border collaborative arrangements, programs for international students, establishing English-medium programs and degrees, and others have been put into place as part of internationalization*. However, the fair and transparent principles that many countries have agreed to were not necessarily implemented very widely. Many higher education institutions are still ignorant of the convention despite its ratification by the government. Many find it difficult to implement though only a tiny minority. The promotion of the European dimension in higher education can be helped by more transparency between existing educational systems.

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EXPERT SYSTEM: A CATALYST IN EDUCATIONAL DEVELOPMENT IN NIGERIANwigbo Stella N¹ and Agbo Okechuku Chuks²^{1&2}*School of Science Education, Federal College of Education(Technical), Omoku, Rivers State, Nigeria*

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Abstract

The Use of expert system as a tool in teaching and learning process in Nigerian educational systems is very much desirable as it will facilitate teaching and learning process. The introduction of Computer aided instruction (CAI) in our classrooms is a welcome innovation but the use of expert system which is an integral part of CAI has not been fully utilized. An expert system is a well know area of artificial intelligence designed to enhance the availability of knowledge required in the educational system. In developed countries, expert system is very useful in teaching courses such as engineering, mathematics, earth sciences and distance tutorial lessons. Nigerian cannot afford to be left behind in the adoption of CAI in teaching and learning. Expert system has a lot of benefits especially to the students, trainers and educational institutions. The disadvantages not with standing, this paper suggests that effective introduction of expert system in the teaching and learning process in Nigerian educational system be adopted as its advantages over traditional chalk-talk method is innumerable.

Keywords-Artificial intelligence, Computer aided instruction, Expert system, Intelligent tutoring system, Domain knowledge

Introduction

An expert system is computer software that attempts to act like a human expert on a particular subject area. It uses a knowledge base of human expertise for problem solving, or to clarify uncertainties where normally one or more human experts would need to be consulted.

Knowledge-based expert systems, or simply expert systems, use human knowledge to solve problems that normally would require human intelligence. These expert systems represent the expertise knowledge as data or rules within the computer. These rules and data can be called upon when needed to solve problems. Books and manuals have a tremendous amount of knowledge but a human has to read and interpret the knowledge for it to be used. Conventional computer programs perform tasks using conventional decision-making logic containing little knowledge other than the basic algorithm for solving that specific problem and the necessary boundary conditions. This program knowledge is often embedded as part of the programming code, so that as the knowledge changes, the program has to be changed and then rebuilt. Knowledge-based systems collect the small fragments of human know-how into a knowledge-base which is used to reason through a problem, using the knowledge that is appropriate. A different problem, within the domain of the knowledge-base, can be solved using the same program without reprogramming. The ability of this system to explain the reasoning process through back-traces and to handle levels of confidence and uncertainty provides an additional feature that conventional programming does not handle.

Most expert systems are developed via specialized software tools called shells. These shells are equipped with an inference mechanism and require knowledge to be entered according to a specified format. They typically come with a number of other features, such as tools for writing hypertext, for constructing friendly user interfaces, for manipulating lists, strings, and objects, and for interfacing with external programs and databases. These shells qualify as languages, although certainly with a narrower range of application than most programming languages.

In educational field, many of the expert system's application are embedded inside the Intelligent Tutoring System (ITS) by using techniques from adaptive hypertext and hypermedia. Most of the system usually will assist student in their learning by using adaptation techniques to personalize with the environment, prior knowledge of student and student's ability to learn.

In terms of technology, expert system in education has expanded very consistently from microcomputer to web based (Woodin, 2001) and agent-based expert system (Vivacqua and Lieberman, 2000). By using web-based expert system, it can provide an excellent alternative to private tutoring at anytime from anyplace (Markham, 2001) where Internet is provided. Also, agent based expert system surely will help users by finding materials from the web based on the user's profile. Supposedly, agent expert system should have capability to diagnose the users and giving the results according to the problems.

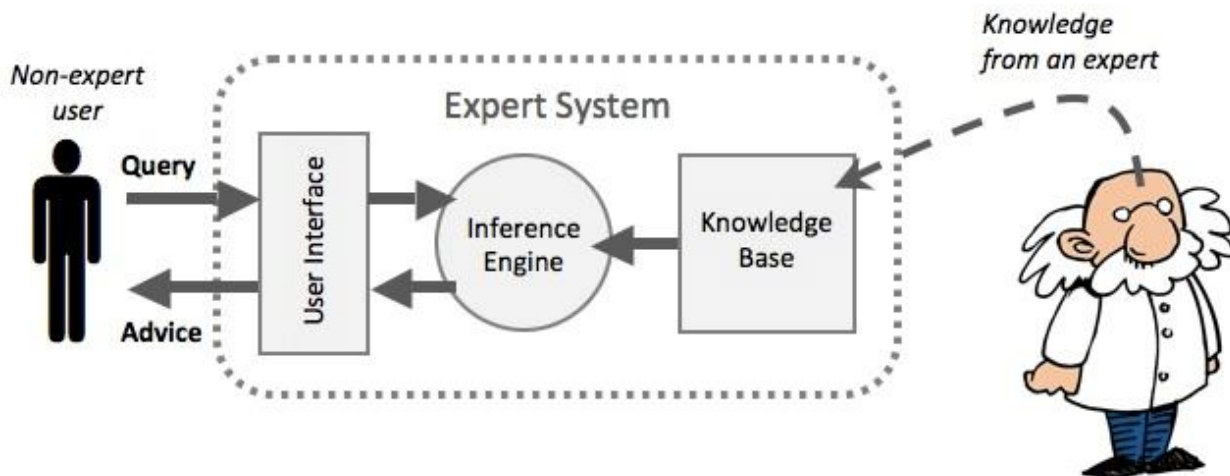
Besides the use of expert system in technology, it also had tremendous changes in the applying of methods and techniques. Starting from a simple rule based system; currently expert system techniques had adapted a fuzzy logic (Starek, Tomer, Bhaskar, and Garcia ,2002) and hybrid based technique (Prentzas, Hatzilygeroudis, Koutsojannis, 2001).

According to Markham (2001), expert system are beneficial as a teaching tools because it is equipped with the unique features which allow users to ask question on how, why and what format. When it is used in the class environment, surely it will give many benefits to students as it prepare the answer without referring to the teacher. Beside that, expert system is able to a give reasons towards the given answer. This feature is really great as it can make students more understanding and confident with the answer. Expert system also has provided excellent alternative to private tutorial. The system is usually developed using Java technology, thus making it interoperable and independent platform. (Markham, 2001),

Ability of expert system to adaptively adjust the training for each particular student on the bases of his/her own pace of learning is another feature that makes expert system more demanding for students. This feature is used in teaching engineering students. It should be able to monitor student's progress and make a decision about the next step in training.

Expert system has been used in several fields of study including computer animation (Victor Yee, 1995), computer science (Heather Christine Markham, 2001), engineering (Zorica Nedic, Vladimir Nedic and Jan Machotka, 2002), language (Expert System in Language Teaching), and business study. For Computer Animation Production, expert system has been used as a guide to developer to design 2D and 3D modeling package. Other than that expert system also is used as a tool in teaching mathematic related subject.

How Do Expert Systems Work?



An expert system is made up of three parts:

A user interface - This is the system that allows a non-expert user to query (question) the expert system, and to receive advice. The user-interface is designed to be simple to use as possible. In academic expert systems, the potential users are the tutors (trainers) and the tutees (students) (Darlington, 2000). Both interact with the system via an interactive interface where user queries pertaining to a particular subject are created and the system is then commanded to compute and decide on the solution or advice to the query. It is equipped with the unique features which allow users to ask question on how, why and what format. Student's tutorials and additional materials can be requested and passed on to the student easily over the interface. In addition, revision and self assessment is expertly conducted between the system and the student and thus better preparation for student examinations. The tutor also uses the interface to the system to create queries on what to expertly deliver to students as well as setting parameters on computer aided student assessments, tests and marking. The actual training or instructing which is supposed to be done by the instructors can easily be conducted by the expert system on the student's pace and thus effective dissemination of data as the student interacts with the system. The non-expert user queries the expert system. This is done by asking a question, or by answering questions asked by the expert system.

A knowledge base - This is a collection of facts and rules. The knowledge base is created from information provided by human experts the knowledge base is independent from all other components of an expert system which makes it flexible to accept changes without affecting the whole system. It is the duty of the experts in a particular domain to research and compile data to fill into a knowledge base for use by an expert system to meet demand of expert ideas in areas where they are falling into short supply. As the system matures, new rules maybe added and existing ones maybe amended or deleted from the knowledge base with the use of the knowledge acquisition module. All these are normally done to take into account inventions, innovations and discoveries as technology improves. In addition, some material may become obsolete and thus there will be need to update to standard material since education system is dynamic. In addition, expert knowledge is formally represented in a knowledge base which means that the system cannot forget unlike what humans do with the increase in time.

An inference engine - This acts rather like a search engine, examining the knowledge base for information that matches the user's query. The inference engine uses the query to search the knowledge base and then provides an answer or some advice to the user.

Knowledge engineering

This is the art of designing and building expert systems, and knowledge engineers are its practitioners. We stated earlier that knowledge engineering is an applied part of the science of artificial intelligence which, in turn, is a part of computer science. Theoretically, a knowledge engineer is a computer scientist who knows how to design and implement programs that incorporate artificial intelligence techniques. Today there are two ways to build an expert system. They can be built from scratch, or built using a piece of development software known as a "tool" or a "shell." A knowledge engineer interviews and observes a human expert or a group of experts and learns what the experts know, and how they reason with their knowledge. The engineer then translates the knowledge into a computer-usable language, and designs an inference engine, a reasoning structure, that uses the knowledge appropriately. He also determines how to integrate the use of uncertain knowledge in the reasoning process, and what kinds of explanation would be useful to the end user.

Accumulation of knowledge of a task domain is the province of domain experts. Domain knowledge consists of both formal, textbook knowledge, and experiential knowledge -- the *expertise* of the experts.

Can Expert Systems Make Mistakes?

Human experts make mistakes all the time (people forget things, etc.) so you might imagine that a computer-based expert system would be much better to have around.

However expert systems can face some problems:

- Can't easily adapt to new circumstances (e.g. if they are presented with totally unexpected data, they are unable to process it)
- Can be difficult to use (if the non-expert user makes mistakes when using the system, the resulting advice could be very wrong)
- They have no 'common sense' (a human user tends to notice obvious errors, whereas a computer would not)

Benefits of Expert system

Expert systems offer an environment where the good capabilities of humans and the power of computers can be incorporated to overcome many of the limitations. Expert systems have many benefits as: 1. Increase the probability, frequency, and consistency of making good decisions. 2. Help distribute human expertise. 3. Facilitate real-time, low-cost expert-level decisions by the non expert. 4. Enhance the utilization of most of the available data. 5. Permit objectivity by weighing evidence without bias and without regard for the user's personal and emotional reactions. 6. Permit dynamism through modularity of structure. 7. Free up the mind and time of the human expert to enable him or her to concentrate on more creative activities. 8. Encourage investigations into the subtle areas of a problem. 9. Expert system gives emphasis on individual student by keeping record of their learning ability and speed. 10. Expert system provides a convenient environment to ask, query and find out their solutions. 11. Expert system also gives a congenial way to find out errors and fix them.

Benefits to the students (tutee)

The systems better performs simulations and aid practices better than the teaching side. However, the expert systems are normally used in support of other learning / teaching activities such as the problem based learning(PBL). The students learn by repeated use of the concept and they understand, even the slow learner can visualize. Expert systems are reproducible and thus making them readily available for consultation by students at every stage and permits (indeed always should permit) the student to interrogate and analyze the reasoning process. Finally, worked examples, and all forms of guidelines are readily available to students for revision purposes.

Benefits to the Trainer (tutor)

The expert system takes on the tutoring function that is, presenting a series of screens of information, test questions and feedback. Expert systems are also excellent in instructional design, decision making, planning, controlling, and collaboration with both the student and trainer. It reduces explanation where a trainer has difficulties in illustrating concepts.

Benefits to the college

Professional material is passed on to students by semi-professional staff without compromising standards. This means that the colleges and universities will be able to compete with regional institutions operating under normal economic environment with adequate resources. In spite of being expensive to develop, expert systems will reduce the quantity of human experts required to deliver teaching responsibilities. However expert systems must also check on the student skills and their background in computer usage as they will end up being a block to the learning of the student.

Disadvantages

- The Garbage in, Garbage out (GIGO) phenomenon: A system that is used expert-system technology provides no guarantee about the quality of the rules on which it operates. All self-designated "experts" are not necessarily so, and one notable challenge in expert system design is in getting a system to recognize the limits to its knowledge.
- Expert systems are notoriously narrow in their domain of knowledge. An expert system or rule-based approach is not optimal for all problems, and considerable knowledge is required so as to not misapply the systems.
- Ease of rule creation and rule modification can be double-edged. A system can be sabotaged by a non-knowledgeable user who can easily add worthless rules or rules that conflict with existing ones. Reasons for the failure of many systems include the absence of (or neglect to employ diligently) facilities for system audit, detection of possible conflict, and rule lifecycle management (e.g. version control, or thorough testing before deployment). The problems to be addressed here are as much technological as organizational.

An example and a good demonstration of the limitations of an expert system is the windows operating system troubleshooting software located in the "help" section in the taskbar menu. Obtaining technical operating system support is often difficult for individuals not closely involved with the development of the operating system. Microsoft has designed their expert system to provide solutions, advice, and suggestions to common errors encountered while using their operating systems.

RECOMMENDATIONS

Having presented a general overview of an expert system, its benefits in the Nigerian educational system, I therefore make the following recommendations:

- (1) that there should be a massive awareness and promotion of expert system in Nigerian educational system
- (2) that there should be an effective introduction of expert at all levels.
- (3) that due to the usual one teacher too many students, expert system should be adopted as a strong assistance for repeated studying and understanding
- (4) that there should be continuous research and documentation on expert system towards improving the knowledge base of the system.

CONCLUSION

The paper shows that expert systems are very importance in the field of education. They are becoming an integral part of engineering education and even other courses like accounting and management are also accepting them as a better way of teaching. The few expert systems available in the market present a lot of opportunities for the students who desire more spotlight and time to learn the subjects. They present a friendly and interactive environment for students which motivate them to study and adopt a more practical approach towards learning. The study shows that expert system may act as an assistor or substitute for the teacher. Expert systems focus on each student individually and also keep track of their learning pace. This behavior of expert system provides independent learning procedure for both student and teacher, where teachers act as mentor and students can judge their own performance. Expert system is not only beneficial for the students but also for the teachers which help them guiding students in a better way. Expert systems offer several advantages over traditional chalk-talk method and is bound to replace it in near future. The bottom-line of the paper is that expert systems for education are here to stay.

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ASSESSMENT OF THE NATURALLY OCCURRING RADIOACTIVE MATERIAL (NORM) CONTENT OF HYDROCARBON EXPLORATION AND PRODUCTION ACTIVITIES IN OGBA/EGBEMA/NDONI OIL/GAS FIELD, RIVERS STATE, NIGERIA.

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Abstract

The concentration of the Naturally Occurring Radioactive material (Norm) of soil and sediment samples collected from Ogba/Egbema/Doni oil fields and their host communities was measured by determining the gross alpha and gross beta activity concentration in twelve oil fields and their host communities. Determination of the gross alpha and gross beta radioactivity of host community soil, field soil and field sediment samples were obtained by using gas flow proportional counter (EURISYS MEASURE-IN-20 low background multiple channel alpha/beta counter). Background measurement and plateau test was done to determine the background radioactivity and optimal operational voltage and frequencies. The gross alpha activity concentration in host community soil ranges from BDL to $2590.0 \pm 34.0 \text{ Bqkg}^{-1}$ with a mean value of $289.16 \pm 7.0 \text{ Bqkg}^{-1}$. While the gross beta activity concentration ranges from $1660.0 \pm 27.0 \text{ Bqkg}^{-1}$ to $206,600.00 \pm 1906.0 \text{ Bqkg}^{-1}$ with a mean value of $22690.0 \pm 104.0 \text{ Bqkg}^{-1}$. In field soil samples analyzed, the gross alpha activity concentration ranges from $17.0 \pm 1.0 \text{ Bqkg}^{-1}$ to $1400.0 \pm 22.0 \text{ Bqkg}^{-1}$ with a mean value of $378.83 \pm 10.0 \text{ Bqkg}^{-1}$. The gross beta activity concentration in field soil samples ranges from $3350.0 \pm 35.0 \text{ Bqkg}^{-1}$ to $110,090.0 \pm 1360.0 \text{ Bqkg}^{-1}$ with a mean value of $1782.0 \pm 267.0 \text{ Bqkg}^{-1}$. Furthermore the gross alpha activity concentration in field sediment samples ranges from BDL to $620.0 \pm 15.0 \text{ Bqkg}^{-1}$ with a mean value of $203.66 \pm 6.0 \text{ Bqkg}^{-1}$ while the gross beta activity concentration ranges from $1070.0 \pm 79.0 \text{ Bqkg}^{-1}$ to $22,590.0 \pm 459.0 \text{ Bqkg}^{-1}$ with a mean activity value of $7485.92 \pm 165.0 \text{ Bqkg}^{-1}$. The mean alpha activity concentration for the control soil sample was $22.78.0 \pm 1.02 \text{ Bqkg}^{-1}$ which is low compared with the observed alpha activity values in community's soil, field soil and field sediment samples respectively, while the mean gross beta activity concentration was found to be $666.0 \pm 14.0 \text{ Bqkg}^{-1}$ which is also lower than the observed beta activities on the soil/sediment samples. The result indicates an elevation of Norm content due to hydrocarbon exploration and production in the area. This could be detrimental to health of individuals exposed to these radiations.

Keywords: Gross alpha, Gross beta, Norm, Natural radioactivity, Proportional counter, Sediment, Soil, Assessment.

Introduction

Naturally occurring radioactive materials (NORM) are found almost everywhere. NORM is inherent in many geologic materials and consequently encountered during geological related activities. NORM encountered in hydrocarbon exploration and production operations originate in subsurface formations that may contain radioactive materials such as Uranium and thorium and their daughter products, ²²⁶Ra and ²²⁸Ra. This can be brought to the surface in the surface in the produced water in conjunction with oil and gas. In addition, radon gas a radium daughter, may be found in produced natural gas. In gas processing activities, NORM generally occurs as radon gas in the natural gas stream (Ajayi et al, 2009; Mokobia et al 2006).

During exploration and extraction processes, various operational practices contribute to or induce NORM occurrence, namely remote sensing methods of mapping and explosives associated with seismic exploration, drilling equipment and activities and down –the –hole geophysical logging methods. In some instances, radioactive marker bullets are employed as an aid in relative depth determinations. The gamma ray log is used to locate the bullets after casing has been set. Radioactive tracers are also used in evaluating the effective of well cementing and under ground water and crude oil flow direction for the purpose of correlation (Ajayi et al ,2009). In some cases, various amounts of radioisotopes are injected with the secondary recovery flooding fluids to facilitate flow.

In Nigeria and other countries, many studies have been carried out on the radioactivity matrices (Tchokossa, 2006, Ajayi et al,2009, Diad et al, 2008, Al-Masri and Suman2003; Isinkaye and Shitta,2010 and Fatima et al,2008). It has been noted that radiation is part of the natural environment and it is estimated that approximately 80% of all human exposure comes from naturally occurring radioactive materials. Hydrocarbon exploration and production activities have the potential to increase the risk of radiation exposure to the environment and humans by concentrating the quantities of naturally occurring radiation beyond normal background levels (Ajayi et al ,2009).

EPA(2005) on environments, health and safety online stated that the more radiation dose a person receives, the greater the chance of developing cancer, leukemia, eye cataracts, Erythema, hematological depression and incidence of chromosome aberrations. This may not appear until many years after the radiation dose is received (typically, 10-40 years). Ogba/Egbema/Ndoni local government area oil fields produce about 80% of the total crude oil and gas supply in the Niger Delta region of Rivers state. Yet none of the research works done so far has addressed the NORM content of the hydrocarbon exploration and production activities and its radiological impact on the workers and the general public. This study therefore, seeks to assess the Norm content of hydrocarbon exploration and production activities and to estimate the radiological health implication to the general public and oil/gas workers.

Material and Methods

The Study Area

The study area lies with latitude 5°13'N and 5°22'N and longitude 6°33'E and 6°42' north west of the Niger Delta region of Nigeria(UNDP,2006). It is one of the onshore oil producing area of

Rivers state. The area which is one of the highest oil and gas production onshore of Niger Delta has over 900 oil wells with over thirteen active oil fields and playing a host to three multinational companies (Abali,2009). The area is criss-cross with network of pipelines carrying either oil or gas to the flow stations from the different oil wells (UNDP, 2006).

Oil activities started in Onelga in 1964 and production started in 1966 and ever since been in a continuous operation with increase in the number of drilled oil wells. Gas flaring and oil spillage due to rupture of pipe leakage has been the major environmental pollutant in the area.

Onelga has a topography of flat plains netted in a web of rivers –the Niger, Sombreiro(Nkissa), Orashi and their tributaries as well as dotted creeks. The tertiary lithostratigraphic sequence of the Niger Delta consists in an ascending order of the Akata, Agbada and Benin formations respectively. With the Benin formation making up an overall clastic sequence of about 9000-12,000m thick deposits (Ajayi et al,2009). The paralytic Agbada formation is a sequence of alternating sandstone and shales. Major hydrocarbon accumulations are

The counting equipment used for the gross alpha and gross beta counting is the gas filled proportional counter with 450mgkm³ thick window of diameter 0.06m. It is a EURISYS MEASURE IN 20 low background multiple (eight) channels alpha and beta counter. The counting system incorporates interference from high energy cosmic radiation into the measuring environment (ISO, 1997; Onoja 2004). The counting gas is an argon-methane mixture in the ratio of 90% to 10%. The instrument was calibrated following the ISO calibration standard procedure (ISO , 1997).

Results and Discussions

The two acceptable gross alpha and beta radioactivity counting modes (alpha only and beta (+ α) mode) only whose respective voltages are 1650 and 1700V were employed to count the prepared soil/sediment. The results of the gross alpha and beta activity in host community soil, field soil and field sediment are presented in table 1 below.

Table 1: Gross Alpha and Beta Activity Concentration for the Different Soil and Sediment Samples in the Fields.

S/ N	SAMPLE D OIL FIELD	SOIL/SEDIMENT SAMPLE ACTIVITY (β qkg ⁻¹)					
		Host Comm. Soil Sample		Field Soil Sample		Field Sediment Sample	
		α -activity	β - activity	α -activity	β - activity	α -activity	β - activity
1	Ebocha	2590.0 \pm 34.0	206,600.0 \pm 1906.0	170.0 \pm 18.0	3350.0 \pm 35	47.0 \pm 1.0	6040.0 \pm 121
2	Mgbede	47.0 \pm 1.0	9460.0 \pm 135	75.0 \pm 2.0	4250.0 \pm 70	14.0 \pm 6.0	1500.0 \pm 111.0
3	Obiafu	BDL	2490.0 \pm 32	120.0 \pm 3.0	18250.0 \pm 182.0	380.0 \pm 11.0	22520.0 \pm 450.0
4	Obrikom	93.0 \pm 2.0	6850.0 \pm 107.0	220.0 \pm 4.0	15220.0 \pm 257.0	BDL	1070.0 \pm 79.0
5	Ebegoro	35.0 \pm 13.0	1320.0 \pm 24.0	160.0 \pm 3.0	14780.0 \pm 167.0	440.0 \pm 2.0	3770.0 \pm 100.0
6	Omoku	69.0 \pm 2.0	10260.0 \pm 146	300.0 \pm 3.0	12030.0 \pm 105.0	250.0 \pm 3.0	7450.0 \pm 91.0
7	Erema	170.0 \pm 8.0	1660.0 \pm 27.0	1230.0 \pm 23.0	3970.0 \pm 36.0	220.0 \pm 4.0	34250.0 \pm 269.0
8	Idu-Ogba	140.0 \pm 3.0	13040.0 \pm 132.0	17.0 \pm 1.0	5200.0 \pm 146.0	620.0 \pm 15.0	2430.0 \pm 24.0
9	Obagi	46.0 \pm 2.0	5240 \pm 100.0	580.0 \pm 16.0	3220.0 \pm 27.0	35.0 \pm 1.0	2440.0 \pm 67.0
10	Ogbogene	100.0 \pm 10.0	1760.0 \pm 32.0	74.0 \pm 2.0	9820.0 \pm 170.0	90.0 \pm 21.0	4240.0 \pm 120.0
11	Odugiri	60.0 \pm 7.0	4370.0 \pm 29.0	200.0 \pm 3.0	13660.0 \pm 119.0	58.0 \pm 2.0	3040.0 \pm 100.0
12	Agwe West	120.0 \pm 2.0	9230.0 \pm 85.0	1400.0 \pm 22.0	110090.0 \pm 1360.0	290.0 \pm 3.0	10810.0 \pm 122.0
AVERAGE		289.16\pm7.0	22690.0\pm104.0	378.83\pm10.0	17820.0\pm267.0	203.66\pm6.0	7485.92\pm165.0

Table 2: Alpha and Beta Activity Concentration in control Samples

S/N	SAMPLE TYPE	α - ACTIVITY (βqkg^{-1})	β – ACTIVITY (βqkg^{-1})	SAMPLE EFF %
1	Soil	33.0 \pm 1.0	1660.0 \pm 14.0	90.52
2	Soil	20.10 \pm 0.42	98.0 \pm 2.34	80.21
3	Soil	15.24 \pm 0.12	240.0 \pm 10.1	100
	Average	22.78\pm1.02	666.0\pm11.20	

Table 1 shows the gross alpha and beta activity concentration in host community soil, field soil and field sediment samples. From table 1, the gross alpha activity concentration in host community soil ranges from BDL to 2590.0 \pm 34.0Bqkg⁻¹ with a mean value of 289.16 \pm 7.0 Bqkg⁻¹. While the gross beta activity concentration ranges from 1660.0 \pm 27.0Bqkg⁻¹ to 206,600.00 \pm 1906.0Bqkg⁻¹ with a mean value of 22690.0 \pm 104.0Bqkg⁻¹. In field soil samples analyzed, the gross alpha activity concentration ranges from 17.0 \pm 1.0 Bqkg⁻¹ to 1400.0 \pm 22.0Bqkg⁻¹ with a mean value of 378.83 \pm 10.0Bqkg⁻¹. The gross beta activity concentration in field soil samples ranges from 3350.0 \pm 35.0Bqkg⁻¹ to 110,090.0 \pm 1360.0Bqkg⁻¹ with a mean value of 1782.0 \pm 267.0 Bqkg⁻¹. Furthermore the gross alpha activity concentration in field sediment samples ranges from BDL to 620.0 \pm 15.0Bqkg⁻¹ with a mean value of 203.66 \pm 6.0Bqkg⁻¹ while the gross beta activity concentration ranges from 1070.0 \pm 79.0Bqkg⁻¹ to 22,590.0 \pm 459.0 Bqkg⁻¹ with a mean activity value of 7485.92 \pm 165.0Bqkg⁻¹.

Table 2 show the gross alpha and gross beta activity of the control samples. The mean alpha activity concentration for the control soil sample was 22.78.0 \pm 1.02Bqkg⁻¹ which is low compared with the observed alpha activity values in community's soil, field soil and field sediment samples respectively, while the mean gross beta activity concentration was found to be 666.0 \pm 14.0 Bqkg⁻¹ which is also lower than the observed beta activities on the soil samples. Comparison of the results of mean gross alpha and beta activity in the host community soil, filed soil and field sediment samples with the gross alpha and beta activity of the control samples has shown that the gross alpha and beta activity of the control samples were far less than the gross alpha and beta activity of the soil/sediment samples. This is an indication that the NORM content of the oil fields sampled and their host communities has been elevated due to hydrocarbon exploration and production activities in the area. Figure 2 is a graphical comparison of the gross alpha activity of the soil/sediment samples with the gross alpha activity of the control soil samples. While figure 3 is a comparison of gross beta activity of the soil/sediment samples with the gross beta activity of the control samples. Gross alpha and beta activity graphs exceeded that of the control in both figure 2 and 3.

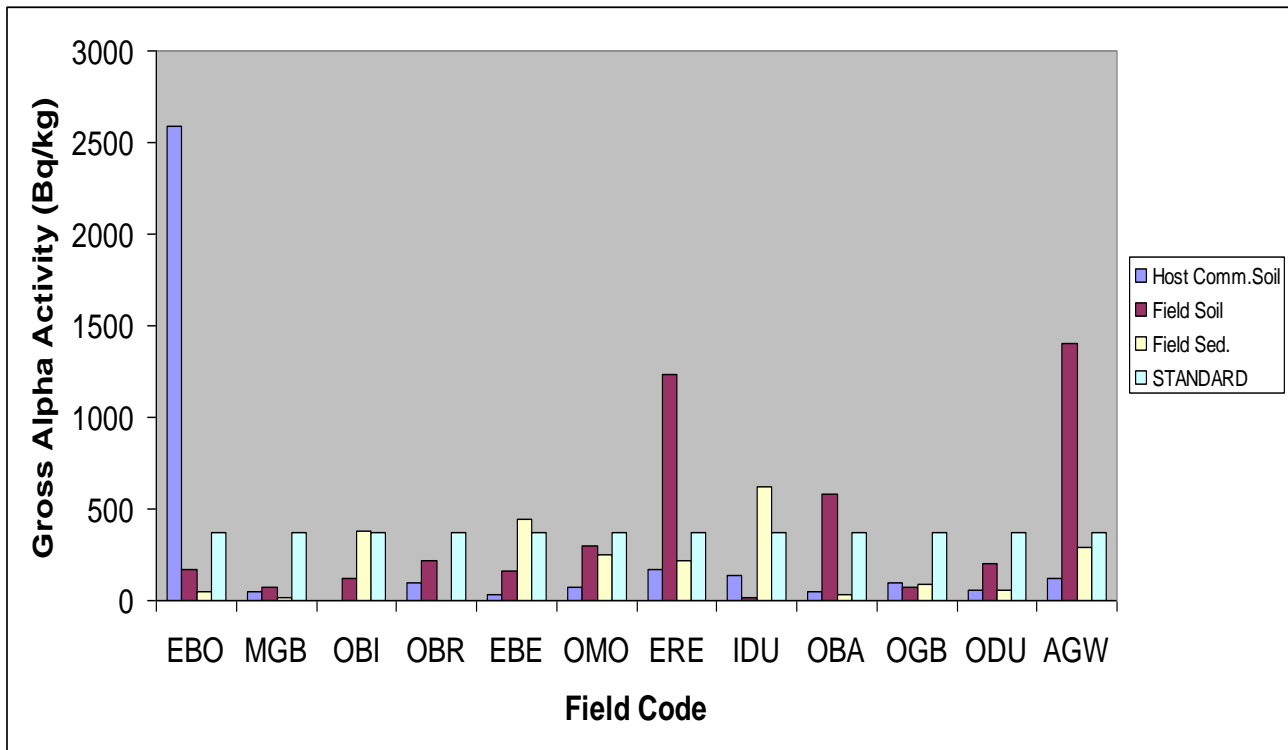


Fig.2: comparison of gross alpha activity concentration in soil samples with the standard UNSCEAR standard for soil.

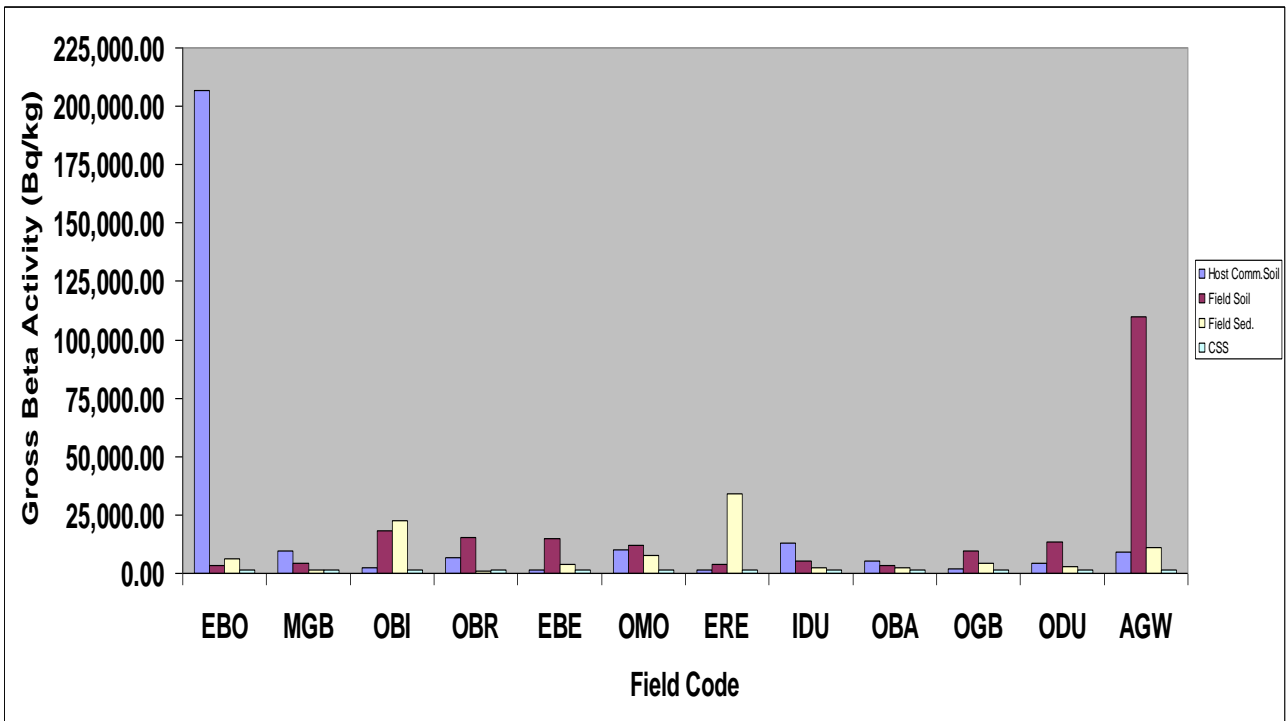


Fig 3: Comparison of gross Beta activity concentration in soil/sediment samples with gross beta activity of the control soil sample.

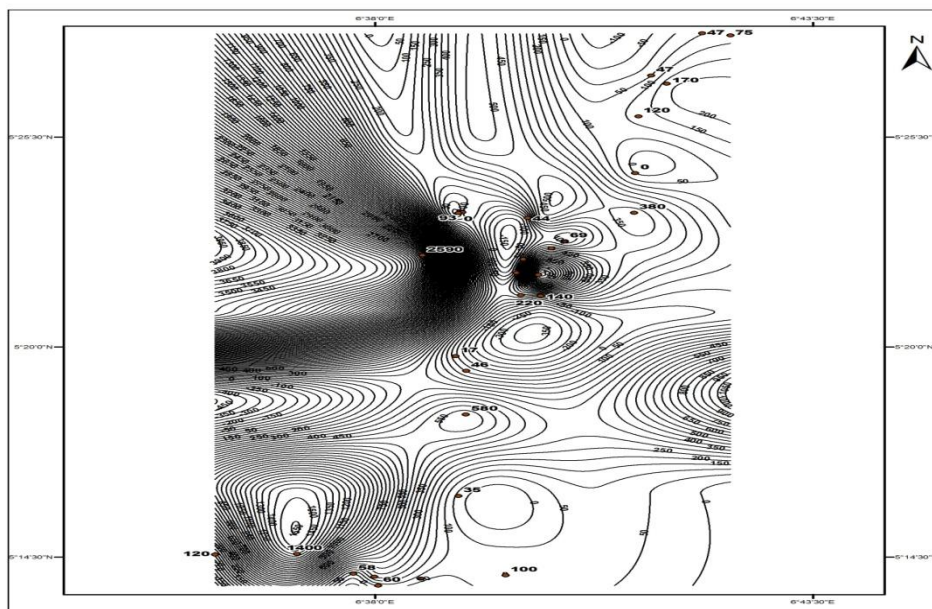


Figure 4: contour map of gross alpha activity in soil/sediment samples

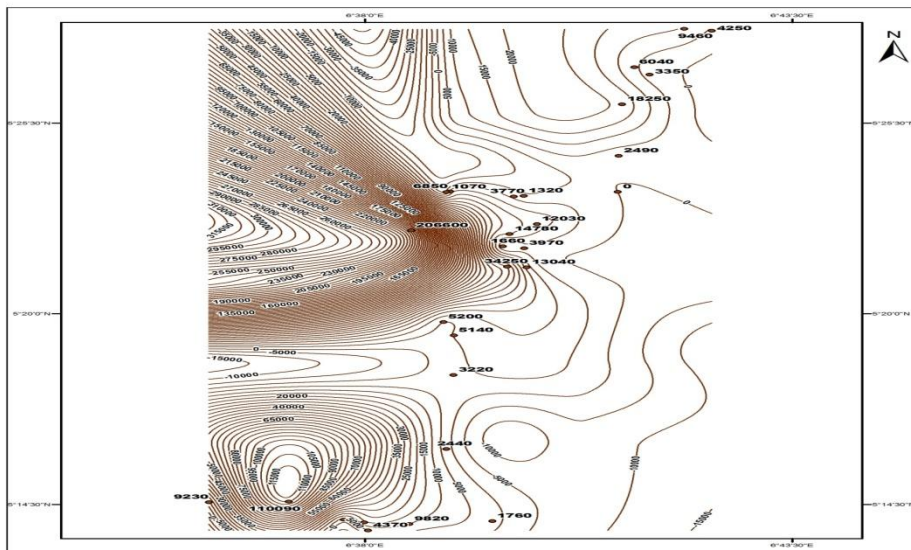


Fig 5 : contour map of gross beta activity concentration in Bqkg⁻¹ of soil/sediment samples.

Figure 4 and 5 show the iso-gross alpha and beta maps (contour radiological maps) expressed in Bqkg⁻¹, dry weight. The data show that the gross alpha and beta activity concentration of soil/sediment sample are not uniformly distributed. Areas bounded by latitude 5°22'-5°23' and longitude 6°38'- 6°40' has an elevated gross alpha activity concentration while areas bounded by latitude 5°22'- 5°26' and longitude 6°38'- 6°40' has an elevated beta activity concentration. Other areas have varying low values of alpha activity concentration and relatively high beta activity concentration. This non-linear distribution of alpha activity and beta activity in the oil fields sampled could be an indication that the cause of an elevated NORM in the oil fields is not strictly from the geological constituents, thus the enhancement of the NORM content of this environment which lead to enhancement of gross alpha and gross beta activity may have been due to modification and degradation due to industrial activities in the area. The obtained results showed that the

gross alpha and gross beta radioactivity concentrations in soil and sediment samples were found to be relatively higher than observed results in the works (Ozlem *et al*,2009;Ajayi et al,2009,Yuanxun *et al*,2003; Stephen,2004). This can be explained by the oil and gas exploration and production activities in the area which discharges their waste into cellar pits or ponds and sometimes into the water bodies and waste dumps. As a result of these activities, NORM content of the area is enhanced.

The gross alpha radioactivity concentration in soil samples is defined as the total radioactivity of all alpha emitters which in this case is mainly due to uranium and radium and thorium isotopes (Osmond and Ivanovich,1992). The values of gross alpha radioactivity originating from these alpha-emitters in soil samples depend on the geological characteristic of the area, content of mineral component and the type of activities in the area. Alpha emitters mixed to ground water by filtering from soil have contributed to the increased concentrations of gross alpha in well water samples. The gross beta radioactivity in soil is due to the natural long-lived isotopes ^{40}K , ^{210}Pb and ^{228}Ra (Cothorn et al, 1986). Others are artificial isotopes, such as ^{90}Sr and ^{137}Cs . However, the gross beta activity in soil samples in the studied area could be affected by hydrocarbon exploration and production activities that discharge effluent in cellar pits, water bodies, around the plant and the surrounding environment. Precipitation and flooding erode radionuclide on surface soils.

Conclusion

The main target of this work was to assess the naturally occurring radioactive material (Norm) content of a hydrocarbon exploration and production of Ogba/Egbema/Ndoni fields by determining gross alpha and beta radioactivity concentrations. In the host community soil, field soil and field sediment samples, the concentration of the gross alpha and beta were higher than that of the control samples from a non- oil bearing community. Natural radioactivity is directly related to the kind of geological layers and of their physico-chemical conditions. But the contour maps in figure 4 and 5 shows a non-linearity of the distribution of these radionuclide indicating that the cause of Norm elevation which lead to enhanced gross alpha and beta radioactivity might not be from geological constituent of the area but due to industrial activity in the area. The overall result shows a gross radiological pollution of the area which could be detrimental to the health of the oil workers and the general public as continuous exposure can lead to build up of radionuclide in the body which could lead to cancer and other related sicknesses. Therefore we recommend further studies on radiological burden of the water resources of the area and ascertain safety measure to limit exposure to these ionizing radiations.

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**EXPLORING EMERGING MYTHS AND REALITIES IN GENDER AND FEMININE
EDUCATION FOR NATION-BUILDING IN NIGERIA: OVERCOMING THE
CHALLENGES FOR EFFECTIVE HUMAN RESOURCE DEVELOPMENT**

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Abstract

This exposition highlights that, although Nigeria joined many other countries, agencies and organizations in adopting the resolutions of the Dakar Framework of Action (2000) on "Education for All" (EFA), our Nigerian women are still subjected to the vicious circles of gender-stereotyping and gender discrimination, which are designed to keep them in disadvantageous position in the quest for employing education in the task of achieving effective human resource development. The paper considers that there prevails a variety of constraints militating against the effective realization of not only the endorsements and resolutions of the Dakar Framework of Action but also the decisions taken at other World Conferences which are all geared at improving and enhancing the human resource development indices of women through education. The paper attempts to explain the effects of gender-stereotyping and gender discrimination on the human resource development of our womenfolk, which have prevented them from contributing meaningfully to the socio-economic development of the country. However, the paper endorses that, through meaningful and relevant education, mediated by way of requisite curriculum content structures, much of the effects of gender-discrimination and gender-stereotyping against these women could be ameliorated. This development could go a long way in providing, our women with the vital resource-base not only for achieving self-actualization and self-fulfillment but also for contributing productively to the necessary where-with-all needed for sustainable socio-economic and socio-political development in Nigeria. \

Introduction

Umoh (2004) reflects that the likelihood of factors such as gender, customs and traditions, religion and family education background to exert influence on the human resource development of an individual is an issue of very serious concern to our young people. In this context, gender is considered as a societal construct that separates the roles expectations of males and females. Keller (1991) also describes gender as a cultural construct that distinguishes the roles, behaviours, mental and emotional characteristics between males and females developed by a society.

However, Okeke (1999) argues that as society assigns and imposes certain behaviour characteristics on either sex, members begin to think, feel or act in ways expected of the society. Thus certain behaviour characteristics and attributes have been imposed by society on either sex and these behavioural attributes have now been constituted into stereotypes. Okeke (1999) also observes that these stereotyped "sex" roles and functions imposed by culture or tradition from one generation to another became accepted without question, internalized and erroneously interpreted and applied as if they are biological characteristics. Thus Okeke (1999) emerges with a very relevant thesis to this exposition that, although males and females can never be identical, however, gender differences and gender-stereotyping tend to be exaggerated to a point

such that they are constituted into myths and predicaments which tend to limit the human resource development and utilization of one's potentials.

What is being emphasized from the above is that when we sex-stereotype roles, we directly or indirectly limit full participation of individuals as well as limit full development of their resources. This is also a very serious constraint upon full realization of human resource development. In the Nigerian society, our women-folk have become victims of gender-stereotyping of roles and behavior attributes such that these have heavily militated against their overall human resource development in the task of nation building. . The problems and issues deriving from this gender stereotyping, according to Boserup (1970), have largely been instrumental for the marginalization of women in almost every aspect of human resource development. In Nigeria, this circumstance has contributed its own quota in the present very low indices of human resource development of the Nigerian womanhood.

Some effect of emerging myths and realities of gender discrimination and stereotyping on the Human Resource Development Indices (HRDI) of Nigerian womanhood.

Bolarin (1995) considers that Nigerian women, unlike the male counterparts, have not made any significant contribution in terms of the socio-economic development of Nigeria. She reflects that the possibility of making this contribution is very much in doubt when one takes cognizance of the high level of illiteracy prevailing amongst Nigerian women. She expatiates further that non-formal education programmes for women can only be effective if the recipients are involved in the formulation of objectives, planning and execution of such programmes based on their needs, aspirations, interests, abilities and competencies; she regrets that this development is quite far from being the case.

A number of research studies on the literacy level of Nigerian women (Abe, 1987; Awolesi, 1989; Bolarin, 1992; Odu, 1987; Adamu, 1988; Nwagbara, 1995; and Okeke, 1999) have shown that women are lagging behind their male counterparts in every level of formal education. The same pattern of low representation of Nigerian women has been discussed in several research studies on-career aspirations amongst these womenfolk (Bolarin, 1995; Durojaiye, 1975; Okpala and Onocha, 1985; and Osuji, 1976). These studies generally endorse that Nigerian women have been grossly under-represented in the various sciences and Science-based courses and careers. It is considered that as serious as these issues are, one realizes that it is erroneous and unrealistic to think that the problem of Nigerian women lagging behind their male counterparts is a problem that can be solved within a short period of time as the slogan "Education for All in the Year 2000" tends to point out. In her research studies on "functional women education" Bolarin (1995) posited that UNESCO endorsed that 62% of the adult illiterates in Nigeria have been found to be women. This posture discloses that serious work needs to be done in the area of "Women Literacy Programmes" if the situation is to improve. It is endorsed in this exposition that one will not expect much from illiterate women-folks who definitely lack the basic functional education and training which will lead to their effective participation in the socio-economic development of this country.

Etuk (2004) discloses that gender discrimination has had very serious negative consequences on the human resource development of the women-folks in Nigeria. Thus Olayinka (1973), Osuji (1976), and Abiri (1977) found from their research studies that vocational aspirations and choice are influenced by certain variables including gender and family background. These researchers revealed that males chose male-stereotyped occupations while females chose female-stereotyped occupations. Thus sex-roles and sex-stereotyped concepts, as sanctioned by the Nigerian cultural values, have traditionally insisted that the place of women is the home. This cultural expectation, according to these researchers, is responsible for the domination of males in some job areas and females in other areas. In this perspective, Ehindero (1986) discloses that such professions and courses as Home Economics, Nursing, Secretary-ship, and other famine-related courses have traditionally been regarded as aspects of the school curriculum reserved for females.

Etuk [(2004) submits that the endorsement of gender-stereotyping and gender discrimination in the Nigerian socio-cultural patterns have had a pronounced negative effects on the human resource development and availability, quantitatively and qualitatively in Nigeria. Etuk (2004) recounts that the negative effects of these gender-stereotyping in Nigeria have weighted more against our women-folk. He enumerates these effects thus: (a) overwhelming domination of males in such a job area as the auto-mechanic profession; (b) shortage of manpower in certain professional fields as the carpentry field because it is believed to be a special reserve-field for men; (c) more number of unemployed women who have resorted to becoming complete house-wives because of lack of job opportunities which largely emanate from the problems intrinsic in gender-stereotyping; (d) very few number of job areas available for women due to gender discrimination; (e) little concern for women education which limits the quality of their innate capabilities for human resource development; (f) under-utilization of the potentials of women in a number of professional fields because of the negative effects of gender-stereotyping associated with these profession; (g) general shortage of women skilled manpower in the labour market due to the neglect that women education have suffered at all levels of education; and (h) uneven distribution of the entire labour force due to gender discrimination and stereotyping that our women-folk have been a victim of.

Nwagbara (1995) reveals that as a result of the "negative and unrealistic" gender-stereotyping construed in reference to their role-behaviour, Nigerian women have not effectively participated in the nation's development. She reveals that, at present, a variety of social and cultural barriers which impinge on such gender issues as "early marriages", "high bride-price", "domestic and rural drudgery", "discriminatory family treatment" and "old age insecurity" are some of the social injustices that afflict Nigerian womanhood. Nwagbara (1995) further considers that "low social and economic status" "marital instability", and "insecurity at old age" are some of the causes of high fertility amongst Nigerian women. She endorses that the large-scale exclusion of Nigerian women in the nation's development has fostered and enhanced fertility rates amongst them.

Okam and Umeh (2004) warned that the current over population and unemployment crises in Nigeria is largely traceable to the incidence of high fertility rates amongst the women-folk. It is conceded that in spite of the gender issues and problems which largely derive from the stereotyping of women's role-behaviour and status, women make up about 50% of Nigeria's population (Adamu, 1987; Nwagbara, 1995; Okam and Ulineh, 2004). Again, in spite of their numbers, this section of the Nigerian population is characterized, to a very large extent, by widespread illiteracy, especially in the rural areas. Thus Nwagbara (1995) expatiate further that it is not an understatement to say that about 90% of the women in Nigeria are uneducated, yet it is these women who are central to the issues that bear on the Nigerian over population crisis. She reflects that it is only if these women are well educated and well-informed can they, on their own, understand the implication of large populations and or the problems of overpopulation and unemployment. Ajaegbu (1985) observes that in some rural locations of Nigeria, many women breed children without due consideration of the implications on their health and on the well-being of their families. Sometimes this development, according to Ajaegbu (1985), is due to cultural biases in which child-bearing is construed as God-sent and should not be tampered with. However, on these illiteracy-syndromes menacing and militating against the human resource development of our Nigerian women folk, Adamu (1987:2) warns "that in this competitive world, no development-oriented government can afford to watch helplessly half of its population being drowned in total or partial darkness or ignorance, more so that this neglected half is mostly charged with the responsibility of bringing up the younger generation who are usually labeled leaders of tomorrow. He reflects the problem thus:

What kind of leaders is the nation going to have if their early formative years are marked by misguidance by ignorant mothers.

Exploring the realities and assets in feminine education for nation-building as demanded and endorses in the Dakar Framework for Action (DFA) for Human Resource Development

The Dakar Framework for Action (2000) for "Education for All" (EFA) endorses that every woman has a right to education. It asserted that it is only through a sustained commitment of women to useful and meaningful education could they contribute with strength and purpose in addressing a variety of problems that have engulfed the world. The Conference reflected that the world faces daunting problems; it enumerates some of the notable ones as follows: mounting debt burdens, the threat of economic stagnation and decline, rapid population growth, widening economic disparities among and within nations, war, occupation, civil strife, violent crime, the preventable deaths of millions of children and widespread environmental degradation. It noted that these problem have led to the major obstacles in the provision of women's education in many of the least developed countries of the world;

The conference equivocates that it is only through a genuine commitment of women to education could they embrace their essential rights and capacities for the purpose of benefiting and tapping into the promises and possibilities of the new century including the following: a variety of useful scientific and cultural developments; availing themselves of available information, much of which are considered relevant to survival and basic well-being; an exposure to information schemes which are rooted in the provision of more life-enhancing knowledge; including the structures involved in learning how to learn; as well as tapping into the synergistic effects that occurs when important information is coupled with the modern advancement that is rooted in our new capacity to communicate. The Conference entertained the hopes that these new forces of development, when combined with the cumulative experience of reform, innovation, research and the remarkable educational progress of many countries, could make the goal of women education an attainable goal.

Based on the foregoing philosophical reflections and pronouncements by the Dakar Framework of Action (2000) on the place of education in enhancing the human resource development of women, it emerged with three major components in respect of its framework about tie vital need for women to be educated as follows : (a) the implications of the fundamental right of all women to be educated; (b) the purpose of education for all women; and (c) an expanded vision and a renewed plea for women to become committed to education.

In respect of the implication of the fundamental right of all women to be educated, the Conference considered the relevance of the following to the totality of the spectrum of womanhood as follows: (a) exposing them to an understanding that education can help them ensure a safer, healthier, more prosperous and environmentally sound world while simultaneously contributing to their social, economic, and cultural progress, tolerance and international cooperation; (b) acquainting them with the knowledge that education is an indispensable key for personal and social improvement; (c) a recognition that sound basic education for women is fundamental to the strengthening of higher levels of education for them including their attainment of scientific and technological literacy and capacity and thus to self-reliant development; and (d) a recognition of the necessity to provide and to present the coming generations of women an expanded vision of and a renewed commitment to education to enable them address the scale and complexity of the challenges confronting humankind in the quest for survival and effective living.

With regard to the purpose of education for all women, the Conference considered the vitality and necessity of meeting their basic learning needs in a variety of ways through the process (education) itself. The following endorsements were made: (a) the necessity for meeting women's basic learning needs in the areas if literacy, oral expression, numeracy, and problem-solving through exposure to basic learning content that embraces knowledge, skills, attitudes and values required by human beings for the purpose of executing the following: (i) ability to survive;(ii) ability to develop their full capacities;(iii) ability to live and work in dignity;(iv) ability to participate fully in development; (iv) ability to improve the quality of their lives; (v)

ability to make informed decisions and to continue learning. The Conference emphasized that the acquisition and satisfaction of these "need areas" in the lives of women could expose and equip them to achieve the following designs, namely: (i) empowering them in any society and conferring upon them the responsibility to respect and build upon their collective cultural, linguistic and spiritual heritage;(ii) a commitment to promoting the education of others; (iii) a commitment furthering the cause of social justice; (iv) a commitment to the achievement of environmental protection; (v) a commitment to a display of tolerance towards social, political and religious systems which differ from their own; (vi) a commitment to ensuring that commonly accepted humanistic values and human rights are upheld; and (vii) a commitment to work for international peace and solidarity in an interdependent world. A cultivation of these designs, according to the Conference, could commit our womenfolk into the task of promoting the transmission of common cultural and moral values which are designed to enable them find their identity and worth; they could also be enabled to recognize "education" as more than an end in itself which is designed to create the necessary foundation for life-long learning and human development on which an individual may build systematically further levels and types of education and training.

In the context of an expanded vision and a renewed plea for women to become committed to education, the Conference suggested the need for them to contemplate and embrace educational designing that surpass present resource levels of institutional structures, curricula and conventional delivery systems while building on the best in current practices. The Conference endorsed the need for urging women to tap with vigour and creativity into the present new possibilities which result from the convergence of the increase in information and the unprecedented capacity to communicate in a bid at achieving this design. Thus, in the circumstance of the determination for increased effectiveness in the education of women, the Conference emerged with a number of ways of achieving the expanded vision of education thus: (a) universalizing access and promoting equity (b) focusing on learning; (c) broadening the means and scope of education generally; (d) enhancing the environment for learning; and (e) strengthening partnership which bear on education as a human endeavour.

In the sphere of universalizing access and promoting equity, the Conference awakens women to the realization that an enormous potential for human progress; and empowerment largely derive upon their ability and enablement to acquire the education and the start needed to tap into the ever-expanding pool of relevant knowledge and the new means for shaping this knowledge; the Conference calls for the removal of every obstacle that prevents the active participation of girls and women in education; the Conference also demanded that all gender stereotyping in education should be eliminated. It advocated that active commitment must be made to remove educational disparities against women; it also endorsed that women should not suffer discrimination in access to learning opportunities. As regards the focusing on learning, the Conference endorsed that active and participatory approaches are particularly valuable in women's education in a bid at assuring learning acquisition and allowing them to reach their fullest potential.

In the task of broadening the means and scope of education for women, the Conference noted that their learning needs are diverse and should be met through a variety of delivery systems. It explains that literacy programmes could be employed in creating the basis and foundation for other life-skills; it expatiates further that literacy in the mother tongue could be used in strengthening women's cultural identity and heritage. It also suggested that women could be encouraged to utilize skills-training and apprenticeship devices to explore the value of educational programmes in a number of societal issues for a purpose of enhancing their human resource development. These educational programmes could possess relationships which bear on such issues as: health, nutrition, population, agricultural techniques the environment, science, technology, family-life including fertility awareness.

In the area of enhancing the environment for learning, the Conference endorsed that societies must ensure that all women receive the nutrition, health care and general physical and emotional support they

need in order to participate actively in and benefit from their education. It advocates that the knowledge and skills that will enhance the learning environment of children should be integrated into community learning programmes for women; the Conference endorsed that the education of children and their mothers is mutually supportive and this interaction should be used to create for all (including women) a learning environment of vibrancy and warmth.

With regard to the issue of strengthening partnerships, the Conference advocated that authorities (national, regional and local) should explore new and revitalized partnerships at all levels for the purpose of providing education for all (including women). It endorsed the need for creating a variety of partnerships such as: partnerships among all sub-sections and forms of education; recognizing the special role of teachers, administrators and other educational personnel; partnerships between education and other government departments, including planning, finance, labour, communications and other social sectors; partnerships between government and non-government organizations, the private sector, local communities, religious groups, and families. The Conference urges that the recognition of the vital role of both families and teachers is particularly important in this "partnership" context; the Conference cautions that the terms and conditions of service of teachers and their status, which constitute a determining factor in the implementation of education for women must be urgently improved in all countries in line with the joint ILO/UNESCO Recommendation concerning the Status of Teachers (1966). The Conference reminded all stakeholders that the essence of "an expanded vision and a renewed commitment" to the education of women is rooted in exploring and employing "partnership designs" in achieving deserved ends.

Some challenges intrinsic in the myths and realities rooted in gender and feminine discrimination and stereotyping: problems of achieving effective human resources development for nation-building in Nigeria.

Discrimination against women's education in relationship to the bid for enhancing their human resource development has been the subject of concern for several years in the world. Four World Conferences were held in Mexico (1975), Nairobi (1985), Copenhagen (1995) and Beijing (1995) and were designed, among other aims and objectives, to improve and enhance the human resource development indices of women. In the perspective of this exposition, these Conferences largely dealt with the ways and means of executing, in practical terms, most of the pronouncements and recommendations demonstrated above in the Dakar Framework of Action (2000) for the Human Resource Development of Women. The United Nations (UN) has also organized very high frequency Commissions on women and approved a decade for women from 1985 to 1995. These Commissions "endorsed, recognized and emphasized the need to promote the education of girls and women and to bring about the necessary conditions for them to enjoy full and genuine equality in education especially at the secondary and higher levels and in science and technology education" (Okeke, 1999). Also, these Conferences, according to Ukpabor (2007), advocated the need to enhance the status of the girl-child and women and help them to participate fully in the various responsibilities of economic, social and political life for rapid and qualitative development of the country. In line with these reflections, the National Policy on Education (NPE, 2004) clearly states that every Nigerian shall have a right to equal educational opportunities according to his or her ability.

Adugbo (2000) recounts that the basic objective of the foregoing Conferences is to bring about gender equality at home, in the work place and the wider national and international communities. He expatiates further that these conferences were largely designed to bring to focus the status and rights of women which leave very much to be desired because it is believed that the perceived discrimination against them engenders certain obstacles which prevent women's active participation in all spheres of life. Thus Okeke (1999) is emphatic on the view that gender issues in education has assumed great and negative dimensions in the lives of our womenfolk; She reminds us that many persistent problems of

underdevelopment such as "overpopulation", "high inflation", "high infant mortality rate", "poor nutritional status and health care", "low family income", "children's under-achievement in education" and "low gross national productivity" can find their solution in the requisite and effective education of women and this requisite and effective education appear to be eluding our womenfolk on daily basis.

Thus Adugbo (2000) reflects sadly that female education is known to have lagged far behind that of their male counterparts in most countries of the world including Nigeria. He reminds us that even though the Beijing Declaration and the Platform for Action (1995) regards education as a human right, low level of education is generally observed among women. Boserup (1970) believes that this development largely resulted from the discriminatory policy in education and the attitude of many parents; she concedes that parents were more willing to send their sons to school than their daughters. Thus Odu (1986) states that in Nigeria, much of the illiteracy and lack of numeracy prevailing in the country are found amongst the womenfolk. According to the UNEESCO (1960) figures, the only place where girls constituted 50% of the enrolled primary school population was Lagos; it was only 20.3% in the Northern States; the figures for the secondary school level were 12.7% in the old Eastern Nigeria; 19.8% in Western Nigeria; and 12.3% in the North. Yet, it has to be stressed that education is an essential tool for achieving the goals of equity, development and peace. It has been clearly documented and endorsed in many ways that a high priority must be given to education to ensure development in this country (Olayinka, 1973; Osuji, 1976; Okpala and Onocha, 1985; Abe, 1987; Odu, 1987; Adamu, 1988; Awolesi, 1989; Bolarm, 1995; Nwagbra, 1995; Okeke, 1999; Etuk 2004). To neglect the education of women is to neglect the full potential of human resource development and ignore the totality of development (FAO, 1975; Wilson, 1963). What this neglect implies, among others, is that this pattern of education lays the foundations between the roles men and women are supposed to play in society. The girls are made to accept the role of the women primarily as a wife and mother. These situations have been well articulated by Hammond and Jablor (1977) when they pointed out that "Africa" itself provides the ordeal which initiates the youth (whether females or males) into the society of men. The exclusiveness of male society is mentally accompanied by a sense of masculine Superiority to which women give ascent.

Thus in spite of the view that Nigeria's National Policy on Education (2004) lays emphasis on gender equality on education, women's education still trails far behind men's with far-reaching adverse consequences for both individual and national well-being. Thus Aboribo (2000: 82-83) considers that the willingness, enthusiasm and ability of women to actively participate in the development process in Nigeria is a function of many factors which are socio-economic and political. He reflects on these factors thus: (a) conflicting religious and cultural norms and values which have done little or nothing to advance women's education because their educational endeavours are influenced by these norms and values; (b) only educated parents could countenance the tendency to send their female children to school; most illiterate parents thought very less about the relevance of that "super structure"; (c) the endorsements of early marriages by parents for their female children led to early settlement in life for these ladies and this development in itself deprived them of education; (d) many residential school environments have been found to be un-conducive for the pursuit of education in respect of women; these schools lacked the necessary facilities and resources and conducive atmosphere to engender female education; (e) some husbands and even parents might want to terminate their support for female education at a certain level of attainment and thereafter terminate it; (f) in some cultures, the female sex is to be seen and not to be heard; their activities are restricted strictly to the home and domestic affairs; this position coupled with allied pastures and attitudes appear to have shaped the female emotions, interests and activity over the years; in certain circumstances, women are denied and deprived of many socio-economic benefits which their male counterparts enjoy and these deprivations and discrimination have affected the status of girls and women in the society; (g) generally, there is low transition of females to higher levels of education (i) inadequate and incommensurate response of governments (Federal, State and Local) to the reality and scope of the problem of discrimination of women in the quest

and pursuit of education; (i) women non-governmental organizations have not adequately participated or emerged with sufficiently meaningful and sustainable educational programmes for the females; (j) although the government Blue Print (1989) on women's education has been in existence for almost two decades, it does not contain adequate appraisal of the state of women's education in the country; the implementation of its lofty ideals have not been sufficiently and vigorously pursued; (k) widespread researches have not been sufficiently executed to alert the nation about the consequences of denying women of access to education; also, most public functionaries are not adequately 'aware of the viable options or strategies to adopt in promoting female education; (l) women's education was not given any priority attention in the 1976 Universal Primary Education; again, women's education has not been adequately attended to in the present dispensation \ in spite of the endorsements in the National Policy on Education (2004) regarding the provision of equal access to education for all groups; and (m) in spite of the United Nations' declaration of a Decade for Women (1975-1986) which resulted in greater involvement of women in development activities in many parts of the world, Nigerian women have not received sufficient attention regarding their involvement in schemes and structures that could bring about large-scale human resource development.

The implication of the foregoing reflections largely subscribe to the view that our women have not sufficiently acquired the requisite knowledge, skills, attitudes and values that are necessary for making them active participants and beneficiaries of resource development activities in society. Thus the implementation of the ideals of the Dakar Framework of Action (2000) for the education of women in this country has largely not been executed (Umoh, 2004; Etuk, 2004; Okam and Umeh, 2004; Ukpebor, 2007; and Onuekwue, 2007). However, a number of research studies (Yeld, 1964; Kaita, 1972; Omololu, 1972; Uyanga, 1976; Musa, 1981; Hake, 1970; Adamu, 1987 and Chineme, 1999), have generally confirmed the negative and demoralizing effects of gender-stereotyping on the human resource development of Nigerian women. Thus, Yeld (1964) identifies that the high degree of seclusion generally imposed on women, as a result of adherence to certain religious and cultural activities, constitute one of the most adverse limiting factors on the education of women and girls in Kebbi and Sokoto States. Kaita (1972) stresses that in many parts of Sokoto, Kebbi, Katsina and Kano States, the greatest problems that hinder women education are mostly attributable to their home-background and religion as well as some social and community sanctions. Thus Kaita highlights that children are brought up right from the beginning with some "feelings against Western Education and in this respect, they are unwillingly forced to go to schools against which they already had cultivated a traditional prejudice for. Omololu (1972) expresses her dismay on the issue that women are still being held inferior to men almost in every part of the world. She reflects that male children are preferred to female children because the male child will propagate the family name; for this reason, according to Omololu, any amount of money could be spent on his education and this would not be regarded as a waste, whereas, in the case of a girl, it is considered a waste as she would eventually end up in the kitchen. Musa (1981) highlights the view that most Hausa husbands disapprove of the independent activity of women outside the home, feeling that it would lead to liaisons with other men. He also points out that in the Northern States, there is the tendency to regard all unmarried educated women as sexually loose, especially those who work or appear well-dressed. This prejudice is extended by the general populace even to highly educated ladies attempting to enter the professions. Musa also discloses that in these Northern States, particularly among the Hausas, men generally do not want to marry educated girls, fearing that the home may be neglected if a married woman with children spends most of her time out of the home working, and with no responsible person at home, the children may be adversely affected. Uyanga (1976) discloses that the problem of finding a husband once a woman is educated is a major force militating against human resource development amongst women particularly in the Hausa-speaking areas of the North. ; She stresses that the Hausa-speaking communities' lack of interest in marrying educated women is very high and precarious. She expatiates that this development could be as a result of one or more of these factors: high bride price, cultural upbringing, desire of men to be dominant, religious values or the superiority feelings of

educated women and their rejection or seclusion. These forces, according to Uyanga, are so pervasive that, though a great proportion of men may have the desire to marry the educated women, very few have the genuine intention of doing so. Hake (1970) comments that the problem of allowing girls to attend school is a significant one for parents living in Northern Nigeria. He reflects that the Muslim religion entreats women to be humble and subservient towards men especially their husbands. He discloses that parents entertain fears that when a girl receives even an elementary form of education she would no longer be submissive to her parents as well as to her future husband. Hake (1970: 17-18) advances a number of reasons militating against female education in Northern Nigeria as follows: pervasion against the co-educational approach to female education; and the failure of teachers in the public schools to emphasize the need for moral education in their institutions. Adamu (1981) in his research studies considers a number of reasons which have operated adversely against female education, particularly in the Northern States thus: the desire of men to maintain their dominance over women; the fear that women might supersede men in knowledge and therefore pose a threat to their positions and dominance; irrelevant curriculum; men's fear of being displaced from; their jobs by females; the need for upholding the patrilineal system of social organization; the negative effect of Western Education on female members of the community that encourages them to disrespect their traditional cultural norms (it is upheld that this development tends to foster gross immorality among the educated women); early marriages; and the lack of confidence in the teachers operating in both the primary and secondary schools. In her research studies. Chineme (1999) discloses that although Nigeria joined other countries, agencies and organizations in adopting the 1990 World Declaration on Education for All (EFA) by the year 2000, there are many constraints against the effective realization of this resolution. She emerged with the view that the conventional methods of education alone can not achieve education for all by the year 2000. She advances the need for embracing Popular Education (PE) as a strategy in the education of illiterate women, a group that resigns its helpless predicament to fate. Chineme expatiates that Popular Education conscientizes people and empowers them to take action and change all oppressive social and economic structures. She endorses that the empowering of women demands action on several fronts - from the government, non-governmental organizations, cooperative societies and public spirited individuals. She considers that a concerted effort from all these groups either collectively or singly could ensure sustainability of any gains achieved.

Overcoming the predicaments of emerging myths in gender and feminine discrimination and stereotyping through effective education for human resources development for sustainable national development in Nigeria.

Umoh (2004) reflects that the pattern of defense based on gender-stereotyping does not and would not favour human resource development in Nigeria. He emphasizes the need for people to employ the virtues implicit in education as an end to bring about human resource development through an exploration of the innate characteristic intrinsic in the womenfolk. It is also important to recognize that, to a very large extent, the family influences virtually affects all aspects of a child resource development capacities including his thinking, behaviour and career selection (Umoh, 2004). Azikikve (1998) notes that children are socialized very early into "appropriate" sex-typed behaviour including a variety of forms of human developmental activities and occupations.

What is being emphasized here is that an individual's career choice including his human development indices is often a reflection from sex-stereotype initiated through family socialization or education. As a result of parent-child socialization, adolescents often make their career choice including their human resource development indices in accordance with the aspirations held for them by their parents (Nwezeh, 1988). Thus, family and home socialization often produce a significant contribution to an individuals human resource development indices and behaviour. However, unfortunately, Umoh (2004)

considers that family education in the aspect of socializing the child into occupational area based on gender is discriminatory and bears a negative consequence on human resource development. In other words, sex-stereotyping in occupational choice is pervasive in boosting the human development indices of an individual. Thus while sex-stereotyping limits choices of both male and female, it is particularly constraining for women because few career occupations are perceived as being appropriate for women. Besides, the fewer job areas available for women might be of low status and income and thus seem discouraging.

It is suggested that the family as an agent of socialization and the first institution for the propagation of career aspirations, behaviour and human resource development indices, particularly for young persons, must be ready to make the home ultimately equitable in terms of motivation, counseling, and supervising both males and females through the employment of education, both as a process and as an end in itself. Thus both males and females at home should be made to face difficult task situations while they are severely monitored to determine the direction of their potent fiats. Over-painpering of the female folk, according to Umoh, makes them weak in thinking, initiative and problem-solving. In essence, if women are initially challenged at home through exposures to problem-solving tasks and a variety of forms of educative endeavours, and there is a pattern of sex-stereotyping, both male and female alike would flourish into full developed human resource assets for the nation.

Umoji (2004) concedes that no nation will develop without quality and quantity manpower and human resources. Thus, the actualization of our quest for human resource development requires that parents, teachers, and the learners must be abreast with the current trend in the labour market in terms of existing employment opportunities and the skills required to fill in the opportunities. Hurlock (1973) notes that too little vocational information limits the child and often forces him to select an occupation not well suited for his interest, abilities and human resource development. It follows that career development and information are necessary for human resource development. By providing adequate and appropriate career information, through education, students can be helped to acquire competencies that will enable them make realistic choices.

Anyikwa (1998) entertains the view that most parents in Nigeria are illiterates and do not possess the adequate career information to help their children to begin to cultivate the necessary pre-requisites and ideals germane for effective human resource development. Their choice of career for their children is usually based on gender and gender-stereotyping. It therefore becomes directly a function of the school, through the education process, to help the child out of the predicament of making unrealistic career that could become counter-productive for effective human resource development in the final analysis. In other words, a child's career choice abilities, his nature and demands should constitute an integral part of the function of education in the context of nurturing, grooming and improving these human resource development ingredients and prerequisites in the interests of the child.

It is considered that probably the most basic function of the school in respect of an individual's career development including his/her human resource development agenda is to encourage him to grow and utilize his/her full potentials. This aim rests on the assumption that each person, woman or man, is capable of utilizing his/her abilities to the fullest if given opportunities to grow and realize his/her potentials through adequate and meaningful exposures to education through the school (Umoh, 2004; Anyinkwa, 1998; Etuk, 1998; Okam and Umeh, 2004). The school has an obligation to assist the individual to fully utilize his/her abilities and on completing her/his education, to engage in jobs, careers or activities that are commensurate with his/her abilities and interests in the quest for effective human resource development in the task of contributing meaningfully to sustainable national development. In other words, school's responsibility, among others, is to assist the individual (man or woman) formulate realistic and realizable career and human resource development goals. In order to achieve this design, the school must include, as part of its curriculum offerings, career and human resource development programmes so as to enable both sexes cultivate the necessary human resource development structures and ingredients germane

for achieving self-actualization and self-fulfillment in a bid at contributing productively to sustainable national development in Nigeria.

Conclusion

A number of scholars (Okeke, 1999; Nwagbara, 1995; Bolarin, 1999 Anyikwa, 1998; Etuk, 1998; Umoh, 2004; and Okam and Umeh, 2004) are opposed to the ideas or ideals in gender-stereotyping because they could constitute impediments to effective human resource development, particularly in respect of our women-folk. These researchers and academics generally endorse that individuals possess innate characteristics and potentials which when properly developed, through education, enable them to assume full responsible personalities who can contribute meaningfully and productively to national development. Thus, effective family education could be employed in exploring gender differences amongst young persons (males or females) so as to enable them cultivate the ideals intrinsic in embracing human development structures that constitute necessary prerequisites for making good career choices. The above-named researchers generally concede that sex-stereotyping is responsible for shortages of manpower resources in certain professional fields and this development has been allowed to weigh adversely against our women. It is considered in this exposition that sex-stereotyping should not constitute a prominent issue in deciding life in Nigeria; it is also entertained that women have not been given equitable education and employment opportunities necessary for effective human resource development in Nigeria.

We need to employ education for the purpose of exploring gender issues and matters to enhance and improve the psyche of our womenfolk. We also need to explore all the necessary and a variety of pedagogical processes and avenues in order to expose our womenfolk to the curriculum resource base of human resource development so as to enable them contribute their own quota in addressing and solving such national development problems as the "over-population crisis" in which Nigeria is currently wallowing in. Through meaningful exposures to education, our womenfolk could be made to occupy central and strategic positions in our socio-economic framework such that they could put checks and restrictions in our population growth. It is vital that all women be exposed meaningfully to formal or non-formal forms of education programmes in order to tap into the knowledge resource base of human development as a curriculum design. Through this emphasis, these women could become human resource-assets and experts on issues and matters which bear on sustainable national development in the context of Nigeria.

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ASSESSMENT OF NORM-CONTAINING FOOD CROPS/STUFFS IN OML 58 & OML 61 WITHIN THE NIGER DELTA REGION OF NIGERIA.

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ABSTRACT

A preliminary assessment of the levels of natural radionuclide in some commonly consumed cereals, fruits, vegetables and tubers within OML 58 and OML 61 in Niger Delta Region of Nigeria has been carried out. The areas under study were divided into six (6) zones (A,B,C,D,E,F) and investigated. An insitu measurement approach was adopted using Nuclear Radiation Meter (Radarlert-100), and a handheld Global Positioning System (GPS 76 CSX) equipment. Sixteen (16) readings each was taken in each of the six zoned areas making a total of ninety-six (96) food crops samples which was randomly selected. Measured average radiation levels in each of the six zones ranges between $0.009 \pm 0.001 \text{mRhr}^{-1}$ ($0.479 \pm 0.038 \text{mSvyr}^{-1}$) to $0.020 \pm 0.001 \text{mRhr}^{-1}$ ($1.064 \pm 0.065 \text{mSvyr}^{-1}$) for zone A, $0.011 \pm 0.001 \text{mRhr}^{-1}$, ($0.585 \pm 0.041 \text{mSvyr}^{-1}$), to $0.022 \pm 0.002 \text{mRhr}^{-1}$ ($1.170 \pm 0.105 \text{mSvyr}^{-1}$), for zone B, $0.010 \pm 0.001 \text{mRhr}^{-1}$ ($0.532 \pm 0.048 \text{mSvyr}^{-1}$) to $0.025 \pm 0.002 \text{mRhr}^{-1}$ ($1.330 \pm 0.016 \text{mSvyr}^{-1}$) for zone C, $0.010 \pm 0.001 \text{mRhr}^{-1}$ ($0.532 \pm 0.048 \text{mSvyr}^{-1}$) to $0.028 \pm 0.002 \text{mRhr}^{-1}$ ($1.490 \pm 0.134 \text{mSvyr}^{-1}$) for Zone D, $0.005 \pm 0.000 \text{mRhr}^{-1}$ ($0.266 \pm 0.021 \text{mSvyr}^{-1}$) to $0.022 \pm 0.002 \text{mRhr}^{-1}$ ($1.170 \pm 0.105 \text{mSvyr}^{-1}$) for Zone E, $0.010 \pm 0.001 \text{mRhr}^{-1}$ ($0.532 \pm 0.048 \text{mSvyr}^{-1}$) to $0.016 \pm 0.001 \text{mRhr}^{-1}$ ($0.851 \pm 0.068 \text{mSvyr}^{-1}$) for Zone F. The mean food crop radiation levels ranges from $0.012 \pm 0.001 \text{mRhr}^{-1}$ ($0.798 \pm 0.065 \text{mSvyr}^{-1}$) to $0.016 \pm 0.001 \text{mRhr}^{-1}$ ($0.849 \pm 0.067 \text{mSvyr}^{-1}$) while the mean background radiation levels ranges from $0.011 \pm 0.001 \text{mRhr}^{-1}$ ($0.585 \pm 0.041 \text{mSvyr}^{-1}$) to $0.015 \pm 0.001 \text{mRhr}^{-1}$ ($0.798 \pm 0.065 \text{mSvyr}^{-1}$). The annual equivalent dose estimated were in the range of 0.613mSvyr^{-1} to 0.849mSvyr^{-1} far below the dose limits for radiological workers (20mSvyr^{-1}) and the dose limit for the public (1mSvyr^{-1}) (ICRP, 1994). Comparison of the measured radiation levels of the food crops samples with the normal background levels show that 45 samples which represent 46.8% of the whole sample exceeded the normal background level of 0.013mRhr^{-1} (ICRP, 1994). These values obtained will not pose any immediate radiological health hazard to the populace consuming these food crops/stuffs but may have some long-term health side-effects

Keywords: Radiation, Naturally, Occurring, Radioactive, Materials

INTRODUCTION

Radiation plays an important and sometimes vital role in our everyday lives. Every day each of us is exposed to naturally occurring quantities of radiation. We are exposed to this Naturally Occurring Radioactive Materials (NORM) through the air we breathe, the food we eat, the soil on which we walk, the water we drink, and even within our bodies (Ademola, 2008). Monitoring for radioactive materials are therefore of primary importance for human and environmental protection, but rapid and accurate method for the assay of radioactivity is essential (El-Bahi, 2004). Over 60 radionuclides (radioactive elements) can be found in nature, and they are classified in three general categories- **Primordial**-formed before the creation of the earth, **Cosmogenic**- formed as a result of cosmic ray interactions, **Artificial radionuclides** –enhanced or formed due to human actions or activities (Eyebiokin, et.al. 2005). The series of naturally occurring radionuclides often found in the food chain are Uranium-238 and Thorium-232 and their progenies while the non-series one is the potassium-40 (^{40}K).

Potassium-40 is the principal naturally occurring source of internal radiation, despite its low isotopic abundance (ICRP, 1994). The deleterious radiological health hazards posed by human activities, especially in the production of energy, research, medical application of nuclear facilities and oil and gas extraction and production have attracted great concern and tremendous interest over the years in the field of radiation protection (Arogunjo, et. al., 2004). Dietary pathways become contaminated with radioactive materials from these man-made applications during routine operation, accidents and migration of radionuclides from radioactive waste disposal repositories into the biosphere. This anthropogenic contribution gained prominence after the Chernobyl nuclear power plant accident on 26th April 1986 when large quantities of the radioactive substances were released to the environment, which eventually found their way in the soil and vegetation (Tang, et.al, 2003; Rahman and Voigt, 2004). One of the major anthropogenic sources of contamination in the environment is radiocaesium (¹³⁷Cs, half-life 30.2years), as reported by some authors (Rahman and Voight, 2004, Velasco, et.al., 2004; Arogunjo, et.al., 2005). It is a dominant fission product with high relative mobility in the soil-plant system, long-term bioavailability, high radiotoxicity and is long lived. Apart from these man-made sources, the radiation burden of the environment is constantly being enhanced by ionizing radiations from natural sources and their transfer to plant and produce have been noted by some authors (Velasco, et.al., 2004; Badran, et.al., 2003). Contamination of the food chain occur as a result of direct deposition of these radionuclides on plants leaves, fruits, tubers, root uptake from contaminated soil or water, and animals ingesting contaminated plants, soil or water. Considerable efforts are being made by many authors in many parts of the world to measure the activity of radionuclides in the food chain and the estimated soil-plant transfer of radionuclides (Velasco et al, 2004). Some works have been carried out in this area by some authors in recent time. The aquatic environment (like Niger Delta environment) received the greatest input of radionuclides from atmospheric testing of nuclear weapons and low levels of radioactive wastes discharges from nuclear industries where they exist. Sea also contains naturally occurring radionuclides of primordial and cosmogenic origin. Both aquatic plants and animals accumulate elements to concentrations greater than those of the ambient water (Akinloye, et.al., 1999). As a source of food, that aquatic environment provides a large fraction of the diet through aquatic foods of some individual and certain local population. Contamination of fish therefore, constitute a significant pathway for the uptake radiocaesium to man. The presence of ²²⁶Ra in water constitutes a major source of naturally occurring radionuclide and its content in food contributes significantly to the radiation intake on the general populace (Olomo, 1990). Fruits, Vegetables, Cereals, and Tubers are vital in our diet and presence of natural radionuclides ⁴⁰K, ²³⁸U and ²³²Th in them have certain radiological implication not only in the foods, but also on the populace consuming these food sources (Fortun, et.al., 2004). These doses received by a person consuming aquatic foodstuffs, fruits, vegetable depends on the radionuclides concentration of the food and the quantity (Jibiri and Farai, 1998; Farai and Oni, 2002).

STUDY AREA

The area is situated approximately between latitudes 5^o 13¹-15¹ N and longitude 6^o 36¹-40¹ E of the North Western quadrant of the Rivers State of Nigeria. The area which is made up of Ogba/Egbema/Ndoni, Ahoada-East, Ahoada-West, Emuoha, Ikwerre, local governments of Rivers State are within Oil Mining License (OML) 58 (Total Fina Elf) and Oil Mining License (OML) 61, Nigerian Agip Oil Company (NAOC) respectively. The area is the heart of the hydrocarbon industry and contributes the highest chunk feeder of the natural gas to the Nigeria Liquefied Natural Gas project.

LITERATURE REVIEW

One of the three goals of the United Nations for sustainable food security is to ensure that all people have access to sufficient, nutritionally adequate and safe food (Jibiri et al; 2007). Natural radioactive elements are transferred and cycled through natural processes and between the various environmental compartments by entering into ecosystems and food chains. Vegetables may be subjected to direct and indirect contamination of uranium series radionuclide. Use of fertilizers leads to elevation of uranium series nuclides in vegetables. Naturally Occurring

Radionuclides (NORM) of Th and U are significant contribution of ingestion dose and are present in the biotic systems of plants, animals, soil, water and air. Distribution of those radionuclides in different parts of the plant depends on the chemical characteristics and several parameters of the plant and soil (Shanthi et al, 2009). Olomo (1990) study's on natural radioactivity in some Nigeria foodstuffs examined, varies and concluded that the major factor that may be responsible include, application of fertilizer, soil type and irrigation pattern. Arogunjo, et.al (2004) studied the level of natural radionuclide in some Nigerian cereals and tubers using HpGe detector and reported average concentration of ^{40}K , ^{238}U and ^{232}Th as $130+8.12\text{Bqkg}^{-1}$, $11.5+3.86\text{Bqkg}^{-1}$, and $6.78+2.13\text{Bqkg}^{-1}$ respectively, while ^{137}Cs was not detected in any of the food stuffs analyzed. Eyebiokin, et.al., (2005) also studied the activity concentrations and absorbed dose equivalent of commonly consumed vegetables in Ondo state using NaI(IL) detector and reported that mean effective dose equivalent for Akure, Idanre and Agbabu were 0.59mSvy^{-1} , 0.73mSvy^{-1} and 0.64mSvy^{-1} respectively. They concluded that the values obtained are lower than the UNSCEAR (1993) recommended value for normal background. Ojo and Ojo, (2007) on the radiological study of brackish and fresh water food samples in Lagos and Ondo States, they reported that the average concentration of $50.92+7.04\text{Bqkg}^{-1}$ ^{238}U and $24.60+6.47\text{Bqkg}^{-1}$ ^{232}Th were found to be higher in brackish water while ^{40}K ($738.94+84.81\text{Bqkg}^{-1}$) was found to be higher in food samples got from fresh water.

Mlwilo et al (2007) study on radioactivity levels of staple foodstuffs and dose estimates for most of the Tanzanian population revealed that the average activity concentration of ^{40}K , ^{232}Th and ^{238}U in maize were $48.79+0.11$, $4.08+0.01$ and $13.23+0.10\text{BqKg}^{-1}$ respectively and in rice $3.82+0.02$, $5.02+0.02$ and $24.67+0.03$. BqKg^{-1} respectively. He concluded that the relatively high average concentrations of the radionuclides in maize compared to rice may be attributed to the extensive use of phosphate fertilizers in maize production in Tanzania and that the total annual committed effective doses due to total ^{232}Th and ^{238}U intakes as a result of consumption of staple foodstuff for infants, children and adults were 0.16 , 0.29 and 0.36msvyr^{-1} respectively, which are lower than the annual dose guideline for the general public. Activity concentrations of ^{226}Ra , ^{228}Th , ^{40}K in different food crops from a high background radiation area in Bitsichi, Jos Plateau, Nigeria were studied by Jibiri et al (2007). The activity concentration in the food crops ranged below detection limit (BDL) to 684.5BqKg^{-1} for ^{40}K from BDL to 83.5BqKg^{-1} for ^{225}Ra , and from BDL to 89.8BqKg^{-1} for ^{228}Th . It was further revealed that activity concentrations of these radio nuclides were found to be lower in cereals than in tubers and vegetables. The average external gamma dose rates were found to vary across the farms from $0.50+0.01$, to $1.47+0.04\mu\text{Sr}^{-1}$. Because of the past mining activities in the area, it was found that the soil radioactivity has been modified and the concentration level of the investigated natural radionuclides in the food crops has been enhanced but however, the values obtained suggested that the dose from intake of these radionuclides by the food crops is low and that harmful health effects are not expected.

Shanthi et al (2009) carried out a study to evaluate the radioactivity concentration in the food crops grown in high-level natural radioactive area (HLBRA) in South–West, India. The calculated daily intakes of these radionuclides isotope (^{226}Ra , ^{228}Ra , ^{228}Th and ^{40}K) using concentrations in south Indian foods and daily consumptions of these foods were found to be ^{226}Ra , $0.001-1.87$, ^{228}Ra , $0.0023-1.26$, ^{228}Th , $0.01-14.09$, ^{40}K , $0.46-49.39$ Bq/day. It was concluded that the daily internal dose resulting from ingestion of radionuclides in food was $4.92\mu\text{Sv/day}$ and the annual dose was 1.79mSvyr^{-1} .

In view of the potentially dangerous effects of radioactive substances, no effort should be spared in their quantitative determination in all the identifiable pathways.

MATERIALS AND METHODS

A large sample of local food crops/stuffs mainly cereals, vegetables, fruits and tubers were purchased from various markets where they were produced in all the zones under study. The zones were selected based on their common culture and markets existing within them. Measurements were carried out with Digilert Nuclear Radiation Monitoring meter (Radalert-100) and the Global positioning system (GPS 76 CSX) handheld equipment for the measurement of the geographical coordinates of the sample points and stop clock for timing. An insitu

approach of measurement was preferred and adopted, this is to enable samples maintain their original characteristics. Measurement procedure and method used was that of (Avwiri et al, 2007), (Arogunjo et al, 2005). Readings were obtained between the hours of 1200 and 1600, since the exposure rate meter has a maximum response to environmental radiation within these hours (Louis et al, 2005). The Radalert – 100 is a health and safety instrument that measures alpha, beta, gamma and x-ray radiation. It uses a Geiger-Mueller Tube (GM) to detect radiation. The GM-tube generates a pulse of electrical current each time radiation passes through the tube and causes ionization. Each pulse is electronically detected and registered as a count. The Radalert – 100 was characterized and set to the exposure rate mode to measure the radiation level directly which was displayed in milli Roentgen per hour (mRhr⁻¹). The average meter readings and dose equivalent were calculated using the appropriate formula to estimate the whole body equivalent dose recommended by the National Council of Radiation Protection and measurement (NCRP, 1993) which stipulates that $1\text{mRhr}^{-1} = (76 \times 0.7)\text{mSvyr}^{-1}$

DATA PRESENTATION

Table 3.1 Background Radiation levels of the study area.

Location	Geographical location	Radiation levels (mRhr ⁻¹)				Average radiation (mRhr ⁻¹)	Equivalent dose (mSvyr ⁻¹)
		1	2	3	4		
	Ikrom/Ebocha /Mgbede	0.631	0.189			0.1	62
	Ikrom/Obite/Akabuka/Agidi	0.694	0.411			0.1	65
	Ikrom/Edoha/Abua	1.546	0.272	0.5		0.11	65
	Ikrom/Ikiri/Umuduga	0.215	0.710			0.1	41
	Ikrom-Alimini/Ndele	0.255	0.719			0.1	45
	Ikrom/Engenni Community	0.855	0.901			0.1	65
	Mean value					0.1	57

Table 3.2.a The Mean Exposure Rates for Individual Food Crop in the Surveyed Areas

Code	Surveyed Area	Mean site radiation Levels (mRhr ⁻¹)			
		Staples	Vegetables	Tables	Fruits
	Ikrom/Ebocha /Mgbede	2.01	4.01	2.01	6.01

	ku/Obite/Akabuka/ Obagi	7 01	8 01	4 01	6 01
	ada/Edoha/Abua	3 01	6 01	3 01	5 01
	/Ikiri/Umuduga	4 01	9 01	3 01	3 01
	-Alimini/Ndele	3 01	8 01	2 01	3 01
	ma/Engenni Community	0 01	4 01	1 01	1 01
	AN VALUE	3 01	7 01	3 01	4 01

Table 3.2.b Mean Equivalent Dose for individual food crop in the surveyed Areas.

Code	eyed Area	n site Equivalent dose (mRhr ⁻¹)			
		s	rs	tab-les	als
	kom/Ebocha /Mgbede	8 48	8 50	8 51	1 71
	ku/Obite/Akabuka/ Obagi	4 71	1 73	5 54	5 71
	ada/Edoha/Abua	1 53	5 63	2 54	2 63
	/Ikiri/Umuduga	5 61	1 31	0 45	5 57
	-Alimini/Ndele	1 57	4 32	7 38	5 43
	ma/Engenni Community	3 47	8 52	6 46	5 41
	AN VALUE	7 56	6 53	5 48	2 58

3.3 The Mean Exposure Rate and Equivalent Dose for all Food Crops in the Study Area (Zone A to Zone F)

The Mean Exposure Rate and Equivalent Dose for all food crops are presented in Table 3.3.1 - 3.3.2 below:

Table 3.3.1 Mean Exposure rate for all food crops.

Code	eyed Area	ean site ation Levels (mRhr ⁻¹)				n exposure for all os (mRhr ⁻¹)
		s	rs	tab-les	als	
	kom/Ebocha /Mgbede	2 01	4 01	2 01	6 01	14 01
	ku/Obite/Akabuka/ Obagi	7	8	4	6	16

		01	01	01	01	001
	da/Edoha/Abua	3	6	3	5	14
		01	01	01	01	001
	/Ikiri/Umuduga	4	9	3	3	5
		01	01	01	01	01
	-Alimini/Ndele	3	8	2	3	4
		01	01	01	01	001
	ma/Engenni Community	0	4	1	1	2
		01	01	01	01	01

Table 3.3.2 Mean Equivalent Dose for all food crops

Code	Keyed Area	Mean site radiation Levels (mRhr ⁻¹)				Mean equivalent dose for all crops (mRhr ⁻¹)
		Stems	Leaves	Tables	Roots	
	kom/Ebocha /Mgbede	8	8	8	1	09
		48	50	51	71	55
	omoku/Obite/Akabuka/ Obagi	04	01	05	05	49
		71	73	54	71	67
	da/Edoha/Abua	01	05	02	02	55
		53	63	54	63	58
	/Ikiri/Umuduga	05	01	00	05	73
		61	61	45	57	24
	-Alimini/Ndele	01	04	07	05	27
		57	82	38	43	55
	mbiama/Engenni Community	03	08	06	05	13
		47	52	01	41	47

Table 3.4 Comparison of Exposure rate for all food crops with Background Radiation levels.

Code	Key Area Name	Mean Site Radiation level for all crops (mRhr ⁻¹)	Mean Background Radiation levels for zone (mRhr ⁻¹)
A	kom/Ebocha /Mgbede	0.014 ± 0.001	0.013 ± 0.001
B	omoku/Obite/Akabuka/ Obagi	0.016 ± 0.001	0.015 ± 0.001
C	da/Edoha/Abua	0.014 ± 0.001	0.015 ± 0.001
D	/Ikiri/Umuduga	0.015 ± 0.001	0.011 ± 0.001
E	-Alimini/Ndele	0.014 ± 0.001	0.014 ± 0.001
F	Mbiama/Engenni Community	0.012 ± 0.001	0.015 ± 0.001

Table 3.5. Comparison of Equivalent dose calculated for surveyed Area and background radiation with the National standards

Code	Zone Area Name	Mean background Dose (Rhr ⁻¹)	Mean Equivalent Dose rate for all crops (mSVyr ⁻¹)
A	Ikoma/Ebocha /Mgbede	0.692 ±0.062	0.709 ±0.055
B	Ikoma/Obite/Akabuka/ Obagi	0.798 ±0.065	0.849 ± 0.067
C	Ikoma/Edoha/Abua	0.798 ±0.065	0.755 ± 0.058
D	Ikoma/Ikiri/U muduga	0.585 ±0.041	0.773 ± 0.124
E	Ikoma-Alimini/Ndele	0.745 ± 0.045	0.727 ± 0.055
F	Ikoma/Mbiama/Engenni Community	0.798 ±0.065	0.613 ± 0.047

Fig. 3.1: Comparison of measured radiation levels for all Crops with Normal background Radiation Levels.

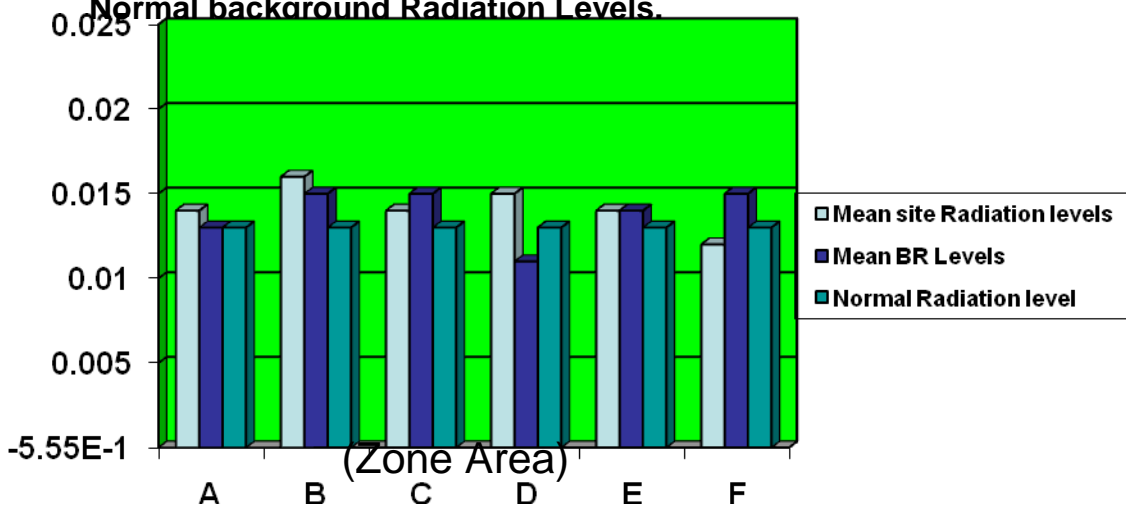
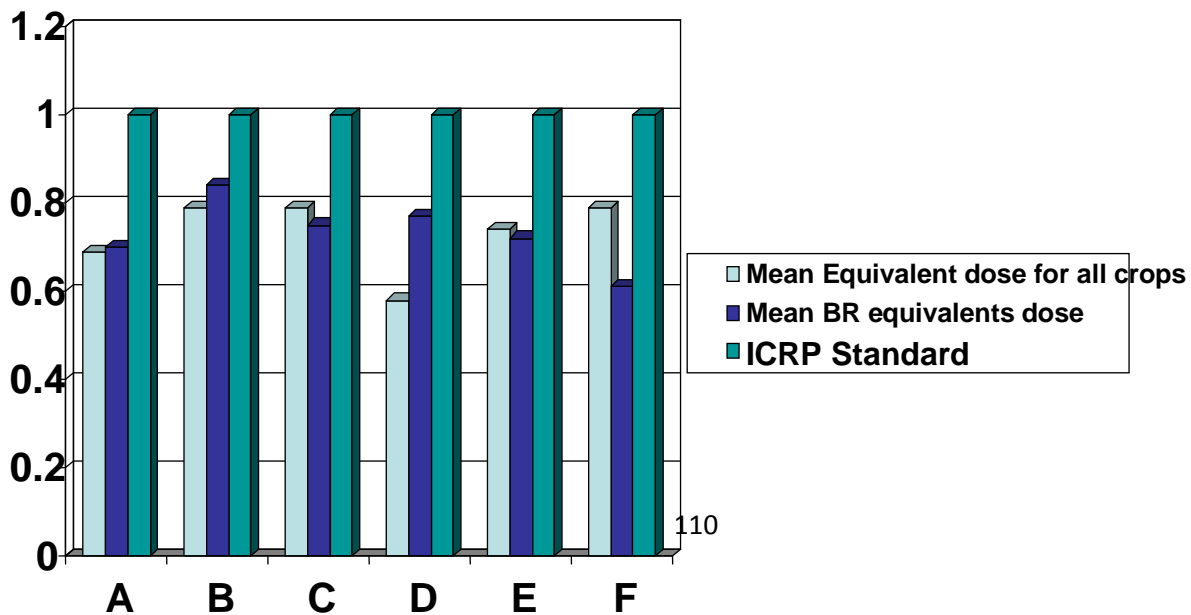


Fig.3.2: Comparison of the calculated equivalent dose with the ICRP standard of equivalent dose



(Zone Area)

DISCUSSION

An insitu method of radiation levels measurement conducted within OML 58 and OML 61 of parts of the Niger Delta Region areas were divided into six (6) zones (Zone A,B,C,D,E,F, respectively). The average exposure levels determined for zone A (Obrikom/Ebocha/Mgbede) ranges between 0.009 mRhr^{-1} (0.479 mSvyr^{-1}) in pumpkin, *Corchoris olitorius* to 0.020 mRhr^{-1} (1.064 mSvyr^{-1}) in both corn, *Zea mays* and Okro, *Abelmoschus Esculentus*. For zone B (Omoku/Obite/Akabuka/Obagi), the average exposure levels determined ranges between 0.010 mRhr^{-1} (0.585 mSvyr^{-1}) in Pepper, *Piper nigrum* to 0.022 mRhr^{-1} (1.170 mSvyr^{-1}) in orange, *Citrus spp.* For zone C (Ahoada/Edoha/Abua), the average exposure levels determined ranges from 0.010 mRhr^{-1} (0.532 mSvyr^{-1}) in Pepper, *Piper Nigrum* to 0.025 mRhr^{-1} (1.330 mSvyr^{-1}) in sweet Potato, *Ipomoea Batatas*. For zone D (Elele/Ikiri/Umodioga), the average exposure levels determined ranges from 0.010 mRhr^{-1} (0.532 mSvyr^{-1}) in pawpaw, *Carica papaya* to 0.028 mRhr^{-1} (1.490 mSvyr^{-1}) in sweet Potato, *Ipomoea batatas*. For zone E (Elele-Alimini/Ndele), the average exposure levels determined ranges from 0.005 mRhr^{-1} (0.266 mSvyr^{-1}) in orange, *Citrus spp.* to 0.022 mRhr^{-1} (1.170 mSvyr^{-1}) in yam, *Dioscorea spp.*

For zone F (Mbiama/Engenni community), the average exposure levels determined ranges from 0.006 mRhr^{-1} (0.319 mSvyr^{-1}) in orange, *Citrus spp.* to 0.016 mRhr^{-1} (0.851 mSvyr^{-1}) in Yam, *Dioscorea spp.* Table 3.1 shows the exposure rate determined for the background radiation levels for the six zones which ranges from 0.011 mRhr^{-1} (0.585 mSvyr^{-1}) in zone D, (Elele/Ikiri/Umodioga) to 0.015 mRhr^{-1} (0.798 mSvyr^{-1}) in zone B and F respectively. Table 3.2.1 show the mean exposure rate determined for individual food crops. The average exposure rate ranges from 0.013 mRhr^{-1} (0.697 mSvyr^{-1}) in fruits to 0.017 mRhr^{-1} (0.866 mSvyr^{-1}) in Tubers. Table 3.3.1 shows mean exposure rate for all food crops which ranges from 0.012 mRhr^{-1} (0.613 mSvyr^{-1}) in zone F (Mbiama/Egenni Community) to 0.016 mRhr^{-1} (0.849 mSvyr^{-1}) in zone B (Omoku/Obite/Akabuka/Obagi). Table 3.4 show the comparison of average exposure rate for all food crops investigated with average background exposure radiation levels. The lowest average radiation exposure rate of 0.011 mRhr^{-1} was obtained at zone D (Elele/Ikiri/Umodioga), which may be due to low level of oil and gas activities within the zone compared with the highest average radiation exposure rate of 0.015 mRhr^{-1} obtained in zone B (Omoku/Obite /Akabuka/Obagi) which is the area of operation of NAOC (OML 61). The results of the exposure rate of all food crops sampled and investigated showed that 45 food crops samples which represent 46.8% of all the food crops collected and investigated exceeded the normal background level of 0.013 mRhr^{-1} (ICRP standard). But these values obtained are within the range previously reported by Avwiri and Agbalagba (2007), Arogunjo et al (2004), Avwiri, Ononuogbo (2010) (unpublished material) in the Niger Delta Region. The maximum exposure rate of 0.028 mRhr^{-1} recorded in sweet potato, *Ipomoea batatas* in Zone D (Elele/Ikiri/Umodioga) could be due to application of potassium based fertilizer in improvement of food crop yield which is prevalent in the area. It could also be due to the high water content of tubers, which tend to accumulate soluble radionuclides. The result of the computed mean effective equivalent dose rate for the six zoned areas (Table 3.5) are $0.709 \pm 0.055 \text{ mSVyr}^{-1}$, $0.849 \pm 0.067 \text{ mSVyr}^{-1}$, $0.755 \pm 0.058 \text{ mSVyr}^{-1}$, $0.773 \pm 0.124 \text{ mSVyr}^{-1}$, $0.727 \pm 0.055 \text{ mSVyr}^{-1}$ and $0.613 \pm 0.047 \text{ mSVyr}^{-1}$ respectively. These values obtained are within the dose limit of 1 mSvyr^{-1} for the general public and 20 mSvyr^{-1} for radiological workers recommended by International Commission on Radiological Protection (ICRP).

Figures 3.2 shows a comparison of the mean site (sample) equivalent and mean BR equivalent dose with the national acceptable equivalent dose limit. It shows that all the calculated equivalent doses both from samples and the area under study are very close to the safe limit of 1 mSvyr^{-1} for the general public. At Zone D (Elele/Ikiri/Umodioga), the mean equivalent dose calculated was $1.011 \pm 0.331 \text{ mSVyr}^{-1}$ which is far greater than the permissible limit for the general public but within the safe limit for the radiological workers. Since the equivalent dose rate of 1.011 mSVyr^{-1} is slightly higher than the basic safety standards allowed limits for the public, it therefore implies that the environment is becoming unsafe and continuous consumption of these food crops by

the general populace in the study area is posing danger on a daily basis. Relevant checks on this trend are therefore necessary by all stake holders.

CONCLUSION

A preliminary assessment of Naturally Occurring Radioactive Material (NORM) containing food crops within OML 58 and OML 61 in the Niger Delta Region has been carried out using the insitu measurement approach. This was meant to determine the background ionization radiation level of the study area and the food crops samples. The study revealed a rising radiation level though within the acceptable limit for the general public and within the safe limit for radiological workers. The equivalent dose rate obtained for all food-crops sampled did not exceed the safe limit recommended by the international bodies on radiation protection except in few samples where slight elevation above the recommended safe limit was observed. Other analytical methods of ascertaining the exposure rate at various sites and samples such as Exploranium GR-135 to identify the different radionuclide isotopes present in the samples and Hyper Pure Germanium (HyGe) detector to know the specific radionuclides responsible for the contamination/pollution of these foodstuffs is hereby recommended.

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IMPROVING UNIVERSITY EDUCATION IN NIGERIA THROUGH MOBILE ACADEMIC DIRECTORY

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Abstract

Improving the economy of third-world countries and revamping the falling standard of university education are among the challenges of the current political administration in West African and Nigeria in particular. These are captured in the vision 2020 agenda for Nigeria. Mobile devices have gradually become part of our daily life and most Nigerians cannot live without them. Devices that are compliant with Mobile Information Device Profile (MIDP) will enable software engineers to develop applications that can run on multiple platforms and improve on the system's functionality. The functionality of mobile devices can be improved to deliver any type of data to any user, anywhere in world and with the use of different programming languages. This paper models a MIDlet application that adds additional functionalities in the use of our mobile devices. It designs an academic directory that runs on any java-enabled mobile device, and provides increased access to academic information for research purposes by presenting an ideal combination of two of the fastest growing technologies in the world today: the mobile technology, and the computer network technology to build a J2ME-based mobile application. It will encourage effective university administration and interaction among lecturers for research purposes. Consequently, the standard of educational can be improved upon.

Keywords: MIDP, Mobile device, MIDlet, J2ME, Academic directory.

1.0. INTRODUCTION

Mobile devices have become part of our everyday life and most of us can no more live without them. Devices that are compliant with Mobile Information Device Profile (MIDP) will enable software engineers develop applications that can run on multiple wireless platforms and improve on the system's functionality. That is, the functionality of mobile devices can be developed to deliver any type of data to any user, anywhere in world and with the use of different programming languages. Using the generic framework provided by J2ME platform, it has become possible to develop various MIDlet applications, and thus, the power of these mobile devices can become endless. Software programs that once needed large, expensive computer systems can now be run on a single processor chip. For example, the average mobile phone handset now contains computing capabilities comparable to those of a standard desktop PC of just five years ago. No doubt, a mobile phone will lack the computational power, memory, etc of a computer and cannot perform the same functions as high-end servers or client workstations. The J2ME is Sun Microsystems's attempt to port the Java programming language to devices with such resource limitations.

In this paper, emphasis is focused on proffering a solution to the problem of a complete absence of an integrated database of university lecturers and selected principal officers of Nigerian universities and the need to bridge the communication gap between the NUC officials and university authorities. This unique directory is also geared towards enhancing effective communication among lecturers in the same field of specialization. Currently, the mobile phone is being used as a tool for communication. It has helped people and organizations achieve a lot by connecting people together, via calls and sms, for purposes ranging from education, business, pleasure, etc. But its potential has not been fully exploited. This project apart from bridging the communication divide among NUC officials and the entire university community, also provides a value added service in the form of software that gives NUC, her staff, and the entire university

community, more value for their money via mobile devices they already possess. The findings in this paper if fully applied will increase our access to information and information is the major tool for good decision-making and proper management and administration, especially in the university educational system. Lecturers in the same area of specialization in different universities and research centers can now engage in a more profitable interaction.

1.1. THEORITICAL FRAMEWORK FOR THIS STUDY

This study used the generic framework provided by J2ME platform, which contains a subset of several specialized classes. We will focus on two of such classes: the CLDC (Connected Limited Device Configuration) and MIDP (Mobile Information Device Profile). These sets of classes make up a *profile* in the J2ME terminology and are based on the extremely limited device memory, processor speed, battery, and network connectivity bandwidth. The CLDC is the base platform on which the MIDP APIs are stacked. The CLDC classes consist of a standardized set of functionality that all vendors who offer J2ME-certified phones will support. Generally, you won't have to interact directly with those classes, but certain devices require that you access those lower-level classes to perform certain functionality. The MIDP profile has been developed to support the vertical niche of cell phones or similar devices constrained by screen and keypad limitations, in addition to the obvious battery, processor, and bandwidth constraints.

1.1.2. Mobile Device Programming

There are many programming languages (technologies) available today for developing mobile applications. Some of these technologies include: Java 2 Micro Edition (J2ME), Python, C/C++, Easy Mobile Programming (EMP), etc. Of all these languages, the J2ME stands out as the technology (programming language) of choice because it is platform independent and has a rich set of APIs appropriate for mobile devices. Consequently, the Mobile Academic Directory of university lecturers (MOBIACAD) developed in this work made use of the Java 2 Micro Edition (J2ME).

1.1.3. What is J2ME?

The J2ME is Sun Microsystems's attempt to port the Java programming language to devices with resource limitations. A mobile phone, which lacks certain computational power, workstation power, large memory, etc, cannot perform the same functionality as high-end servers or client workstations. The J2ME platform is built upon the Java programming language to provide the maximum functionality available on the resource-limited device. A subset of the base functionality is provided along with some specialized classes. In this work, I will focus on the CLDC (Connected Limited Device Configuration) and MIDP classes of the J2ME. These sets of classes make up a “profile” in the J2ME terminology which is based on the extremely limited device memory, processor speed, battery, and network connectivity bandwidth.

J2ME is meant for small devices such as mobile phones, TV set top boxes, Vehicle telemetric, pagers, PDAs, etc. Since applications (including their data) that will run in such devices cannot be larger than 1 MB or so, J2ME combines a resource constrained Java Virtual Machine (JVM) and a set of Java Application Program interface (API) for developing applications for mobile devices. J2ME runs atop a Virtual Machine (called the KVM) which allows reasonable, but not complete, access to the functionality of the underlying phone. J2ME was designed for devices with:

- Limited processing power
- Limited system memory
- Limited storage capacity
- Small display

- Less Battery power
- Limited connectivity to internet.

All J2ME-compliant device manufacturers include the miniature version of the JVM in their devices, which is very light weight and suitable for such small devices. This JVM enables the execution of small Java programs which are called *MID*lets.

J2ME can be divided into three parts, as shown in Figure 1.2 below: a configuration, a profile, and optional packages. A configuration contains the JVM (not the traditional JVM, but the cut-down version) and some class libraries; a profile builds on top of these base class libraries by providing a useful set of APIs; and optional packages, as well, an optional set of APIs that you may or may not use when creating your applications. Optional packages are traditionally not packaged by the device manufacturers, and programmers can package and distribute them with your application. The configuration and profile are supplied by the device manufacturers and are embedded in the devices.

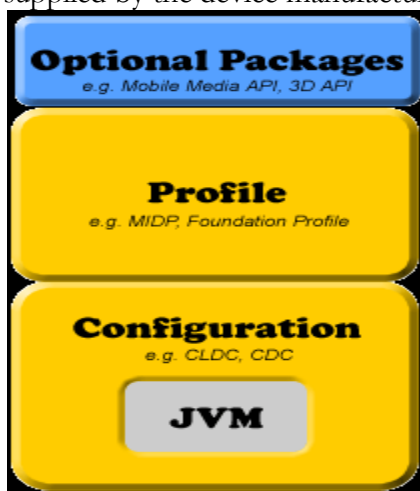


Figure 1.2. The J2ME stack

1.1.4. The MIDlet Lifecycle and Application Management Software (AMS).

Mobile devices interact with a MIDlet using their own software, which is called Application Management Software (AMS), whether by emulators or real contact. The AMS is responsible for initializing, starting, pausing, resuming, and destroying a MIDlet, (AMS may also be responsible for installing and removing a MIDlet.) To facilitate this management, a MIDlet can be in one of three states which are controlled through the MIDlet class methods, which every MIDlet extends and overrides. These states are active, paused and destroyed.



[Figure 1.3. The possible states of a MIDlet and the transition between them](#)

1.2. MATERIALS AND METHODS FOR THE STUDY

Information was obtained using the various tools of Object-Oriented Analysis and Design Methodology (OOADM) to capture all user requirements for the system and use the analysis and design tools of UML (Unified Modeling Language) to model the basic classes and interacting objects. Our focus was to make use of the user-requirements to model the basic classes and collaborations between them, and to give a detailed and insightful investigation and analysis of the existing system, its working procedures, and its mode of operation. The reason for our choice of the design tools of UML (Unified Modeling Language) is because it contains a set of tools for specifying, constructing and documenting software systems. Unified Modeling Language (UML) is a standardized general-purpose modeling language in the field of software engineering. This standard was created, and is being managed by the Object Management Group (OMG). It includes a set of graphical notation techniques to create visual models of software-intensive systems and for the modeling of all phases of software development: requirements, analysis, design, programming, and testing, especially for java software of embedded systems. It defines a set of structural diagrams that are used to show relationships between objects in a system. The special tools and notations of the UML were extended to model the mobile application for this study. The following factors were put into consideration: sources of data, data analysis techniques, model specifications, etc. When choosing a methodology, it is important to consider not only the features of the methodology, but also the cost of using it, the type of problems to which it is best suited, and its limitations.

In modeling the actual system, each object represents some entity of interest in the system being modeled, and is characterized by its class, its state (data elements), and its behavior. According to Khlaif M (2009), in developing any MIDlet using MIDP, we must be aware that a completely object-oriented design will not represent the best solution. Each created object requires some memory. Because of the fact that the device's available memory is very limited, your application should be economic when creating objects. Various models can be created to show the static structure, dynamic behavior, and run-time deployment of these collaborating objects.

Coding platform is the Java 2 Micro Edition. The database was developed first in Microsoft Access and then converted into Extensible Markup language (XML) in readiness for use with J2ME. At the end of the day, the “jar” file format of the software was distributed via Bluetooth for installation into the mobile device used for this project, which is a mobile phone that supports Java Technology (that is, CLDC 1.1 and MIDP 2.0) named 3250.

1.2.1. Class Relationship in UML modeling for MIDlets

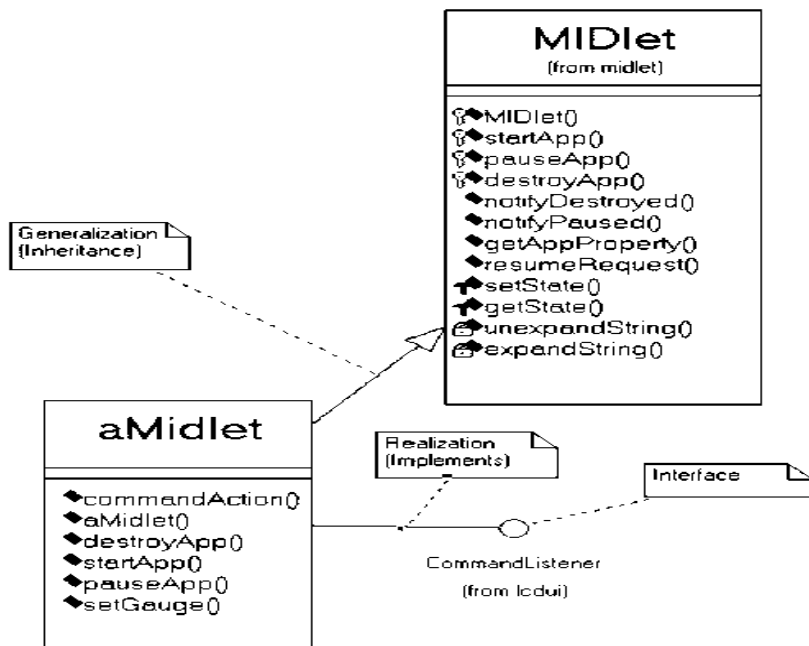


Fig. 1.4 Class relationship in UML

SOURCE: Khlaif M (2009), Pg. 88.

1.2.2. Hardware and Software Requirements

Computers with at least 256MB RAM, 20GB Hard disk, a Bluetooth device & its associated drivers. The receiving phone should be MIDP 2.0 and CLDC 1.1 compatible with Bluetooth capability.

The minimum hardware and software requirements that are required for the development of the MIDP application are summarized in the table 1.1 and table 1.2 below:

Table 1.1: Hardware requirements.

HARDWARE	REQUIREMENT
Processor speed	Pentium II with at a speed of 100MHz and above .
RAM size	256MB and above.
Display	1024x768 or higher with 65536 and more colours.
Hard Disk size	550 Megabytes of memory and above.
Handset model	Any model that is java-enabled (CLDC 1.0 and MIDP 1.0 or CLDC 1.1. and MIDP 2.0 support), with a screen resolution of 128x128 or higher.

Table 1.2: Software requirements

SOFTWARE	REQUIREMENT
Operating system	Microsoft windows.
Java Development Kit	JDK 1.5 and above.
Wireless Toolkit	Sun Java Wireless ToolKit for CLDC.
Integrated Development Environment (IDE)	J2ME Polish, Apache Ant, Eclipse.

1.3. RESULTS AND DISCUSSIONS

1.3.1. Data Flow Diagram of the proposed solution

The Data Flow Diagram of our MOBIACAD is displayed in the figure 1.5 below:

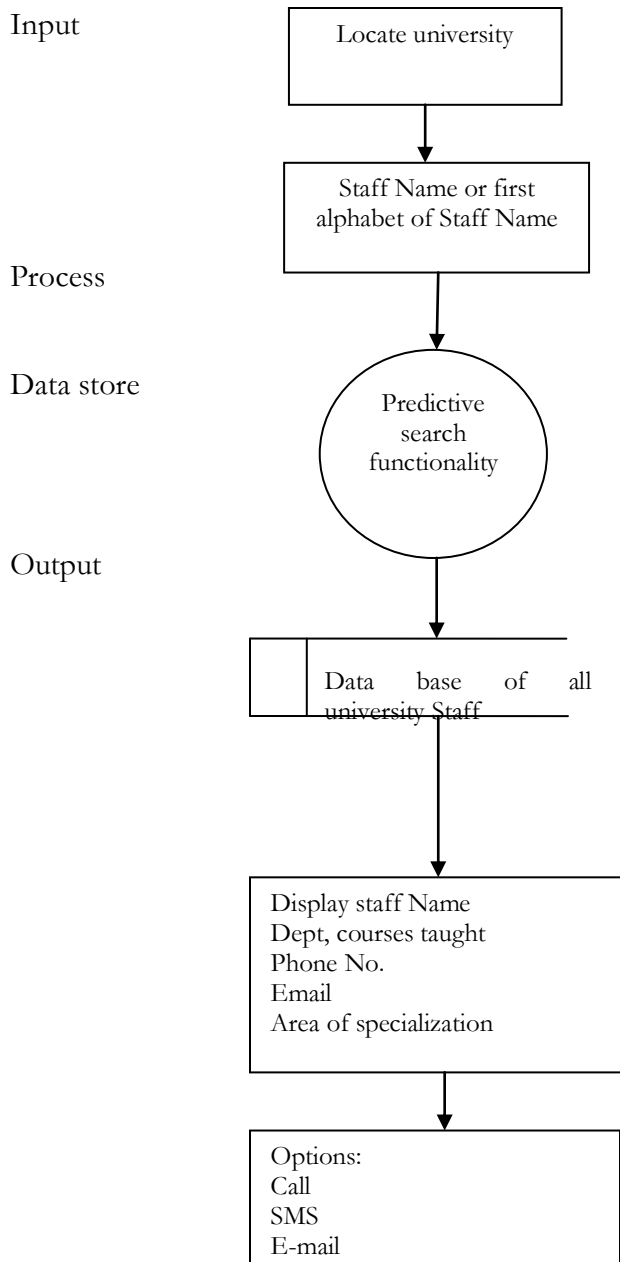


Fig. 1.5. Data Flow Diagram of MOBIACAD

1.3.2. Overall Architecture of the Application

The architecture of the entire information flow in MOBIACAD MIDlet application is displayed in the figure 1.6 below:

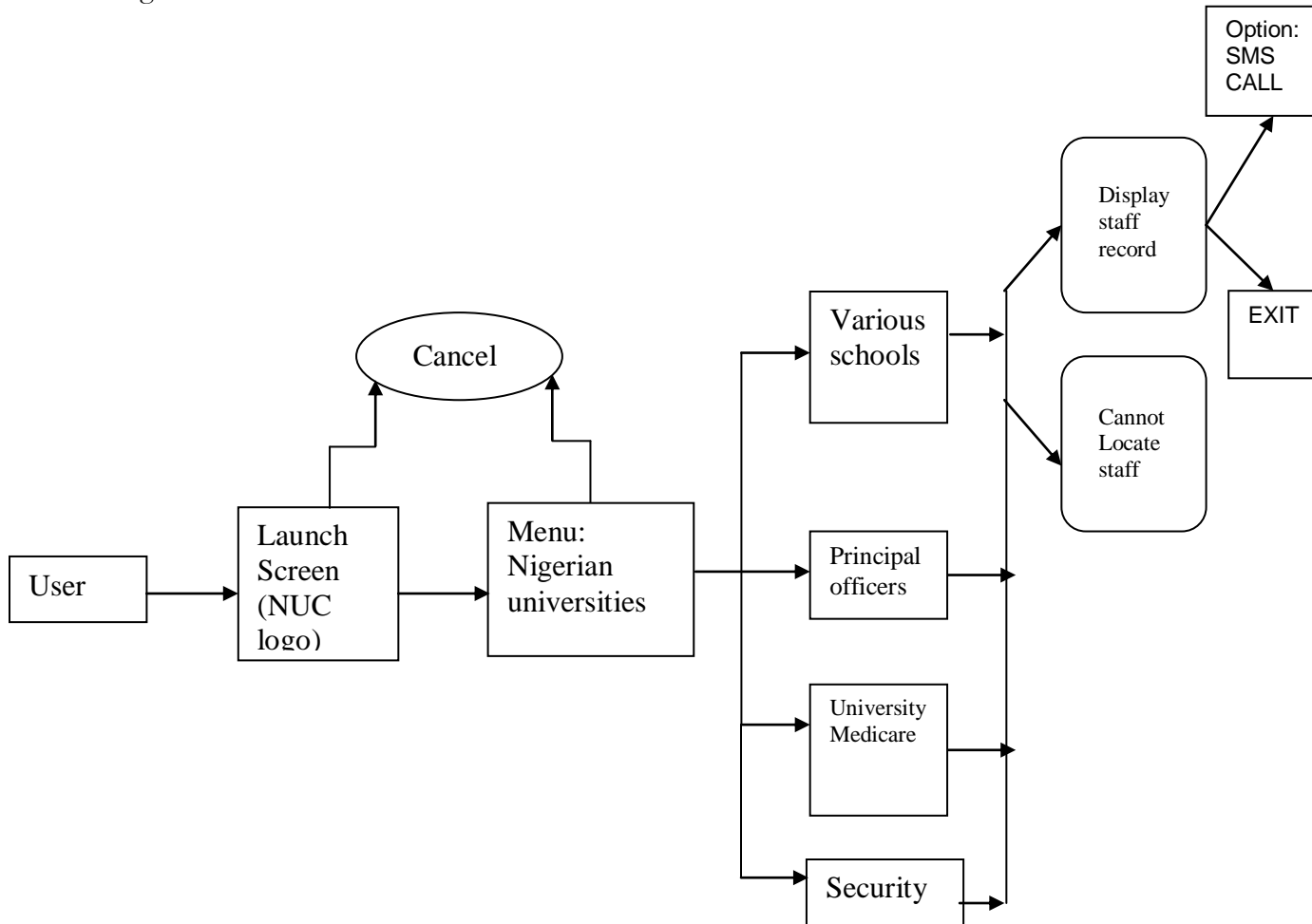


Fig. 1.6 Overall Architecture of MOBIACAD MIDlet Application.

1.3.3. Database Design

As stated earlier, the database was developed first in Microsoft Access and then converted into Extensible Markup language (XML) in readiness for use with J2ME. In developing any MIDlet application using the Mobile Information Device Profile (MIDP), full relational databases has always proved to be very expensive. In fact, the standard MIDP 2.0 does not even support the basic SQL data types such as the Float data type. Again, the standard persistent storage facility (the Record Management Store (RMS) on the MIDP is very much inadequate for enterprise applications. RMS are both very slow and not index-able and poor search functionality. In fact, RMS's linear structure makes it a pain to handle relational or object data. To address this problem, database vendors have developed simple database solutions on top of the known RMS. Some of these databases include: the Oracle J2ME, Extensible Markup Language (XML), Simple Object Database Access (SODA), and the Standard Development KIT (SDK). These databases are

extremely lightweight and fits appropriately to MIDlet applications for mobile devices. Each vendor provides its own lightweight proprietary access API. In this work, XML was used to support Persistent Storage. Persistent Storage in MIDP is centered on record stores.

1.3.3.1. Record Stores

A record store is a small database that contains pieces of data called “records”. A record is simply an array of bytes. Each record in the record store has an integer identification number. Record stores are represented by instances of `javax.microedition.rms.RecordStore`. They are identified by a name.

Within a MIDlet suite’s record store, the names must be unique. The diagram of a record store with two records is shown in fig. 1.7.

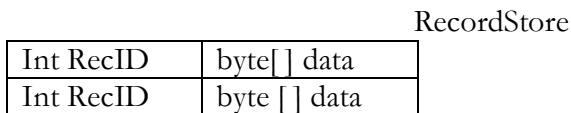


Fig. 1.7 Inside a RecordStore

To create a record store, MIDlets use the following static RecordStore method:

Public static RecordStore openRecordStore(String recordStoreName, Boolean Create).

The class diagram of the record store in our MOBIACAD MIDlet is displayed in fig. 1.8 below:

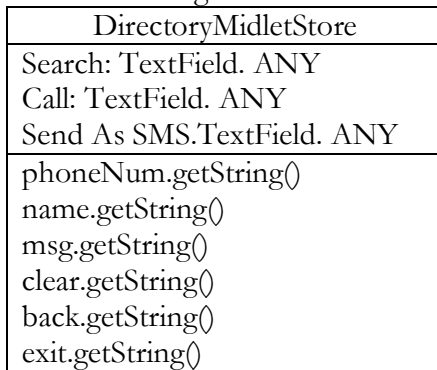


Fig. 1.7 RecordStore class diagram

1.3.3.2. Data Dictionary for MOBIACAD

S/N	Field Name	Type	Description
1	Schools /Faculties	Text	All schools in university
2	SAAT	Text	School of Agriculture
3	SEET	Text	School of Engineering
4	SMAT	Text	School of Management Technology
5	SOSC	Text	School of Science
6	SOHT	Text	School of Health Technology
7	Search	Text	To retrieve desired information quickly
8	Exit	Text	A functionality for exiting from the software
9	Back	Text	A link for returning to a previous menu
10	Clear	Text	A link for deleting a character
11	Lecturers on campus	Text	Names of lecturers on campus

12	Call	Text	A link to call a selected phone number
13	Send as SMS	Text	To send a staff details to a chosen phone number
14	Medicare, Enquiries, Emergency	Text	A link to the phone number of medical personnel

1.4. SITE PREPARATION, INSTALLATION, AND TEST RUN

A space should be created in each department for a table and a computer (desktop or laptop), with a Bluetooth device installed on the computer.

Air-Conditioners should be installed in the room containing the computer before bringing in the computer. A staff is enough to man the system. This staff will be trained before implementation.

The software can be installed on any Java-enabled mobile phone with Bluetooth device. Examples of such mobile phones include: symbian phones, series 60 phones, series 40 phones, etc. Installation steps are as follows:

1. Locate the jar file on your computer.
2. Activate the Bluetooth facility on the mobile phone and transfer the jar file to the selected phone.
3. For series 60/40 phones (e.g. Nokia 2700), the application installs directly into your phones internal memory or memory card; while for other phones, it comes as a text message and prompts the user for installation upon opening the message.
4. Once installed, the application can easily be accessed.
5. The user can navigate through MOBIACAD using the user-friendly graphic interface (GUI).

Some of the results obtained are displayed in figure 1.8.



Fig. 1.8. Application screens with menus

1.5. CONCLUSION

From the results so far obtained and illustrations made, it is evidently clear that, using the generic framework provided by J2ME platform, it has become possible to develop various MIDlet applications.

Consequently, the power of these mobile devices can become endless. The mobile technology is now an integral part of our everyday lives. This is the technology of the 21st century with its inherent and incredible opportunities.

In this paper, we have proffered a solution to the problem of a complete absence of an integrated database of university lecturers and selected principal officers of Nigerian universities and have bridged the communication gap between the National University Commission (NUC) officials and university authorities. This unique directory will definitely enhance effective communication among lecturers in the same field of specialization in different universities, and they can now engage in more profitable interaction. Besides providing an integrated database, we have been able to make it mobile (i.e. making it available for use on mobile phones) to suit the fast-paced lifestyle of today and to make it available and accessible to more people. This system has contributed immensely to the ICT body of knowledge because it has opened the door to a new era of software engineering especially in Nigeria. It has also included additional features in the use of our mobile devices. This will bring about accelerated development in the field of technology. It will also build capacity in embedded system technology at our institutions and Research Centers.

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E-HEALTH IN BIOMEDICAL-ITS ROLE AND CHALLENGES IN BAYELSA STATE, NIGERIA,AFRICA.

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Abstract

This report is taken a broader look at electronic health (E- health) in biomedical, its importance and challenges of adopting this system in biomedical profession in Bayelsa State. Great strides are being made to improve healthcare services through the use of ICT (Information and Communication Technology).One of the most promising ICT development project is the e- health which involves the store and forward system; the tele-medicine system video conferencing and the real time tele-medicine system (Rodrigue 2011). ICT has transformed the ways modern healthcare system acquire, store, access and communicate medical information. These developments offer significant benefits to patients and healthcare providers, though it gives rise to ethical and legal challenges in the protection of patient privacy and confidentiality (Chin 2003) ICT tools can lead to higher quality of healthcare delivery, increased patient safety and better risk management in health services and health care in Bayelsa State. The traditional and humanistic concept of doctor-patient relationship is under threat as this system is used to by pass the need for personal consultations, for patients may not have the opportunity to explain to the doctors or the healthcare providers (Rodrigue 2011). An effective approach in the use of (electronic health) ICT for advancement in biomedical world is the proper training of medical specialists to set up and manage the system, also setting public standards for accessibility and expression of patient autonomy. This ensures its effectiveness and safety .

Key words: Biomedical, Patient safety, ICT, health care providers.

Benefits of Electronic health (e-health) in biomedical field.

Electronic health is based on Information and Communication Technology. These two terms e – health and ICT (Information and Communication Technology)are synonyms. ICT is a tool of expression, the competence of healthcare workers such as medical doctors, nurses medical Laboratory scientist ,radiologist in modern healthcare. ICT has become well assimilated into healthcare delivery system that few doctors can imagine a day without using the computer or the network: prevention of disease and injury, promotion and maintenance of health, relief of pain and suffering, care and cure of those with malady, avoidance of premature death, and pursuit of a peaceful death (Hasting Center Report 1996).

Another benefit of ICT in medicine is in aspect of intra-organizational communication as mostly interpersonal. Synchronous interruptive communication is recognized as a primary source of inefficiency and error in healthcare, but there is much potential for infor Another important benefit of ICT in biomedical profession is that information about patient can be easily read by healthcare providers through the computer, the information is always available, cannot be lost or left sitting on a desk. The information is available to users in different locations, such as doctor in clinic, nurse in ward or radiologist in x-ray department. For record keeping, this can be explained in terms of patient laboratory or any clinical test results in the hospital can be added to patient’s record as soon as the test result is complete and ready, and this will be available immediately to the doctor, or any healthcare provider.

Another vital benefit is ICT can be used to perform life saving operation via robots (Jack 2011); For example if someone had a bad heart condition and needed a vital operation and the health professional was unable to perform it then a robot could perform the operation by the commands of another surgeon elsewhere. ICT enables hospitals to experiment with smart cards which the patient keeps with them and contains all of their medical records, these cards will have to be taken every time they visit a doctor, dentist,

pharmacists or hospital. The smart card can store a complete medical history and can be updated at the end of each visit.

Information and communication technology (ICT) in biomedical profession is a system that provides timely information that can save lives, improve the quality and efficiency of the health delivery system and contain the cost. ICT systems help in the acquisition and storage of electronic medical records, and the accessibility and rapid transmission of healthcare information over the internet. ICT system in biomedical helps diagnosis and treatment of patient faster, for example e-health system such as the store and forward system works like this if a patient is diagnosed and necessary tests are conducted on him or her in one hospital, the results of these tests can be sent via this store and forwarded system to the referral doctor in another hospital and this doctor can then examine the test results and propose the treatment via the same route (Rodrigue 2011). Through ICT the issue of the Journal showcases two essays by authors is made possible (Beredjikian 2001).

E-health in biomedical field can involve the use of real-time system that monitor patients in hospital (outside intensive care in order to provide early warning of health deterioration and the use of mobile phone based telehealth can be used to improve the management long-term conditions of patient of diabetes, asthma, and hypertension. Another benefit of e-health in biomedical signal processing is that it helps vital signs of patient to be monitored using multi-parameter patient monitor system. Within the hospital acutely ill patients routinely have their vital signs continuously recorded by multi-parameter patient monitor. Statistical techniques are used to learn a description of normality in multi-parameter space and abnormalities are subsequently identified by testing for novelty against this description. This can then trigger the intervention of a medical emergency or critical outreach team when the patient begins to deteriorate.

The real-time system of analysis of patient data is enabling personalized healthcare for people with long-term conditions such as asthma and diabetes and will change the way acute patients are managed in hospital. Mobile technology and new methods of communicating information are playing an important role in self-management of long-term conditions. E-health in biomedical field helps bring together the views of leading researchers and biomedical professionals, practitioners from around the globe from a series of high level discussions and workshops.

Role of e-health in Promoting Biomedical Profession.

E-health system in biomedical are very vital in this profession in promoting effective healthcare delivery for example the store and forward system can be used to diagnose a patient, necessary tests are conducted and the results can be sent via the system to the referral doctor in another hospital within or outside of that country for treatment. It improves biomedical research and proper treatment in the world of medicine, these include providing access to scientific resources, improving quality of healthcare services with respect to current information in microbial infection, antibiotics and chemotherapy, academic improvement of potential scientist in biomedical field, including hospital workers. ICT also helps medical healthcare providers have broad knowledge in biomedical research, and the ability to change from an old traditional methods of treatment to an automated and interesting one which eventually leads to effective treatment of any microbial infection or medical complication. ICT is capable of transmitting large amounts of data in very short time intervals, and of bypassing the conventional physical barriers and safeguards, certainly heightens public anxiety (JCAHO 2000) The use of ICT in biomedical field brings about rapid communication and efficient data analysis.

Limitation or Challenges of e-health in biomedical Field.

Majority of medical healthcare providers are wallowing in their traditional method of diagnosis and treatment including research on how to know the new emergence disease globally, they are not ICT compliant, this becomes a herculean task to access this information. Medical or biomedical professionals such as pharmacist, science courses lecturers, medical doctor, nurse, medical laboratory scientist: if these categories fail to acquire the skill, it will be difficult to be current and access information for the betterment

of the patient, also difficult to inculcate the knowledge into potential scientists (students). If staff of medical healthcare are not trained, including the part time staff. Even some staff may be resistant or fearful of using ICT in hospitals, hence cannot access vital information.

Another challenge is most of the electronic health devices are computer based, there is a big danger that patients over rely on computer control equipment. This happened in America when radiation therapy machines accidentally gave patients overdoses of radiation, leading to 3 patients death (Denise 2011). If the computer network goes down , information is unavailable. This could be inconvenient or may even be life threatening. Unavailability or inadequate of ICT's infrastructure present another onerous challenge to the effective utilization of ICT in biomedical field , these include installing , maintaining and repairing including internet; this should be effective to ensure equality with the developed countries. This was stressed by Gyang (2008) that "Information and Communication Technology facilities particularly the internet is important in the access of valuable information. However, inequality of access of these facilities to Nigerians is a serious problem as computers telephone lines , satellite dishes etc necessary for internet connectivity are still not available in most parts of Nigeria districts.

Another limitation could be linked to lack of provision of computer in most tertiary institutions and installation of internet for browsing to have current understanding in biomedical field. Many healthcare workers do not have computers individually, even projectors and other digital electronics, and most of these electronic health machines such as CAT, MRI, are expensive to set up, even most hospitals cannot afford to install them in Nigeria. The hospital., laboratory scan centre especially teaching hospital are underfunded including the manpower, which affect procurement of automated scientific machines to carry out research, diagnosis, and treatment of patients respectively.

Another vital limitation to this system is through communication synchronously. This was stated by Marchetti et al., (2001) and Lavie et al., (2004) that synchronous communication in healthcare especially face to face interactions; interruption is unavoidable, this can have a negative impact on the working memory and performance of healthcare providers, interruption can lead to distraction and forgetfulness and leads to overload and errors. A maternity ward staff in an interruption - driven environment failed to enter patient data into an electronic medical record at appropriate times (Cooper et al., 2005). The failure to register patient data has a detrimental effect on the work of others who rely on documented date in their work process (Bates et al.,2003). Therefore , decreasing synchronous interactions and increasing asynchronous ones contribute a more efficient performance that can help improve organizational memory on the part of healthcare professionals thereby provides effective quality of healthcare .

On the internet you can find a wide variety of medical information which include symptom diagnosis : this is for people who wish to identify their problem without consulting General Practitioners, Information about available treatments, support groups for people suffering from particular ailments, access to medical research and journals, information about side effects and expert systems to aid diagnosis. The challenge with this diagnostic web-sites at times is that they are not trustworthy, and this can lead to incorrect diagnosis and cause false complacency or anxiety (Timmermans et al.,2003).

High cost of using the electronic health in biomedical field on the side of the patients, transferring parts of the research and development cost back to patients may not be so unethical, but the cost can be distributed fairly among providers and users (patients): this is justifiable in terms of benefits to patients. If the usage of e -health in healthcare is not guided by medical goals and ethnics, for the public to be informed and be allowed a say in its design , and cost to patients become prohibitively high; these eventually cause patients to decline in medical care.

Another major ethical conundrum in using e - health in biomedical is the inevitable increasing in the vulnerability of patients' privacy and confidentiality (Chin 2003). These have been deliberated upon by many researchers Yeo (2003) and Ng (2003) and in various other papers and position statements. All have expressed concerns at unprotected accessibility and potential abuse of confidential medical information via

IT (JCAHO 2000); The Brudnick Centre (2003). In her paper, Yeo (2003) rightly pointed out that IT medicine , specifically telemedicine and cybermedicine , can result in ambiguous doctor –patient relationships. Healthcare professionals , especially doctors and nurses, are not trained nor tested in delivery healthcare, both diagnostics and therapeutics, over an electronic domain, medical judgement encompasses a complex interaction of facts, therefore it is difficult to expect even the most sophisticated of computing system to discharge these duties and provide a safe and reliable answer. Another vital challenge is the communication between physician and patients via e-mails lacks human touch , legally ambiguous and equally costly in terms of time and resources, and is fragile in terms of privacy and confidentiality (Beredjiklian et al., 2001). Even system with audio - visual and real time capabilities such as teleconferencing also precludes sensory modalities such as sense of smell and touch, which can be vital in the assessment of patients. Most importantly, it erodes the humanistic nature of the doctor-patient interaction and deprives patients of the physician’s healing touch , which can only be delivered through a person -to -person encounter. Also an unlimited access to one’s own medical records (patients) without the proper professional guidance can be harmful to the patients themselves.

Conclusion

In this work , we critically analyzed the benefits and limitations of adopting electronic health in biomedical profession , getting literature from different scientific disciplines related to improving healthcare delivery through the Information and Communication Technology ICT(e –health), empirical studies show that the approach of fully adopting e-health in biomedical profession should be patient - centered as “service buyers” and be conscious of fundamental precepts of medical ethics in order to overcome the challenges posed by new inventions in order to preserve the ideals and aspirations of the profession and society.

At the end of the analysis, the study reached the conclusion that for effectiveness in electronic health in biomedical profession , healthcare providers should assert and impose their ethical standards and philosophy on the research and development (R & D) as well as design of IT system to be used in practice, so that the end product is consistent and relevant to the goals and philosophy of the medical profession. For example, the medical profession must insist and persuade medical IT companies to focus their R & D efforts beyond mere capacity, power and speed, but also on systems that are safe and more controllable from patients perspectives. Recommendation should be adopted and applied improving.

Following from this model of e –health in biomedical field, Nigeria will experience medical sustainability and integration, thereby brings about peaceful co-existence and co-habitation among healthcare providers and receivers (patients) in Nigeria and the world in general. This automatically leads to the maintenance of good health as a tool for physical, mental, social, cultural and spiritual growth of individuals and their communities.

Recommendation

The government should ensure they provide ICT infrastructure and train all medical staff in the use of the software, this should include the part time staff in order to access vital information.

The government should invest massively in ICT infrastructure in hospitals, healthcare centers tertiary institutions (Universities, Polytechnics, and Colleges of Education for effective skill).

Medical healthcare providers, scientists, including science students should show more interest, remove

Another effective approach is to manage the utilization of ICT in medicine through the use of legislative and regulatory measures looking into legal reforms to enhance the privacy of health information. For example, empowering patients with rights to consent to disclosure, laws to limit disclosure when

consent is absent ,incorporating industry wide security protections and establishing a national data protection authority (Hodges et al., 1999).

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THE INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN LIBRARY OPERATIONS TOWARDS EFFECTIVE LIBRARY SERVICES

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Abstract

This paper examined the integration of information and communication technology (ICT) to library operations for effective library services. The paper also reviewed the need for the effective application of ICT as the best tool for libraries to use in assisting educational researches and students in this age of information explosion, in ensuring effective services. The paper also among other things discusses various ICT resources that can be used for effective library operations and services. Also the paper highlighted benefits and challenges of integrating ICT to library operations. The paper concluded by discussing possible solutions to various challenges to successful integration of ICT to library operations for effective services.

Introduction

Libraries have always been repositories of learning resources. From earliest time, they have provided access to information for scholars and researchers. The constantly increasing amount of information been generated and published, the expanding formats of information storage and retrieval, and ever changing education and research needs of library users make it difficult for any library to be an effective learning resources.

The primary role of the library is to provide information service to support the educational, recreation, cultural, economic and technological endeavours of members in their respective communities. The National Policy on Education (2004) identified the library as one of the most important aspect of educational support services. They are used as media for disseminating information and enhancing literature search and as tool for the development of intellectual compatibilities and promotion of cultural and social integration.

Onohwakpor (2006) stresses library, as a store of knowledge, indispensable to the success of any functional education. He further said that education without the services of library is half-baked education that can only produce narrow minded individual which will not be productive to their community. Efforts are therefore made to acquire, process, preserve and make available the resources to the users. In doing this, type, educational levels, information needs and the objectives of the user community should be taken into cognizance. This is because provision of services in a manner most useful to the library's chants is the ultimate target of all efforts towards effective and efficient services. With the proliferation of information, information is scattered in many areas and in order to keep track of these information many libraries have started embracing the recent developments in information technology to help them for effective library services. It was for this reason that the role of the information immunization technology for effective library services arose as a distinct area of this paper coupled with a view to ensuring the application of the information technology in library operations for effective library service.

Concept of Information and Communication Technology

Information and communication technology (ICT) has been defined by various scholars from different perspectives. Ayodele (2002) defined ICT as electronic based technology generally used to retrieve, store, process and package information as well as provide access to knowledge. Aluko (2004) also

described ICT as enabling technologies (both hardware and software) necessary for delivery of voice/audio, data (high speed and low speed) video, fax and internet services from point A to point B (or possibly to multiply B C etc) using wired and wireless media protocol (IP) and non IP networks. To Nwachukwu (2004) information and communication technologies (ICTs) is the application of computers and other technologies to the acquisition, organization, storage, retrieval and dissemination of information. However, in this context, information and communication technology is the use of electronic devices such as computers, telephones, internet, satellite system, to store, retrieve and disseminate information in the form of data, text image and others.

Types and Characteristics of ICTs

Iwu (2003) categorized ICTs into the following:

- i Sensing technologies: these equipments gather data and translate them into form that can be understood by the computer. These include sensors, scanners, keyboard, mouse, electronic pen, touch or digital boards, barcode sensors or readers, voice recognition system, etc.
- ii Communication technologies: These are equipment that enable information to be transferred from the source to user. It also tries to overcome natural barriers to information transfer like speed and distance some of these include: facsimile machines (fax), telecommunication system, telephone, electronic mail, teleconferencing, electronic bulleting boards, etc.
- iii Display Technologies: These are output devices that form the interface between sensing, communication and analyzing technologies and human user. They include: computer screen, printers, television, etc.
- iv Analysis technologies: These are the technologies that help in the investigation or query of data, analysis and indepth query for answers for simple to complex phenomena in research procedures. A complete set of a computer system could be a micro, mini, mainframe or super scamper.
- v Storage Technologies: These technologies facilitate the efficient and effective storage of information in a form that can be easily accessed. They include: magnetic tapes, disks, optical disks cassettes, etc.

Cockrane (1992) identified the following reasons for the introduction of ICT in libraries:

- i The failure of the existing traditional methods to cope effectively with ever increasing volume in the library.
- ii To allow for easy integration of various activities in the library .
- iii Increase in library activities, that is organization and services .

Information and Communication Technology Facilities in Library Operations and Services

The development and availability of information and communication technologies (ICTs) in libraries have today not only increased and broadened the impact of information resources at their doorsteps, but also placed more emphasis on effective and efficient services. Their applications in libraries, commonly known as library automation, have in deed continued to ease and promote quick and timely access to and transfer of information resources that are found dispensed round the globe. The following are some of the ICT facilities or resources that can be used for effective library operations and services:

- a) **Computer:** Computer can be referred to as the backbone, nucleus or hub of ICT application. In virtually all ICT applications, the computer is interfaced with another devices in order to function effectively. Computer on its own can be used to perform the following function in the library:
 - i Ordering / acquisition
 - ii Circulation
 - iii Library data base
 - iv Inter library loan by two or many libraries that are connected

- v Documentation and administration
 - vi Desktop publishing
 - vii Budgeting
 - viii Cataloguing and classification
 - ix Serial management.
- b) **Internet Facility:** Internet is described as a worldwide network of computer and people. Built upon state of the art technology, the internet makes it possible for thousands of dissimilar physical networks that are not connected to one another and that use diverse hardware technologies to connect and operate as a single communication system. There are locations of various types of information on computer system linked to the internet. It is an important tool for global on line services.
- c) **Video Conferencing:** Through video conferencing, people at different locations in the world could be allowed to hold meetings. Offorma (2000) describes video conferencing as a means of linking up two or more remote computers, all of which have a small camera attached which enables the participants to see each other, to speak to each other and in some systems, to be able to start, send documents through the linked computer. Some libraries use this medium to source for information that not available in their own libraries and at the same time use this great medium to create awareness to users who are ignorant of the available of information resources in the library.
- d) **Electronic Mail (E-mail):** This medium can also be used to send and receive mails. This is commonly and widely used with the internet facilities. E-mail is very useful for sending messages to and from remote areas with enhanced network.
- e) **Networks:** This is a system of interconnected computers for sharing information and resources (Olusanya and Oloyede) this may involve two or more computers in a single office or several computers in different units across an organization or across the country. The networks include the local area network (LAN) and wide area network (WAN). With computer network, libraries can access and share information in different locations and download for users needs.
- f) **Expert System:** Vast amounts of information may be gathered, synthesized and manipulated before decisions are made or conclusion arrived at the some of the complex area of human knowledge. According to Burton (1992) expert systems encapsulate the knowledge and experience of the human expert and make them available to a wider audience. Within information work, expert systems have been applied in the area of cataloguing, classification and information retrieval (MCDonald and Wickert, 1991)

Services Rendered in the Library

The various service provided in the libraries are complimented by available facilities, some of which are technology driven. In modern library, technology application in the provision and performance of library services provided by libraries to patrons. The utilization of emerging technologies in recent times in libraries worldwide has proved beyond reasonable doubt, that a library, whatever its services can perform better when facilities are adequately provided to enhance access to the content of the library.

However, the services rendered in a library differ from are library to another, depending on the clientele, the parent body and type of library. Idowu (2011) enumerated the following library services according to the international standard:

- Reference services
- Document delivery service

- Borrowing, renewing and reserving
- Computerized interactive search
- Technical services
- IT services
- E-library services
- Serials services
- Exhibition and displays
- User education
- Selective dissemination of information (SDI)
- Current awareness (CA)
- Referral service
- Reprographic Service
- Counseling service
- Webliographic service

Role of Librarians in Delivery of Effective Services

Based on clarity in making choices and in concentrating on the main priorities and confidence in talking about teaching and learning issues, the librarian is required to manoeuvre the library into a strategic position within the school system.

Four strategies:

1. Positioning
2. Proactivity
3. Persistence
4. Patience

Positioning: Ensuring library is represented the main curriculum planning committees - seizing opportunities to get involved in college initiatives and into other areas of curriculum management team.

Proactivity: Is likely to be college specific, since each college has its own concerns and priorities. A strategic proactivity involves taking overall responsibility for the college internet and educational IT programmes and making this work. So that the college is now a show – case for this type of work.

Persistence: Pursue issue – proposals monitored, reminders sent – willing to be a member of several committees. Library development is seldom a smooth and painless process – staff cut, finding problems imposed changes on librarians’ roles etc.

Patience: Being ready to wait for the opportunity to become proactive without creating undue resistance by trying to bounce people into change. Librarians are ‘true believers’ but not necessarily make the best advocates, hence the need for patience or cunning!!

Role of ICT in Effective Library Services

Neankwo (2006), opines that ICT's application to library works and services could be seen as the best way that could be used to assist researchers to adequately solve their literature need for effective research activities. This, according to the writer, is because the application of ICT to library operations greatly helps in the provision of efficient reference and information services, the utilization of network operations such as cataloguing, authority control, inter library loans and co-operation and in the participation of international bibliographic project. Also Dike (2000) claimed that instant access to information from a multiplicity of source is one of the major roles of ICT application to library services. Not only can it help in locating the materials where the required information can be found easily but ICT helps in sorting out what information is relevant from a mass of irrelevant information.

The use of ICT has impacted on library services according to Igbeka (2008), Adebisi (2009) and Uwaifo (2010) in the following ways:

1. Online Public Access Catalogue (OPAC): It is the computer form of library catalogue to access materials in the library.
2. No Physical Boundary: The user of a digital library need not go to the library physically once it is connected to the internet.
3. Storage Capacity: Digital libraries have the potential to store much more information, since it requires very little space to contain it.
4. Indexing and Abstracting Services: With the aid of ICT, database of print and audio-visual materials can be created and indexed. Also, ICT has made it possible for information seekers to conveniently access a wide range of library produced abstracts (indicative or informative).
5. Preservation and Conservation: An exact copy of the original can be made any number of times without any degradation in quality.
6. Inter-Library Loan: Needed materials from other libraries can be received within the shortest time through the email, courier services.
7. Access to Electronic Resources: Electronic resources are internet based resources such as electronic journals, reference sources, books etc.
8. Document Delivery Service: Document can be sent to needed users through e-mail, fax, etc.
9. Library Retrieval Systems: This involves using Compact Disc Read Only Memory (CDROM) technological mechanism of acquisition of specialized CD-ROM databases in various courses such as sciences, law, technology, agriculture, social sciences, medicine, humanities etc. the prominent ones are MEDLINE in medicine, AGRICOLA and AGRINDEX in agriculture, LEXIS and NEXIS in law, INIS and AGRIS in pure sciences and Public Affairs in social sciences. They are available commercially.

Online Public Access Catalogue (OPAC) is a great relief to users of the library catalogue in the sense that, different users can search for the same information at the same time using different terminals which is

impossible through the traditional card catalogue. Also, users can search the online library catalogue through ISSN, ISBN, and combination of title and author etc. Overdue notices are generated and sent to users through their e-mails. Users can reservation and overdue notices in the OPAC system. In the area of reference services, chat technologies, Ask a Librarian, Electronic-mail, fax, telephone, Compact Disc-Read Only Memory (CD-ROM) are used to answer users queries by the Reference Librarian in the technological age (Segun, 2003). Students and researchers can search, read through a single CD-ROM the 30 volume Encyclopaedia Britannica/Americana in the library and printout needed pages. Adequate security of those materials must be taken care of by the porters and other library staff.

It may also be noted that current and relevant information are accessed and downloaded by users through the internet. Some higher institutions libraries in Nigeria are connected to the internet and subscribe to online journals where various databases are searched and used by students and staff in various disciplines. It is a plus to those libraries in the area of providing current and relevant information to their users

Barriers to ICT Integration in Library Services

- **Poor infrastructural Facilities:** The problem of poor infrastructural facilities especially erratic power supply have been the major cause of set back in the integration of ICT in library services. Government should therefore provide enabling environment that would allow donor agencies to provide investors particularly those in information sector to take full advantage of recent advances in information technology to bring our libraries up-to-date. In this regards, efforts should be made to make the Nigerian technology limited and power Holding services more efficient that what is currently obtained.
- **Low Level of ICT Compliance:** Many users and members of the library community require knowledge of ICT. To meet this challenge, libraries and librarians can help make ICT knowledge available by creating electronic learning centre within the libraries. Such creation will go a long way to satisfy knowledge thirsty citizenry whose only handicap is lack of opportunity.
- **E-Library:** The library can lose its relevance in ever-changing world of information technology, if nothing concrete is done. E-library could be used to deliver library services and make library facilities available to the reading public in a modern and cost effective way. By so doing, the relevance of the library could be further sustained.
- **Cost:** Despite the fact that ICT is applicable to library service, high cost of ICT equipment could not make it to be widely utilized by most libraries. Adidoye, Aderole and Adelokun (2010) stress that most library users and librarians could not afford the cost of common personal computer.
- **Poor Maintenance of ICT Equipment:** Most libraries lack conducive environments for keeping and effective functioning of ICT equipment. Besides, most of the ICT equipment are poorly managed by most libraries. In addition, the cost of maintaining ICT equipment are very high.
- **Frequent Change in Technology which Might Lead to Total Overhauling of the Existing System:** frequent changes in software upgrading leads to total overhauling of the existing system as we have in some academic libraries in Nigeria.
- **Lack of Sufficient Monetary Allocation/Poor Funding:** most libraries do not allocate sufficient money to the building of ICT infrastructure.
- **Lack of ICT Policies:** There is a lack of systematic ICT policy in most libraries in developing countries which impedes the deployment of ICTs.
- **Inadequate Technical/Skilled Manpower:** There are deaths of technical manpower in the area of ICT in Nigeria. Faulty equipment is abandoned in some libraries because there is no knowledgeable staff to repair them.

- **Inability of the Government to Monitor Effectively the Policy on Information Technology:** various policies on ICTs in Nigeria like NUNET, school-net etc are not properly monitored. Also, there is lack of systematic ICT policy in most libraries in developing countries which Nigeria is part of them.
- **Erratic Power Supply:** ICT infrastructures depend mostly on electricity to function and access the needed information.
- **Technophobia:** the use of ICTs is easier for younger libraries. Several studies, according to Ezeani have shown that older librarians find it difficult to use some of these newer technologies.

Possible Solution to ICT Integration in Library Services

1. Government should endeavour to vote huge amount of money for ICT infrastructural development in libraries.
2. There should be training and retraining for library staff at all level in respect of use of ICT.
3. The concept of e-library should be revitalized in Nigeria libraries.
4. All taxes on ICT resources should be removed. Also where possible there prices should be subsidized
5. ICT equipment should be service regularly by expert, fault should be promptly connected.

Conclusion

Despite the challenges facing the availability and usability of ICTs in Nigerian libraries, librarians and authorities in various institutions must find means of making the facilities and resources discussed in this paper available to their users. It may be noted that if the libraries are provided with the various ICT facilities by the various authorities with adequate funds cum power supply, users and staff of the libraries will utilize the resources. Staffs that are not ICT compliant may be shown the way out if they refused to change for better.

Recommendation

This paper therefore suggest and recommends the following; as a means of enhancing and facilitating maximum use of ICT in library service and operations.

- There must be adequate planning and survey by any library before the introduction of ICT in order to forestall frequent change in the use of the hardware and software;
- Libraries in their zeal to provide qualitative service should open an electronic library where users and library community who do not have the knowledge of the use of ICT can be trained so as to develop the skill on how to exploit the information available for them in the ICT media.
- Adequate funds should be provided by the government and all stakeholders in education sector. This is necessary to enable libraries acquire and procure all ICT equipment that can improve the quality of their services.
- Librarians should equally partake in ICT utilization in the educational enterprise as a developer and not an operative. This he could do by seeking appropriate training, consulting teachers and always considering curricula related educational needs and involvement. However, it is important that in

the enthusiastic embracing of the introduction and application of ICT in the library, librarians should not neglect basic tasks like shelf tidying, stock editing and overdue recall.

- There is need for complementary efforts by different stakeholders (librarians, governments etc) to support effective ICT revolution in Nigeria. Appropriate training should be given to librarians in order to improve the qualities of their services.

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FOREIGN DIRECT INVESTMENT AND THE PERFORMANCE OF THE NIGERIAN ECONOMY

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Abstract

Foreign Direct Investment (FDI) is investment that is made to acquire a lasting management interest (usually 10% of voting stock) in an enterprise and operating in a country other than that of the investors (Jhingan, 1998). This paper examines FDI and the performance of the Nigerian economy. It investigates how FDI impacts economic growth in Nigeria. The paper recommended among other things, that there should be policies and programmes that will promote or improve FDI and macroeconomic variables in the economy.

INTRODUCTION

An agreed framework definition of Foreign Direct Investment (FDI) exists in the literature. That is, FDI is an investment made to acquire a lasting management interest (normally 10% of voting stock) in a business enterprise operating in a country other than that of the investor defined according to residency (World Bank, 1996). Such investments may take the form of either “Greenfield” investment (also called “mortar and brick” investment) or merger and acquisition (M&A), which entails the acquisition of existing interest rather than new investment.

In corporate governance, ownership of at least 10% of the ordinary shares or voting stock is the criterion for the existence of a direct investment relationship. Ownership of less than 10% is recorded as portfolio investment. FDI comprises not only merger and acquisition and new investment, but also reinvested earnings and loans and similar capital transfer between parent companies and their affiliates. Countries could be both host to FDI projects in their own country and a participant in investment projects in other countries. A country’s inward FDI position is made up of the hosted FDI project, while outward FDI comprises those investment projects owned abroad. One of the most salient features of today’s globalization drive is conscious encouragement of cross-border investments, especially by transnational corporations and firms (TNCs).

Many countries and continents (especially developing country like Nigeria) now see attracting FDI as an important element in their strategy for economic development. This is most probably because FDI is seen as an amalgamation of capital, technology, marketing and management.

Sub-Saharan Africa as a region now has to depend very much on FDI for so many reasons, some of which are amplified by Asiedu (2001). For a developing country like Nigeria, the inflow of a foreign capital may be significant in not only raising the productivity of a given amount of labour, but also allowing a large labour force to be employed (Sjoholm, 1999). The effort by several African countries like Nigeria, to improve their business climate stems from the desire to attract FDI. In fact, one of the pillars on which the New Partnership for Africa’s Development (NEPAD) was launched to increase available capital to US \$ 64 billion through a combination of reforms, resource mobilization and a conducive environment for FDI (Funke and Nsouli, 2003).

Nigeria as a country, given her natural resource base and large market size, qualifies to be a major recipient of FDI in Africa and indeed is one of the top three leading African countries that consistently received FDI in the past decade.

However, the level of FDI attracted by Nigeria is mediocre (Asiedu, 2003) compared with the resource base and potential need. Further, the empirical linkage between FDI and economic growth in Nigeria is yet unclear, despite numerous studies that have examined the influence of FDI on Nigeria's economic growth with varying outcomes (Adelegan, 2000 and Akinola, 2004). However, recent evidence affirms that the relationship between FDI and growth may be country and period specific. Asiedu (2001) submits that the determinants of FDI in one region may not be the same for other regions. In the same vein, the determinants of FDI in countries within a region may be different from one another and from one period to another.

The results of studies carried out on the linkage between FDI and economic growth in Nigeria are not unanimous in their submissions. A closer examination of these previous studies reveals that conscious effort was not made to take care of the fact that more than 60% of the FDI inflows into Nigeria is made into the extractive (oil) industry. Hence, these studies actually modeled the influence of natural resources on Nigeria's economic growth.

FOREIGN DIRECT INVESTMENT AND THE PERFORMANCE OF THE NIGERIAN ECONOMY

According to Jhingan (1998) direct investment is the formation of a concern (business) in which company of the investing country has a majority holding. The formation of the business concern may be financed exclusively from foreign source lending to the creation of fixed assets. In the same vein, the World Bank (1996) conceptualized Foreign Direct Investment (FDI) as investment that is made to acquire a lasting management interest (usually 10% of voting stock) in an enterprise and operating in a country other than that of the investors (define according to residency) the investors purpose being an effective voice in the management of earning either long term capital or short term capital as shown in the nations balance of payments account statement.

Nigeria's foreign investment can be traced back to the colonial era, when the colonial masters had the intention of exploiting our resources for the development of their economy. There was little investment by these colonial masters. With the research and discovery of oil foreign investment in Nigeria, but since then, Nigeria's foreign investment has not been stable.

With the end of oil boom in 1982, Nigeria found herself in a quagmire of economic problems. The external sector, these problems include unsustainable balance of payment deficits, a rapid escalating debt stock and a crushing debt service burden. Internally, the economic problems include unsustainable fiscal deficit, rising unemployment and galloping inflation. Above all, investment has collapsed and this contributed strongly to a reduction in real output and per capita real income level. In the late 1980's and early 1990's despite Nigeria's implementation of SAP, beginning from 1986, investment remained low and refused to recover significantly, the decline in investment in the late 1980's and the low investment ratio which persisted into the 1990's no doubt partly explains the slow growth of output during this period. It is certain that with significant recovery of investment, particularly foreign investment, a meaningful resurgence in output growth would remain elusive. And also if foreign investment remains at the current low level of per capita consumption and income and endanger the sustainability of the adjustment effort and hopes of poverty alleviation.

IMPACT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH IN NIGERIA.

There have been some studies on investment and growth in Nigeria with varying results and submissions. For example, Odozi (1995) reports on the factors affecting Foreign Direct Investment (FDI)

flow into Nigeria in both the pre and post structural adjustment programme (SAP) eras and found that the macro policies in place before the SAP were discouraging foreign investors. This policy environment led to the proliferation and growth of parallel markets and sustained capital flight.

Ogiogio (1995) reports negative contributions of public investment to GDP growth in Nigeria for reasons of distortions. Aluko (1961), Brown (1962) and Obinna (1983) cited in Adeolu (2007) report positive linkages between Foreign Direct Investment (FDI) and economic growth in Nigeria. Endozen (1968) cited into Adeolu (2007) discusses the linkage effects of Foreign Direct Investment (FDI) on the Nigerian economy and submits that these have not been considerable and that the broad linkage effects were lower than the Chenery-Watanaba average (Chenery and Watanaba, 1958). Oseghale and Amonkhienam (1987) found that Foreign Direct Investment (FDI) is positively associated with Gross Domestic Product (GDP), concluding that greater inflow of Foreign Direct Investment (FDI) will spell a better economic performance for the country.

Ariyo (1998) studied the investment trend and its impact on Nigeria's economic growth over the years. He found that only private domestic investment consistently contributed to raising GDP growth rates during the period considered (1970-1995).

Furthermore, there is no reliable evidence that all the investment variables included in his analysis have any perceptible influence on economic growth. He therefore suggested the need for an institutional rearrangement that recognizes and protects the interest of major partners in the development of the economy.

Examining the contributions of foreign capital to the prosperity or poverty of LDCs, Oyinola (1995) conceptualized foreign capital to include foreign loans, direct foreign investments and export earnings. Using Chenery and Stout's two-gap model (Chenery and Stout, 1966) cited in Adeolu (2007) he concluded that Foreign Direct Investment (FDI) has a negative effect on economic development in Nigeria.

Adelegan (2000) explored the seemingly unrelated regression model to examine the impact of Foreign Direct Investment (FDI) on economic growth in Nigeria and found out that Foreign Direct Investment (FDI) is pro-consumption and pro-import and negatively related to gross domestic investment. Akunlo (2004) found that foreign capital has a small and not statistically significant effect on economic growth in Nigeria.

However, these studies did not control for the fact that most of the Foreign Direct Investment (FDI) was concentrated in the extractive industry. In other words, it could be put that these works assessed the impact of investment in extractive industry (oil and natural resources on Nigeria's economic growth).

On firm level productivity spillover, Ayanwale and Bamire (2001) assess the influence of Foreign Direct Investment (FDI) and firm level productivity in Nigeria and report a positive spillover of foreign firms on domestic firm's productivity.

Much of the other empirical work on Foreign Direct Investment (FDI) in Nigeria centered on examination of its nature, determinants and potentials. For example, Odozi (1995) notes that foreign investment in Nigeria was made up of mostly "Greenfield" investment, that is, it is mostly utilized for the establishment of new enterprises and some through the existing enterprises. Aremu (1997) categorized the various types of foreign investment in Nigeria into five: wholly foreign owned; joint ventures; special contract arrangements; technology management and marketing arrangements; and subcontract co-production and specialization.

In his study of the determinants of Foreign Direct Investment (FDI) in Nigeria, Anyanwu (1998) identified change in domestic investment, change in domestic output or market size, indigenization policy, and change in openness of the economy as major determinants of Foreign Direct Investment (FDI) inflow into Nigeria and that effort must be made to raise the nation's economic growth so as to be able to attract more Foreign Direct Investment (FDI).

Jerome and Ogunkola (2004) assessed the magnitude, direction and prospects of Foreign Direct Investment (FDI) in Nigeria. They noted that while the Foreign Direct Investment (FDI) regime in Nigeria was generally improving, some serious deficiencies remain. These deficiencies are mainly in the area of the corporate environment (such as corporate law, bankruptcy, labour law etc). and institutional uncertainty, as well as the rule of law. The establishment and the activities of the economic and financial crimes commission (EFCC), the independent corrupt practices commission, and the Nigerian investment promotion commission are efforts to improve the corporate environment and uphold the rule of law. Has there been any discernible change in the relationship between Foreign Direct Investment (FDI) and economic growth in Nigeria in spite of these policy interventions?

Akinlo (2004) investigates the impact of Foreign Direct Investment (FDI) on economic growth in Nigeria using data for the period 1970 to 2001. His error correlation model (ECM) results show that both private capital and lagged foreign capital have small and insignificant impact on economic growth. This study however established the positive and significant impact of export on growth. Financial development which he measured as M_2/GDP has significant negative impact on growth. This he attributed to capital flight. In another manner, labour force and human capital were found to have significant positive effect on growth.

However, an important fact about Foreign Direct Investment (FDI) and growth debate is the endogeneity case in which Foreign Direct Investment (FDI) is theorized to impact positively on economic growth and consequently, lead to greater market which in turn attracts further Foreign Direct Investment (FDI) as well (market size hypothesis). Market size hypothesis states that markets with rapidly expanding economic growth tend to give multinational firms more opportunities to make more sales and profits and therefore become more attractive to Foreign Direct Investment (FDI). This study will therefore make its contributions by examining the contributions of Foreign Direct Investment (FDI) to growth. In addition, analyze the reality or otherwise of endogeneity theory, then determine the contributory variables to Foreign Direct Investment (FDI) flow in Nigeria.

RECOMMENDATIONS

1. Appropriate policy measures to attract foreign capital should be formulated and implemented to boost increased economic growth.
2. Policies that will bring about improvement in foreign direct investment and the balance of payments (BOP) in the economy should be encouraged.
3. Policies and programmes that would promote or stimulate foreign capital in the form of FDI and reduce unemployment should be encouraged.
4. Programmes and policies that promote FDI and reduce inflation should be promoted.
5. The Federal and the various state governments should as a matter of priority, improve the business environment by consciously providing necessary economic and social infrastructure, which will lower the costs of doing business in Nigeria and attract FDI into the country.

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IMPROVING NATIONAL SECURITY USING GPS TRACKING SYSTEM TECHNOLOGY

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Abstract

The state of insecurity in Nigeria has received global attention lately and thus a need for an improved Global Positioning System (GPS) based tracking system is required to meet quickly evolving security issues in Nigeria. GPS tracking technology is one of the most rapidly growing technologies around the world. This paper is an attempt to explore the security benefits embedded in the GPS tracking system in respect to the National Security dilemma and its deployment into Nigeria Security System. The paper delves into the architecture of a GPS tracking system, the mechanism of GPS system and the importance of geofencing and its application in the security of National emoluments (e.g refineries, mast e.t.c), human lives, Cars, Government facilities e.t.c. This paper is a clarion call to the Nigeria Government to implement an holistic approach towards the realisation of the optimum utilization of the NIGCOMSAT satellite especially in the area of security of lives and properties. This paper call the attention of the federal govt to the need for the full implementation of NIGCOMSAT Nigeria to avert some of the cases of bombing that has characterised the political landscape. Hence, a full implementation of Satellite Tracking Technology is capable of averting some of the security problem in the Nation.

Keywords: Global positioning system, Insecurity, Gps tracking system, NIGCOMSAT.

INTRODUCTION

Today, the whole world feels insecure; the environment know no peace and the people can't sleep with even one of their eyes closed. These are apparently evidenced in incessant wars between nations that have resulted in genocide and carnage while extent of damages, "Crimes Against Humanity" being perpetrated by man against fellow man has wrecked on lives and properties cannot be quantified. The sounds of guns, Weapons of Mass Destruction (WMD) and Bomb blast have enveloped the entire world (Comandclem, 2007).

The situation in Nigeria is not an exemption. The uproar in the Niger-Delta and the frequent Bomblast occurrence in the major states in Nigeria are clear evidences of the Level of insecurity in the Nation. Lack of security for life and property has assumed a crisis dimension in Nigeria.

The insecurity in Nigeria has led to the destruction of Lives and properties and has discouraged foreign investors from investing in the Nation economy.

In addressing the challenge to the survival of democracy in Nigeria, it is pertinent to consider security issues and problems that have affected or capable of affecting the attitude, confidence and cooperation of all groups and segments that make up the Nigerian federation. It is also necessary to explore the gaps and gray areas in the national constitution that are responsible for various problems and crises and how these gaps can be addressed. Some of the major security problems currently confronting the nation have been identified to include: political and electioneering conflicts, socio-economic agitations, ethno-religious crises, ethnic militias, boundary disputes, cultism, criminality and organised crimes (Abdulsalami, 2004).

The methodology of tackling insecurity has remained the same: vote more money to purchase vehicles and equipment, recruit more policemen and give orders for arbitrary arrest, urge all arms of security and intelligence to collaborate in ways that permit those dealing with intelligence and counter-intelligence to

dabble in security matters and vice versa, as is the case between the Nigerian police and the State Security Services (SSS).

Abdulsalami(2004) retreated that recent international debates have also raised the need to see security in the broader sense as the struggle to secure the most basic necessities of life: food, fuel, medicine and shelter. This broader human security is important for the attainment of physical and national security and overall peace and development as social unrests arising from the absence of such basic human security can indeed lead to security problems and conflicts.

Globally, Information Technology has been adopted in the developed World to combat the problem of insecurity and uproar. One of the approaches of addressing the problem of insecurity is the use of Cyberspace or Cybersecurity. Cybersecurity has been adopted in the developed world to combat the problem of insecurity and other related Crimes. Cybersecurity is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access.(whatis.techtarget.com/definition/cybersecurity.html).

GPS tracking System is one of the most rapidly growing technologies around the world. Most developed countries have focused on the GPS technologies in resolving some of their inherent security problems. According to Michael K., McNamee A and Micheal M.G. (2006),*the* Global Positioning System (GPS) is increasingly being adopted by private and public enterprise to track and monitor humans for location based services (LBS). A location-based service (LBS) is an information or entertainment service, accessible with mobile devices through the mobile network and utilizing the ability to make use of the geographical position of the mobile device .LBS can be used in a variety of contexts, such as health, indoor object search, entertainment, work, personal life, etc. LBS include services to identify a location of a person or object, such as discovering the nearest banking cash machine or the whereabouts of a friend or employee. LBS include parcel tracking and vehicle tracking services. LBS can include mobile commerce when taking the form of coupons or advertising directed at customers based on their current location. They include personalized weather services and even location-based games. They are an example of telecommunication convergence(Wikipedia).Some of these applications include personal locators for children, the elderly or those suffering from Alzheimer's or memory loss, and the monitoring of parolees for law enforcement, security or personal protection purposes.

GPS has the ability to calculate the position, time, and velocity of any GPS receiver. It does so using a process of triangulation, which works on the premise that you can find any position if the distance from three other locations is also known.

Eric M.Conway(2008) noted that the U.S Department of Defense first launched a Global Positioning Systems (GPS) satellite in 1978 and achieved a full constellation of 24 satellites in 1994, which the U.S. government has named Navstar.Today, GPS is used for both civil and military purposes and is controlled by a joint civilian/military executive board of the U.S. Government.The system is maintained by the U.S. Air Force on behalf of all users. GPS relies on three components: a constellation of satellites (currently 27) orbiting about 20,000km (11,500 miles) above the earth's surface which transmit ranging signals on two frequencies in the microwave part of the radio spectrum, a control segment which maintains GPS through a system of ground monitor stations and satellite upload facilities, and user receivers (civil and military).

Originally conceived by the U.S. Air Force for military purposes in the 1960s, it was commercially released in 1995. In 2000, selective availability was turned off, providing consumers the same level of accuracy as the U.S. military. Since that time, mobile business applications based on GPS and cellular network technologies

have proliferated. The rate of innovation has been high, and the level of adoption has been steadily increasing, showing a great deal of promise for the small start-up companies which are targeting GPS solutions at families, enterprises, and security-related government initiatives. Pasi Kampi (2009) affirmed that satellite tracking is one of the most rapidly growing business areas in the world. Tracking devices have become quite cheap, and they are available to nearly everybody. Even Smartphone can be used as tracking devices.

Sturdevant Rick W. (2009) affirmed that the the Navtar Global positioning System (GPS) is the first satellite navigation system that enabled users to determine precisely their location in three dimensions and time within billionths of a second and grew from a concept into a fully operational system in slightly more than two decades. The widely-used GPS system are the US-based GPS (Global Positioning System) and Russian-based GLOSNASS (Global'naya Navigatsionnaya Sputnikowaya Sistema, Global Navigation Satellite System) satellite positioning systems.

By 1972, the U.S. Air Force (USAF) and the U.S. Navy had been studying for several years the possibility of improved satellite-based radio navigation. The main reasons for GPS development were the need to deliver weapons precisely on target and to reverse the proliferation of navigation systems in the U.S. military.

Gak Gyu (2007) in his paper *Locating and Tracking Assets using RFID*, states that "Accurate locating or tracking is required in many fields from navigating for rescuing wounded people in emergency situation to decision-making for striking the target during the military operations. Therefore, the fields of the academic circles and the industries have been interested in locating and tracking objects or people over the years. The study is getting broad for inside as well as outside. Being able to rapidly locate equipment is critical in-building, including hospitals, manufacturing floors and warehouses. To utilize the limited budget and resources more efficiently, it is important to make optimal strategic decision."

The use of GPS in conjunction with GIS, cartographic mapping, and other technologies proved beneficial in disaster relief and recovery efforts. After hurricane Andrew devastated Florida in 1992, the Federal emergency management Agency (FEMA) contracted with survey crews to experimentally carry out the inventory on the damage using GPS/GIS technology instead of the traditional, manual assessment that involved house-by-house interviews. Based on encouraging results from that experiment, FEMA, the U.S. Army corps of engineers, and a private contractor with GPS/ GIS expertise formed a team in July 1993 to produce maps for *disaster response, recovery efforts, and risk mitigation* in the wake of severe Mississippi river floods that inundated more than 13 million acres, destroyed billions of dollars in crops, and left hundreds of people homeless. Following a GPS-equipped helicopter survey, a pair of two-person ground observer teams with GPS/GIS handheld receivers inspected and inventoried structures in approximately 75 communities south of Quincy, Illinois, more than 1,500 maps/data sheets were produced within a week of the teams' initial transfer of data to the corps of engineers' rock island, Illinois, base station. Prior to GPS/GIS, it would have taken a team of 50 people years to complete the same task. With the maps quickly delivered to FEMA decision makers, they began meeting with local officials and citizens to discuss assistance and requirements to rebuild above the 100-year flood elevation.

The most rapidly expanding area of GPS use for civil, commercial, and personal purposes was probably location-based services (LBS)—positioning and navigation. Similarly, Land-based users include automobile drivers, railroads, fleet managers of trucks, delivery vehicles, and public transportation; emergency responders such as fire, ambulance, and police; and recreational activities such as hiking, hunting, skiing, biking, and golfing. According to Alan A. varghese XXXX from ABI research in oyster Bay, New York, shipments of recreational GPS devices alone rose from 3.2 million in 2002 to 5 million in 2003, with a predicted annual growth of 31 percent until 2009. Sea-based applications ranged from recreational sailing, fishing, and managing shipping fleets, to assisted steering, risk assessment, and hazard warning. Pilots of all varieties—airplane, helicopter, hot-air balloon—relied increasingly on GPS for monitoring their flight path,

for collision avoidance, and for landing. Search-and rescue personnel on land, at sea, and in the air has considered GPS as indispensable. Ultimately, Scientists and Engineers experimented with using GPS for launch and on-orbit operation of Spacecraft. The use of GPS-aided technology for management of vehicle fleets has saved governments and businesses hundreds of millions of dollars by enabling more efficient planning of routes, monitoring misuse by employees, or locating stolen vehicles. Emergency responders found GPS capabilities invaluable. In 1992, a GPS-aided response system was tested in a large crossfield natural gas field north of Calgary, Alberta and it was concluded that it offered noteworthy cost and safety improvements over earlier systems by “providing nearly immediate identification of an alarm site and the nearest field personnel, as well as detailed maps that show the best route to the scene of an alarm. Recovery of stolen vehicles became much more likely with GPS.

The aim of this paper is to explore the current services being offered by GPS system especially in the area of security of lives and properties and to call the attention of the Government of the day to some of the untapped potential of GPS tracking system.

WHAT IS GPS

The Global Positioning System (GPS) is actually a constellation of 27 Earth-orbiting satellites (24 in operation and three extras in case one fails). The U.S. military developed and implemented this satellite network as a military navigation system, but soon opened it up to everybody else. Each of these 3,000- to 4,000-pound solar-powered satellites circles the globe at about 12,000 miles (19,300 km), making two complete rotations every day. The orbits are arranged so that at anytime, anywhere on Earth, there are at least four satellites "visible" in the sky.

A GPS receiver's job is to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location. This operation is based on a simple mathematical principle called *Trilateration*.

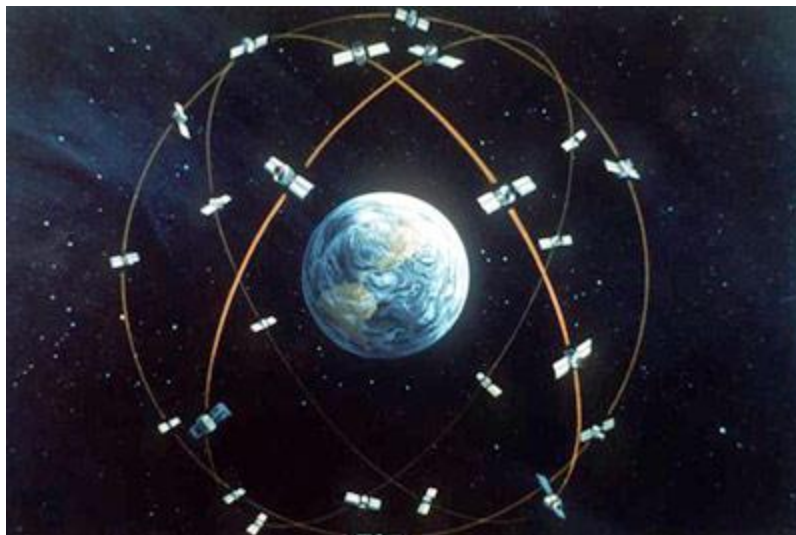


Photo courtesy U.S. Department of Defense

FIGURE 1

In order to make the simple calculation of the location, then, the GPS receiver has to know two things:

- 1) The location of at least three satellites above you
- 2) The distance between you and each of those satellites

OVERVIEW OF GPS TRACKING SYSTEM

A GPS tracking unit is a device that uses the Global Positioning System to determine the precise location of a vehicle, person, or other asset to which it is attached and to record the position of the asset at regular intervals. The recorded location data can be stored within the tracking unit, or it may be transmitted to a central location database, or internet-connected computer, using a cellular (GPRS), radio, or satellite modem embedded in the unit (see Figure 1). This allows the asset's location to be displayed against a map backdrop either in real-time or when analysing the track later, using customized software.

A GPS tracking system uses the GNSS (Global Navigation Satellite System) network. This network incorporates a range of satellites that use microwave signals which are transmitted to GPS devices to give information on location, vehicle speed, time and direction. So, a GPS tracking system can potentially give both real-time and historic navigation data on any kind of journey. A GPS tracking system can work in various ways. From a commercial perspective, GPS devices are generally used to record the position of Objects e.g. vehicles as they make their journeys. Some systems will store the data within the GPS tracking system itself (known as passive tracking) and some send the information to a centralized database or system via a modem within the GPS system unit on a regular basis (known as active tracking).

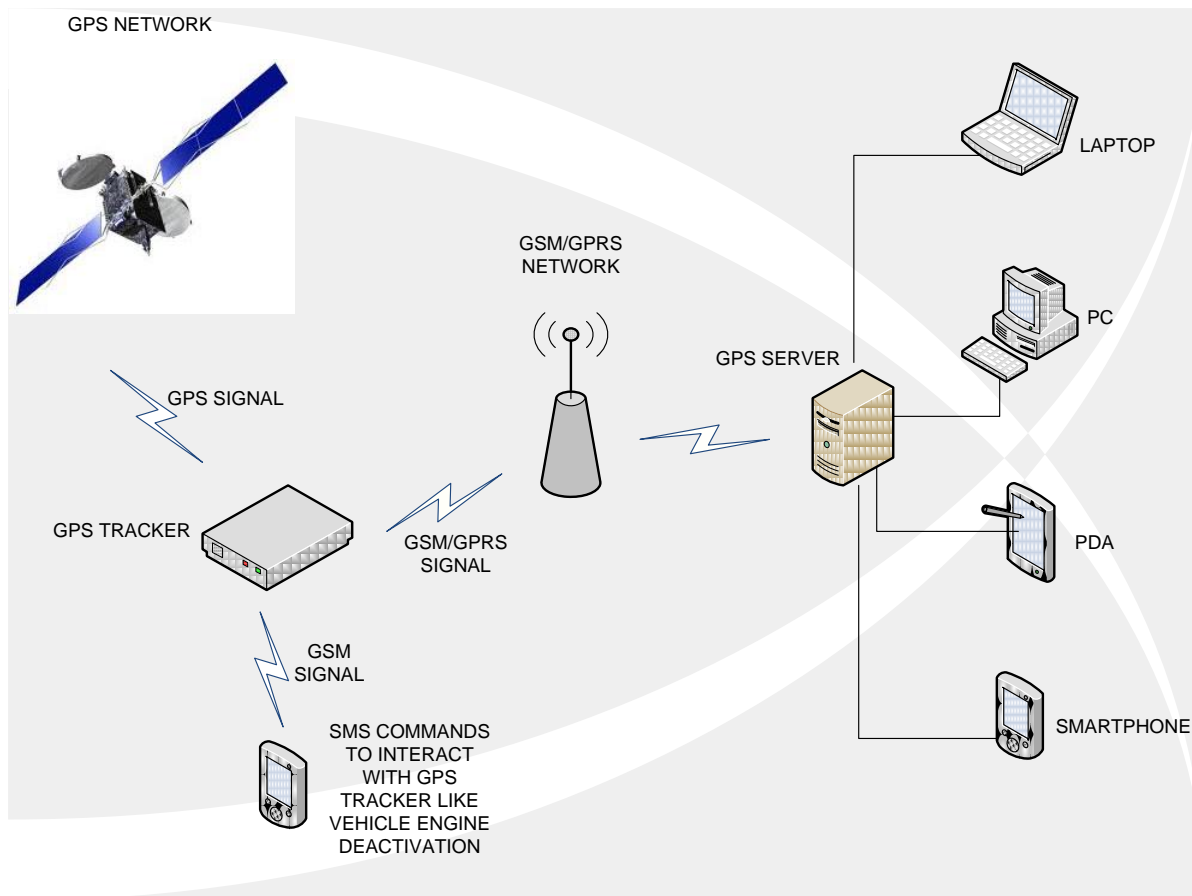
TYPES OF GPS TRACKING SYSTEM

A PASSIVE GPS TRACKING SYSTEM

Passive System monitors location and stores its data on journeys based on certain types of events. So, for example, this kind of GPS system may log data such as turning the ignition on or off or opening and closing doors. The data stored on this kind of GPS tracking system is usually stored in internal memory or on a memory card which can then be downloaded to a computer at a later date for analysis. In some cases the data can be sent automatically for wireless download at predetermined points/times or can be requested at specific points during the journey.

AN ACTIVE GPS TRACKING SYSTEM

Active System is also known as a real-time system as this method automatically sends the information on the GPS system to a central computer or system in real-time as it happens. This kind of system is usually a better option for commercial purposes such as fleet tracking and individual vehicle tracking as it allows the company to know exactly where their vehicles are, whether they are on time and whether they are where they are supposed to be during a journey. This is also a useful way of monitoring the behaviour of employees as they carry out their work and of streamlining internal processes and procedures for delivery fleets.



**THE ARCHITECTURE OF A GPS TRACKING SYSTEM
FIGURE 2**

GPS TRACKING SYSTEM UNITS

Three Types of GPS Tracking Units are there. There are currently three categories of GPS tracking units. The categories are split into how GPS data is logged and retrieved.

Data Loggers

Data loggers are usually the most basic type of GPS tracking; a GPS data logger simply logs the position of the object at regular intervals and retains it in an internal memory. Usually, GPS loggers have flash memory on board to record data that is logged. The flash memory can then be transferred and accessed using USB or accessed on the device itself. Usually data loggers are devices used for sports and hobby activities. They might include devices that help log location for hikers, bikers and joggers.

Data Pushers

Data Pushers are GPS tracking units that are mainly used for security purposes. A data pusher GPS tracking unit sends data from the device to a central database at regular intervals, updating location, direction, speed and distance. Data pushers are common in fleet control to manage trucks and other vehicles. For instance, delivery vehicles can be located instantly and their progress can be tracked. Other uses include the ability to track valuable assets. If valuable goods are being transported or even if they reside in a specific location, they can constantly be monitored to avoid theft. Data pushers are also common for espionage type tasks. It is extremely easy to watch the movements of an individual or valuable asset. This particular use of GPS tracking has become an important issue in the field of GPS tracking, because of its potential for abuse.

Data Pullers

The last category of GPS tracking units is the data pusher units. These types of units push data or send data when the unit reach a specific location or at specific intervals. These GPS units are usually always on and constantly monitoring their location. Most, if not all data puller unit also allow data pushing (the ability to query a location and other data from a GPS tracking unit).

FEATURES OF THE GPS TRACKING SYSTEM

Generally all of the GPS Tracking System has some of the common features that are listed below:-

GSM/GPRS Module - It is used to send the location to the user online. In some case, if the user wants the location through the internet then this module is very useful. By the help of the GSM/GPRS module, we can send data real time. It can be seen on the internet enabled any device as a PC, mobile phone, PDA etc.

Track Playback - Animates your driver's daily driven route so that you can follow every move. The track animation line is colour coded to indicate the speed your driver was travelling during his route.

Idle Time Report - Gives you an accurate report detailing when your driver was stopped and has left the engine running on the vehicle. This report was designed with input from our existing customers who were concerned about high fuel bills.

Track Detail - Provides you with a split screen view when reviewing your driver's route. Stop and transit times, as well as speed information, are displayed in the bottom pane. You can easily toggle between stops by clicking the stop number on the track detail pane.

Group Reporting - Allows you to set vehicles up into groups for faster and easier reporting.

Geo Fencing – It allows us to limit some region of area and if your vehicle goes beyond the boundary of that region then urgent message will be sent by the system to the manager to control the driver. So that the time and money can be saved by this system.

Ignition ON/OFF detection – The system can save the information about the engine that it is in working condition or stop by ignition ON/OFF detection so that the manager can know for how many times the driver stopped the fleet and for how many time. So much time can be saved.

SMS / GPRS Communication - The location about the fleet or the person can be send by SMS or email by this facility.

On-Line and Off-Line tracking – Every user has different requirement and as per the requirement the data can be viewed real time or it can be saved in the unit and when the vehicle reach to its manager, manager can download data and see the route of the vehicle and every other detail that can be seen by the real time.

Buzzer for alerting the driver – Some system uses the buzzer system to alert the driver that he is going out of the boundary or the speed is very high, or anything that is restricted. So that the driver is able to know that he is going wrong.

Monitoring digital events – If you need to know when a piece of machinery was turned On/Off or when a door was Open/Shut, this system will provide you with best options.

Reports – start stop report, standard report, stop sensor report, aggressive driving report, excessive idling report, vehicle mileage report etc reports can be generated by the system to help understand the driver's behaviour and to improve it.

DISCUSSION
HOW GPS TRACKING SYSTEM WORKS

The flowchart below depicts the true pictures on how a GPS tracking system works.

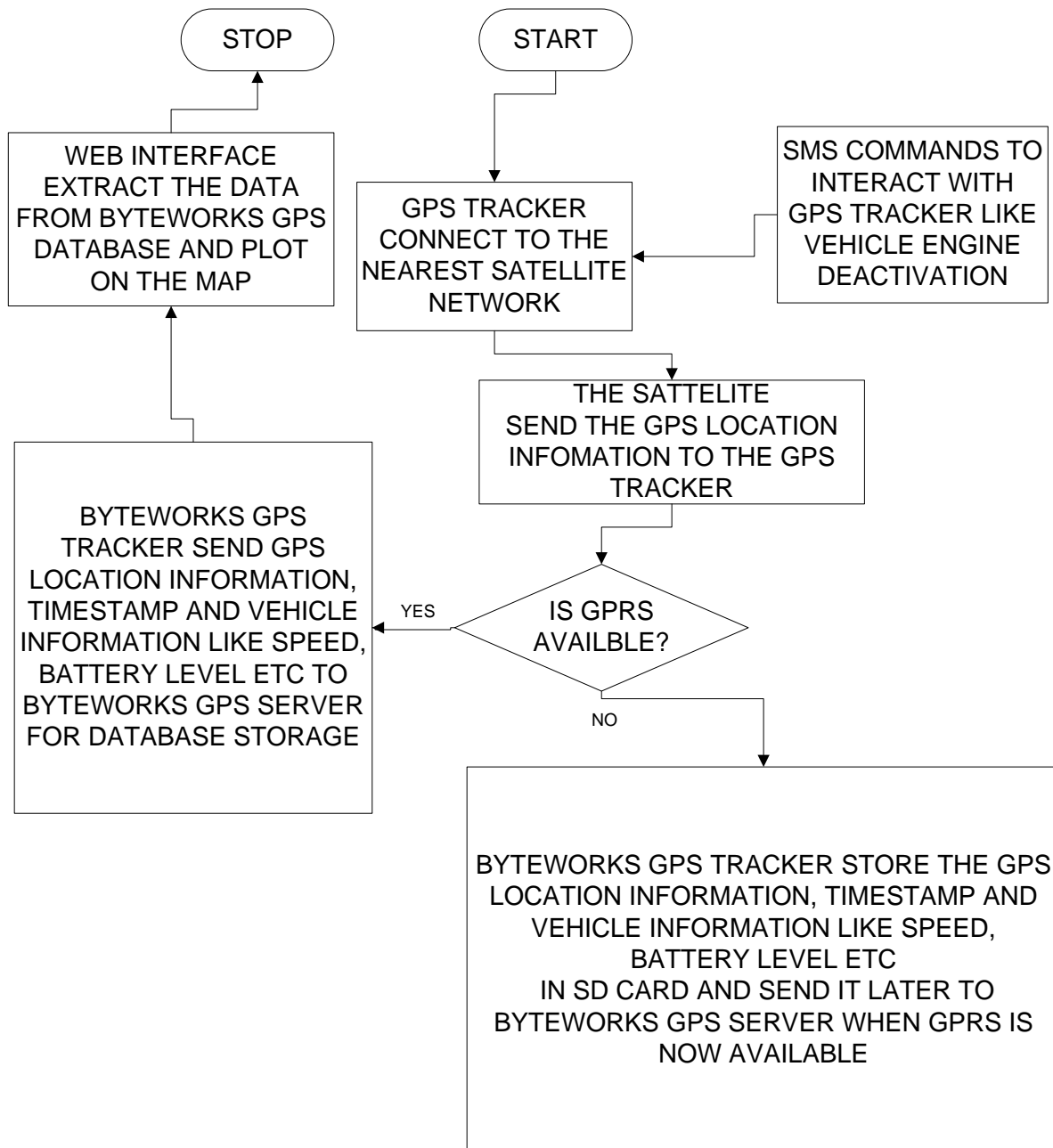


FIGURE 3

SECURITY BENEFIT OF A GPS TRACKING SYSTEM **EMPLOYEE MONITORING**

Employees that are tracked using GPS usually travel in vehicles over long distances. Tracked workers include couriers, and bus and truck drivers. The motivation for tracking employees is linked to improving company productivity. Automated Waste Disposal Incorporated uses GPS to ensure their truck drivers do not speed and are on track to meet their delivery schedule. The company imposed GPS tracking on its employees to reduce overtime and labor costs. After implementing the GPS tracking system the number of overtime hours dropped from 300 to 70 hours on average per week.

PAROLEE AND SEX OFFENDER

Today many parolees are fitted with a small tamperproof GPS tracker worn as a bracelet or anklet. The ankle device is in the shape of a rigid plastic ring, accompanied by a small tracking box that can fit in a pocket . Companies such as iSECUREtrac, design GPS monitoring systems to track parolees and sex offenders ensuring they do not commit any crimes, alert authorities if they enter certain locations, (e.g. schools,parks), and prevent them from leaving their homes, if that is prohibited . Some GPS units can also offer the added capability of knowing how much alcohol a person has consumed by measuring perspiration levels every hour. Parolee and paedophiles tracking is widespread in the United States with an estimated 120,000 tracked parolees in 28 states . However, there are over 50,000 convicted sex offenders in the US that are not tracked at all.

Due to the current over-crowding problem in British prisons, certain types of criminal are being tagged and released. The use of active tags with a large range capability can allow the police and probation services to monitor the whereabouts of tagged criminals and take appropriate action when necessary(Craddock R.J,2004).

TRACKING SUSPECTED TERRORIST

GPS tracking is used in developed countries to monitor the activities of a suspected terrorist or group. A number of national laws stipulate the use of a tracking device affixed to any person suspected of “activities prejudicial to security” (e.g. ASIO Act1979). Previously, the maximum period of time a suspected terrorist could be tracked was 6 months, however, during the Council of Australian Government (COAG) meeting on counter-terrorism it was planned to increase this period to 12 months.

DEMENTIAL WONDERING

Dementia is a symptom of a number of diseases.However; the most common forms are Alzheimer’s disease, vascular dementia and dementia with Lewy bodies. It currently affects five per cent of people aged over 65 years and twenty per cent of people aged over 80 years. Dementia becomes a serious problem when a patient begins to wander. Due to his/her mental state a dementia sufferer may get lost easily and may even be injured or killed. Since it is difficult to keep constant watch over a dementia sufferer, a caregiver can employ a variety of assistive technologies which notify family members automatically by phone or email if problems arise. Proponents of this application emphasize that the technology grants dementia sufferers more independence and freedom to give them a better quality of life(Craddock R.J,2004)..

PARENT TRACKING CHILDREN

Today, parents use GPS tracking devices to monitor the activities of their children. Some of the tracking devices are in the form of a wristwatch. However, some parents desired a platform that would allow them to call their wards, therefore a need for a mobile platform. Users can find the location of their child by logging onto the GPS provider website and viewing data on a map. Locations are updated every two minutes in some tracking solution so parents can keep a constant eye on their child's activities.

CAR TRACKING

Wikipedia described a car tracking system as the one that combined the installation of an electronic device in a vehicle, or fleet of vehicles, with purpose-designed computer software at least at one operational base to enable the owner or a third party to track the vehicle's location, collecting data in the process from the field and deliver it to the base of operation. It stated further that modern vehicle tracking systems commonly use GPS or GLONASS technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed on electronic maps via the Internet or specialized software.

Owners of expensive cars can put a tracker in it, and "activate" them in case of theft. "Activate" means that a command is issued to the tracker, via SMS or otherwise, and it will start acting as a fleet control device, allowing the user to know where the thieves are.

ANIMAL CONTROL. When put on a wildlife animal (e.g. in a collar), it allows scientists to study its activities and migration patterns. Vaginal implant transmitters are used to mark the location where pregnant females give birth. Animal tracking collars may also be put on domestic animals, to locate them in case they get lost.

ESPIONAGE/SURVILLANCE When put on a person, or on his personal vehicle, it allows the person monitoring the tracking to know his/her habits. This application is used by private investigators, and also by some parents to track their children.

R. J. Craddock (2004) identifies other major areas applications of GPS tracking system to include the following;

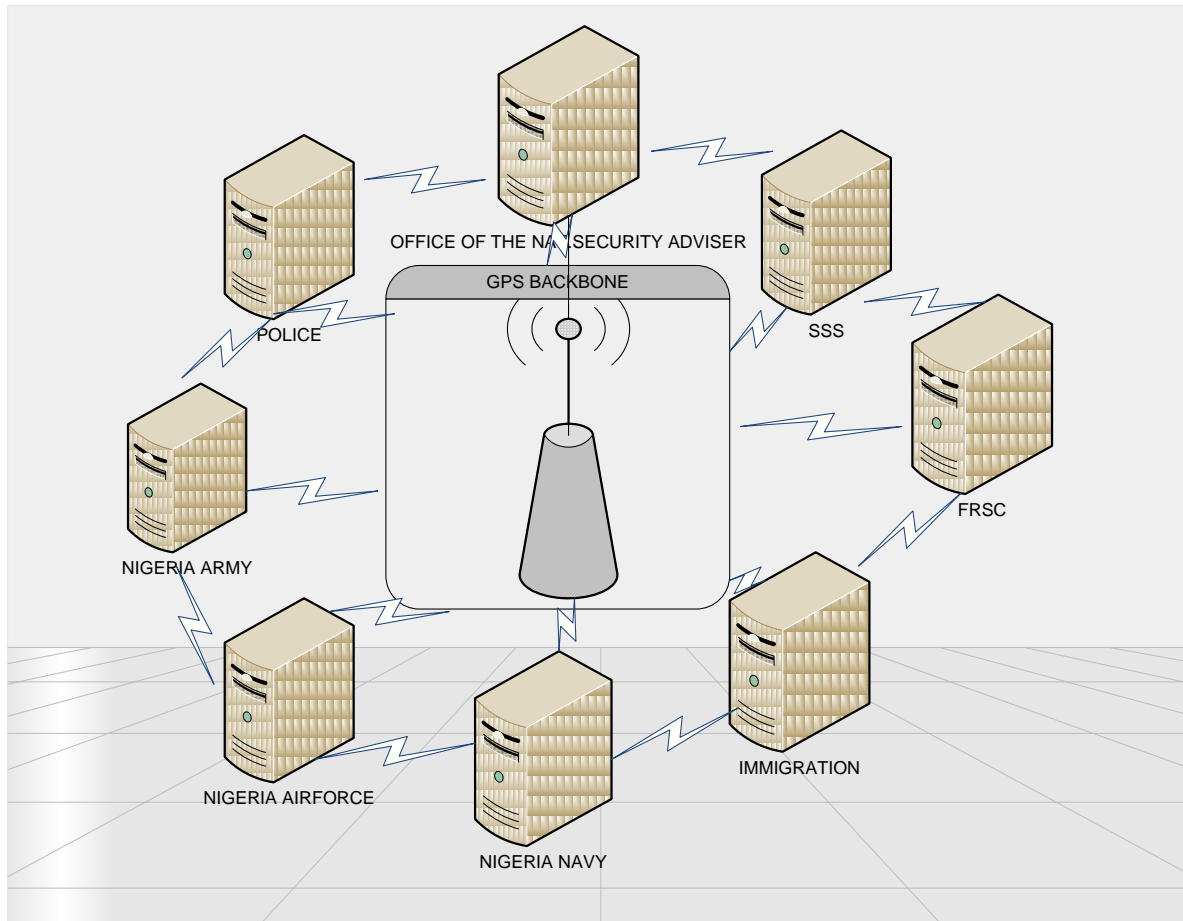
- Position reporting for marine navigation systems
- Positioning and tracking of transport containers
- Development of high accuracy positioning systems using differential GPS
- Tagging of ships, providing remote information access
- Personnel tracking and mapping using Wireless LANs
- GNSS location based systems
- Tracking of emergency services personnel entering hazardous sites, using GPS and RF tags

NIGER-DELTA UPROAR: GPS SYSTEM TO THE RESCUE

The adoption of GPS tracking system by the Federal Government can help to forestall possible attack on government facilities by the Militants and other aggrieved groups in the creeks. Geofencing will go a long way in curbing the activities of these militant groups, the facilities are tracked or tagged and the presence of any invader (untracked person or object) is quickly recognised and a signal sent to the appropriate Law enforcement agents via SMS for quick action to be taken. Similarly, a real time tracking of the expatriate and their families will go a long way in reducing the case of kidnapping in the Niger-Delta.

The use of tagged security passes can assist in controlling who can and cannot enter certain areas of a site or venue. Entry into some prohibited areas e.g. in ports, can be difficult to control. A network of tag readers can be used to alert security personnel when unauthorised tags have or are about to enter a prohibited area (using predictive tracking). In addition, the combination of a tag reader network with a network of smart cameras can provide alerts of un-tagged people within particular areas (Craddock,2004)

PROPOSED FRAMEWORK



**GPS-DRIVEN INTELLIGENT INFORMATION COLLABORATION SECURITY SYSTEM
FIG 2**

We proposed a model (fig 2) –an intelligent collaboration security system which is gps-driven.This model advocate for an integrated information system among the security outfits with GPS as the driven force in Nigeria.Furthermore,once an early warning system powered by a GPS system has been triggered,at any part of the Nation with the help of the Satellite, the information can be shared among the security agencies and joint response or action is initiated to forestall any threat or form insecurity.

CONCLUSION

With this paper, we have been able to x-ray the inherent security benefit embedded in the satellite tracking with a bias in gps tracking system. This paper is without any doubt a blueprint for the Nigeria government to tap into the seemingly latent potential in the gps tracking system in tackling security problem in the

Nation. The financial benefits of installing GPS tracking are more than enough to justify the costs. When coupled with increased security, the return on investment (ROI) of GPS tracking is nearly immediate. We end this paper with the statement from the Managing Director and Chief Executive of NigComsat; Engr Timasaniyu Ahmed Rufai, "The complete installation of satellite particular the one to be replaced after its crash in the orbit was capable of averting recent bomb blast in Jos and Abuja that Killed Scores of innocent Nigerians.

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MATHEMATICS FOR DAILY LIVING: IMPLICATION FOR THE SOCIETY.

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Abstract

With the use of Mathematics and especially now with the support of the mathematical processing and control machine called the computer, significant advancement are realized in science, technology and arts. This paper therefore, identifies seven educational values of mathematics, paying particular attention to its aesthetic value in man's physical environment. In x-raying the usefulness of mathematics in the different areas of life, the paper holds that mathematics is universal not only to science and science related areas, engineering and technology, but also in a way it makes itself relevant to the development of the social science and the liberal arts. Hence, one could almost say that without mathematics, the world could not have been what it is today.

Introduction

The word “Mathematics comes from the Greek $\mu\theta\eta\mu\alpha$ (Mathema) meaning ‘science, knowledge, or learning’ and $\mu\alpha\theta\eta\tau\iota\kappa\acute{o}\varsigma$ (Mathematiko’s) meaning ‘fond of learning’ (Simonson and Gouvea, 2007). Explained this Agwagah (2008) noted that mathematics is often defined as the study of topics such as quantity, structure, space and change. These topics provide the major subdivisions of mathematics into: Arithmetic, Algebra, Geometry, and Analysis. These major disciplines within mathematics arose out of the need to do calculations in commerce among others. According to Thomaskutty and George (2007), mathematics cannot be considered as a classroom discipline only. Reflecting on this, James (2005) stated that not only an Academician, a Scientist, an Engineer, but a shopkeeper, a grocer, a housewife, a sportsman, an employee need mathematics, and who does not need it? A common man can get on sometimes very well without learning how to count and calculate (Agwuagah, 2008). She further highlighted that apart from an Engineer, a Businessman, an Industrialist, A banker, even a labourer has to calculate his wages make purchases from the market, and adjust the expenditure to his income. But is mathematics all about calculations?

People believe mathematics is a divine discipline. For instance, Galileo, in Obodo (2004), stated that mathematics is the language with which God wrote the universe. Some people love mathematics while some fear it; some are attracted to and study mathematics, while some worship it. For instance, ancient Indian mathematicians like Aryabatta and bhaskara worshipped Mathematics, and lived for it. Also, the legend Srinivasa Ramanujan of India adored mathematics. These could be material and non-material reasons why people adore, worship and are attracted to mathematics. For some like Aryabatta and Bhaskara, it was not for any material benefit, but out of their devotion or adoration (Thomaskutty and George, 2007). What are other reasons for people adoring, worshipping, and being attracted to mathematics? Why should everybody learn mathematics? How does mathematics contribute to overall development of the members of the society? What is the significance of mathematics in the society? What should be the advantages of devoting so much effort, time and money of the society to learn mathematics? According to Kulshrestha (2005), these questions indicate the way to explore the values of mathematics.

Thomaskutty and George in Agwagah (2008) identified seven educational values of mathematics to include, Practical or Utilitarian values, Disciplinary values, Cultural values, Social values, Moral values, Aesthetic values and Recreational values. The practical or utilitarian values of mathematics seem to have been given greater emphasis in our society and the school mathematics curriculum than other value. This work therefore will be presented in the following ways:

- Aesthetic values of mathematics
- Usefulness of mathematics in human daily activities
- The role of mathematics in Science and Medicine
- The role of mathematics in Law and Social Sciences
- The language of mathematics
- The role of mathematics in Engineering and Technology

Aesthetic Values of Mathematics Education

Aesthetic is concerned with beauty and art, and the understanding of beautiful things, (Hornsby, 2001). God as well as man appreciates beauty. Hence, after creation, God saw that everything he created was beautiful, man being created in the image and likeness of God saw himself existing in the world full of beautiful things, either as a result of creation or through some fundamental processes of man's innovative nature. Birkhoff in Agwagah (2008) defines aesthetic as the qualities that make a painting, sculpture, musical composition, or poem pleasing to the eye, ear or mind. He noted a mathematical measure of aesthetic value using the formula: $M = O/c$, where M is aesthetic measure or value, O is aesthetic order and C is complexity. This implies that a high aesthetic value is placed on orderliness and a low one on complexity. In order words, beauty increases as complexity decreases. This definition indicates that aesthetic relates with appreciation of beauty and beautiful things, using the senses of eye, ear and mind.

Aesthetic qualities include: variety, integrity, diversity and harmony. According to Brady (2005), harmony and integrity are key to definitions of beauty in classical and medieval philosophy. They are connected to qualities such as order, symmetry etc. Variety and diversity are commonly contrasted with monotony, dullness and lack of interest. Aesthetic value in mathematics refers to the beauty of mathematics or beauty in mathematics. One may ask, is mathematics beautiful? What mathematics is beautiful? What problems are associates with the study of the beauty of mathematics? Can the beautiful image of mathematics be integrated in the context of pedagogy?

According to Hardy (1992), there is no permanent place in the world for ugly mathematics. Hardy is simply saying that mathematics is beautiful. Russell in Agwagah (2008) expressed his sense of mathematics beauty in these words.

Mathematics rightly viewed possesses not only truth, but supreme beauty – a beauty cold and austere, like that of sculpture, without appeal to any part of our weaker nature, without the gorgeous trapping of paintings or music, yet sublimely pure and capable of a stem perfection such as only the greatest art can show. The true spirit of delight, the exaltation, the sense of being more than man, which is the touchstone of the highest excellence, is to be found in mathematics as surely as poetry.

This implies that mathematics do not study pure mathematics because it is useful, but because he delights in it and because it is beautiful. This points to the fact that mathematics is beautiful.

According to Thomaskutty and George in Agwagah (2008), when we go through the biographies of great mathematicians, we see that almost all of them were attracted to this 'divine' discipline, by realizing its

beauty. The fineness, the harmony, the symmetry, all adds to the beauty of mathematics. Mathematics system and structure that if inconsistencies were found in axiomatic foundations of mathematics, most mathematicians would probably prefer to change the axiomatic foundations than to give up the beauty of the body of mathematics.

Mathematics is beautiful in terms of its simplicity, power, utility, multi-connections and other adjectives often used to describe a painting, poem or song (Bett, 2007). Simplicity is one of the highest values in mathematics. Mathematics try to identify the smallest set of rules from which many other propositions can be logically derived. The simplicity of mathematics is expressed in a mathematics article, the beauty is in the elegant efficient way it concisely describes ideas of great complexity. Mathematics ideas are by nature, precise and well defined, so that a precise description is possible in a very short space. Modern notation, for instance makes mathematics much easier. It is extremely compressed; a few symbols contain a great deal of information.

There are topics in mathematics, which can be used to illustrate its aesthetic element of power. Example is the number notational system (Bett, 2007). Using 10 symbols – 1,2,3,4,5,6,7,8,9,0, it is possible to create an infinite number of distinct numbers. The reason is because of the amazing power of place value notation.

The practical utility of mathematics can be shown in many ways. For instance, the universe is made of galaxies, mountains, creatures, vehicles, and all manner of other things each seemingly unique. The way in which those things intrude on one another is a chaotic affair, often violently, but sometimes with great subtlety. But thanks to mathematics, people are able to think about the world of objects and happenings and to communicate those thoughts in ways that reveal unity and order. The numbers, lines, angles, shapes, dimensions, averages, probabilities, ratios operations, cycle, correlations, regressions, etc that make up the world of mathematics enable people to make sense of a universe that otherwise might seem to be hopelessly complicated. (Agwagah, 2008). Circles, squares, triangles and other shapes can be found in things in nature and in things that people build. Numbers and shapes can describe many things in the world. Just as letters and words make up a language in reading and writing, numbers and shapes make up a language in mathematics. Numbers and shapes and operations on them, help to describe and predict things about the world around us.

Usefulness of Mathematics in Human Daily Activities

According to Odili (2006), the utilitarian aspect of mathematics in preparing students for useful living include counting, notations, addition, subtraction, multiplication, division, weighing, measuring, selling and buying.

Every student on finishing secondary education, should have clear idea of numbers and a comprehension of both the very large and the very small numbers. Students should understand the way number is applied to measure lengths, volume, weight, area, density, temperature, speed, acceleration and pressure. Estimation and approximation helps them to check economic waste in every day life. Odili further highlighted that economy of modern living and the technology of modern selling requires a housewife to be able to estimate quickly which of two different prices offers, sizes or measures is the better buy and to be able to see through many of the tricks of the trade. This presentation shows daily usage of mathematics.

The study of mathematics will form in the students the habit of clarity, brevity, accuracy, precision and certainty in expression and this will go a long way in giving us much-needed unity in this nation. In homes, offices, market places and playgrounds get involved in one argument or the other. The success in any argument depends on persuading and there is nothing more persuasive than a logical argument. The

idea of logical, where the validity of conclusions rests upon the validity and consistency of the assumptions and definitions upon which the conclusion are base, will help to eliminate frequency conflicts in our society.

According to Osofechinti in Odili (2006), the importance of mathematics to individuals in their daily undertaking is so enormous that the knowledge of mathematics is an indispensable tool for a successful and balanced human existence on earth. Mathematics helps man to sharpen his understanding and definition of religious concepts. Such concepts as eternity, heaven, spirit life, power, salvation, wisdom, strength, light, hope, faith, righteousness, glory, blessing, truth, grace, peace, neighbour, sun and death can each be defined with mathematical rigor and precision (Osah-Ogulu and Odili, 2000).

In mathematics, Fakuade in Odili (2006) asserts:

In government offices, a modest amount of mathematical knowledge is required for executing business, policies and decisions. In commercial sector, the daily running of businesses, modern development and advances in commercial matters and business connections depends very heavily on experts use of mathematical knowledge and processes.

That is, in preparing individuals for life, we may consider the power of mathematics in character building through active involvement, personal success work with and opportunities for stimulating curiosity, self-expression and self-criticism.

Role of Mathematics in Science and Medicine

Mathematics apart from being an intellectually stimulating discipline, is continuously being developed to meet the changing requirement of Physics, Chemistry, Biology, Social Sciences, Psychology, Engineering and even law to mention a few. Odili maintained that achievement in sciences is often contingent upon mathematics knowledge and the ability to perform mathematical operations. Although, physics and mathematics form different disciplines in institutions, the separation is not any more clear-cut than that between certain fields of mathematics (Ihejieta in Odili, 2006). At the early school stage, physics students are involved in measurement of length, area, volume and masses. To do these with dexterity, calculations, for which a good knowledge of mathematics is essential, are needed.

The physical phenomena in mechanics require a good knowledge of elementary differential equations and vector analysis. Complex numbers are used in treating oscillating quantities and on the principle of super position. Fourier series constitute an essential tool. To describe the motions in a plane or space, the physicist must have a good knowledge of vector algebra. Linear transformation in vector space is needed in the study of the general theory of coupled oscillations. The fundamental concepts and mathematical methods used in treading the mechanics of continuous media are applied in the study of vibrating strings and of the motion of fluids. Lagrange's equations and the fundamentals of advanced dynamics. Hamilton's equations is prerequisite to courses in quantum mechanics. In all sections of physics, mathematics form the basis of understanding it and also of its application. Ingle and Turner in Odili (2006) in their study on mathematics and chemistry at the o'level argued that the pattern of thought used in expressing some scientific concepts is identical to that used in some particular mathematical concepts. They added that students' difficulties with ration and proportion and computational skills in mathematics might affect their ability in learning some chemistry concepts and further suggest the following:

- a. In chemistry computation, mathematics activities involved are addition, subtraction, multiplication, division, fraction, and decimals, positive and negative numbers, reciprocals, index notations and standard forms, use of logarithms, slide rule calculations.
- b. Rate and proportion: Direct and inverse proportion, ration and percentages.

Also, Fakuade and Kalejaiye in Odili (2006) writing on mathematics topics related to chemistry suggest that fractions and decimals, axes and scales, line graph, addition and subtraction, logarithm numbers – use of four figure tables, indices, ratio and proportions, direct and inverse variation, substitution of values in an algebraic expression, and change of subject in a formula should be studied by chemistry students in the SSS level.

Adetula (2002) maintained that in medicine, problem that can be tackled using mathematics include: the conduction of electronic signals by nerves, flow of blood, calculations of radiation, treatment of patients and diffusion of radio active tracer and other chemicals in the body. In the health care delivery system, both the doctor and the patient will be in problem without mathematics. For example in the words of Akesode (2000) from diagnosis of diabetes through paternity testing using DNA to test HIV status, the language is mathematics. From a minor surgery of suturing an ulcer to a major brain surgery or organ transplant, mathematics has a place especially with regard to precision of measurement.

Role of Mathematics in Law and Social Sciences

Odili (2006) affirms that Mathematics is universal not only in the way it influences the basic sciences, the applied sciences, engineering and technology, but also in the way it makes itself relevant to the development of courses in the social sciences and the liberal arts. That is, the dependence of courses in the social sciences such as mathematics is such that a basic knowledge of mathematics beyond further mathematics is required. He further emphasized that successes of mathematics in the study of inanimate nature have inspired the mathematical study of human nature in recent times. Such mathematical topics involved are:

- In finance – constraints in linear programming techniques and probability.
- In insurance business – constructing life tables premium rates, equity linked contracts, ruin theory, discounted cash flow and time series
- In geography – measurement of distance, areas on maps using amp projectors, the study of the solar system, the determination of the shape and the size of the earth, the distance of the horizon, the indivisibility of objects, the relationship between longitude and time, nautical miles, the use of national grid in ordinance survey maps and the interpretation of contour maps, have all been made possible through expert application and knowledge of geometry and trigonometry.
- In education, mathematics is used in educational planning and evaluation, test and measurement, information system, design and implementation.

Mathematical trend analysis, financial/cost analysis, school mapping, operation research, parameter estimation, time series analysis, cohort analysis, descriptive/financial statistical analysis.

The application of mathematics in law is not used in direct forms as in other disciplines. The principles of mathematics reasoning forms the basis for its understanding. Prospective law students with mathematics background perform better. Such areas as ownership right, power, justice, crime, guilt, trial, conviction, evidence, suspect, constitution, charge, offence count, liability, civility etc are now defined with mathematical precision (Gemignani, 1979). Therefore, the impact of mathematics in law shows up in the high performance and great repute enjoyed by the mathematically literate law firm.

Language of Mathematics

The universal language of mathematical acts across cultures and uses carefully defined terms and concise symbolic representation to add precision to communication. Hence, the mathematical statement $5 + 3 = 8$ means the same to a Tiv, an Igala, an Igbo, a Yoruba or a Hausa, no matter what native tongue is used. The grammar of the language, its proper usage is determined by the rule of logic. The study of mathematics form in students the habit of clarity, brevity, accuracy, precision and certainty in expression and this go a long way to unite us in this country. The success in any argument depends on one persuading his opponent and there is more persuasive than logical argument. Therefore, the idea of logic rest valid conclusion upon the validity and consistency of assumptions and definitions to eliminate frequent conflicts in homes.

The vocabulary of mathematics language consists of symbols such as $+$ - addition, $-$ - subtraction, \div - division, Σ - summation, $\sqrt{\quad}$ - Square root, \int - integration etc.

Role of Mathematics in Engineering and Technology

Fakuade in Odili (2006) claims that the better mathematician an engineer is the better engineer he becomes and the more likely he is to make effective use of mathematics. In engineering field, the search for the problem, the study in physical situation and making of a mathematical model, the solution of the problem, generalization of the solution and interpretation of results, all have recourse to the use of mathematics. Mathematics have dominated scene in the aircraft technological development especially by way of research aeronautics and in the structure of aircraft itself. The branch of mathematics closely associated with aeronautics fluid dynamics. Fluid dynamics is the study of motion of gases and liquids, which involves the use of Eulerian equations of motion of fluids, together with the continuity equation, which expresses the conservation of mass, and the equation of state of the fluid. All the mathematical results obtained from the solution of these equations lead to decisions on viscosity of the air, the steadiness of the motion of the aeroplane, external forces acting on the body of the aeroplane, the condition to the air traffic have largely relied on the use of electronic digital computer, which is a major branch of mathematics.

In the recent years, there have been major developments in Information and Communication Technology, the highly synergistic combination and collaboration of computer science or technology with communication technology in the service of humanity. Its effectiveness as an instrument of information dissemination is not inherent in its transmitted form, its power is derived from the mathematical machine that converts inputs into outputs. Excellence in modern warfare together with highly sophisticated contraction space vehicles is an essential determinant of the supremacy and superiority of a nation. All these ideas depends so much on the knowledge and application of mathematics that one could almost say that without mathematics, the world could not have been what it is today.

Conclusion

With the use of mathematics and especially now with the support of the mathematical processing and control machine called the computer, significant advancement are realized in science, technology and arts. The application of mathematics within the context of the socio-cultural environment of man produces harmony, order and peace. It provides serene beauty in man's physical environment (aesthetic values). It is difficult to imagine how such fields as accountancy, engineering, natural and applied sciences, land surveying, quantity surveying, modern corporate management, education, medicine, banking, finance, actual science, architecture, fine and industrial arts, etc could get along in their services to humanity without

mathematics. It becomes necessary that school administrators, teachers, parents/guardians and students should now view mathematics as an all-important subject for making sustenance and development of our society in the 21st century and beyond. What is needed now is more mathematics and not less for our industrial growth, since mathematics as a science numbers, quantities and measurements will continue to provide us with empirical statistical data upon which we can base sound decisions in our developmental efforts. While teachers should expose students to various representations of a mathematical idea, he should provide opportunities in class for students' initiative, independence and creativity in the mathematics classroom.

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**REALITIES OF INTEGRATING INFORMATION AND COMMUNICATION
TECHNOLOGY IN NIGERIAN SECONDARY SCHOOLS: EXPERIENCE FROM A
LOCAL GOVERNMENT IN OGUN STATE, NIGERIA.**

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Abstract

The Nigerian National policy for Information Technology asserts that information technology is the bedrock for national survival and development. The National policy on secondary education also recognizes the prominent role of information technology in knowledge advancement and therefore noted that Government shall provide necessary infrastructure and training for the integration of IT in the school system. The main factors of successful integration of ICT in education comprise the teacher and computer facilities. Taking field experience as a window of assessment on the level of IT integration to education, this paper reported a study on Abeokuta South Local Government of Ogun State. The report showed that the number of teachers who have basic skill in use of IT is low. Moreover, just a few of the schools have enough numbers of computers to serve the school population; this is even not to talk about how accessible they could be to both students and teachers. The case of internet facility provision is not even anything to write home about. This indicates that the schools are largely unprepared to use IT facilities in instruction. Also, there is still much to be done to achieve the goal of IT integration in Nigeria secondary education.

Keywords: Integrating Information and Communication; Nigerian Secondary Schools; Nigerian Experience

Introduction

The Nigerian National policy for Information Technology define Information Technology to include any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement control, display, switching , interchange, transmission or reception of data or information. The National policy on education on secondary education also recognizes the prominent role of information technology in knowledge advancement and therefore noted that Government shall provide necessary infrastructure and training for the integration of IT in the school system. In relation to this, the first mission statement of the national policy for information technology is to use IT for education. It further has as one of the general objectives to integrate IT into the mainstream of education and training. This will undoubtedly be an innovation in the Nigerian educational system

Nigeria's IT policy's vision statement is to make Nigeria an IT capable country in Africa and a key player in the information society by the year 2005, using it as the engine for sustainable development and global competitiveness. In her education, Nigeria presently runs the 9-3-4 educational system which is broadly divided to three segments of basic education, senior secondary and higher education. Here, the primary and the junior part of secondary education is a compulsion for all children as embedded in the universal basic education policy which is a derivative of the global Education for All (EFA). In line with the global trend on information technology application in education, the government of Nigeria has integrated its educational use in the general objectives of the national policy on information technology. The sixteenth objective as stated in the policy is 'to integrate IT into the mainstream of education and training'. This also explains why the National policy on Education (2004) specifically stated on secondary education that 'government shall

provide necessary infrastructure and training for the integration of ICT in the school system in recognition of the role of ICT in advancing knowledge and skill in the modern world. This indicates that the Nigerian society also recognizes the importance of IT in its secondary education. According to the World Bank (2009), secondary education is now being recognized as the cornerstone of educational systems. This is because secondary education has the peculiarities of being at the same time terminal and preparatory,

Secondary School Education and Information Technology

Nigeria presently runs an educational system which is broadly divided to three segments of basic education, senior secondary and higher education. Here, the primary and the junior part of secondary education otherwise referred to as basic education, is a compulsion for all children as embedded in the universal basic education policy which is a derivative of the global Education for All (EFA). It is also important to note that secondary education remains an important part of this educational system. According to the World Bank (2009), secondary education is now being recognized as the cornerstone of educational systems. This is because secondary education has the peculiarities of being at the same time terminal and preparatory, compulsory and post-compulsory. It stands as the crucial link between primary schooling, tertiary education, and the labor market. It also has the ability to connect the different destinations and to take young people where they want to go in life.

Secondary education serves to encourage broad, personal development and social education of all students; to create active, independent learners; and to recognize and make use of individual differences among students. According to the National Policy on Education (2004), the broad goal of secondary education is to prepare the individual for useful living within the society and higher education. Secondary education therefore provides a comprehensive programme for the youth which equips him with basic skills in academic as well as prepares him for coping with the problems of life (Adejumo, 1984, Net Industries, 2009) In relation to use of IT in education, it is an obvious fact that in this modern society, technology is fast changing the instructional process in education. For instance, Ogunsola-Bandele (2002), observed that computer skills enable classroom teachers to join in the ICT drive. This ultimately helps students to have increased self-confidence and full self esteem when using ICT. Therefore, educators and researchers alike in Nigeria need to respond to the responsibility of popularizing Information and communication technology ICT education in tertiary institutions so as to provide quality science, technology and mathematics in the 21st century (Ukwungwu, 2004). In line with this, Temi (2003), observed that the success of IT in Nigerian classrooms would depend on the extent to which the needs of teacher trainees are met during preparation. This obviously calls to mind the challenges of integrating information technology into teacher education.

Major factors of ICT Integration: *Skilled Manpower and Facilities*

The main factors of successful integration of ICT in education comprise the teacher and computer facilities. The role of the teacher in any instructional situation is that of a communicator. Therefore, the teacher's role in the integration of computers in schools is obviously very important, and every educational reform effort should take into consideration teachers' knowledge, skills, beliefs, and attitudes (Cuban, 2001). Beliefs and attitudes play a fundamental role in the way that teachers will deal with ICT in the classroom. In other words, dealing effectively with ICT, relates not only to knowledge of the capability, limitations, applications, and implications of ICT, but also to individuals' attitudes and perceptions regarding IT tools. The effective implementation of IT depends upon users' having positive attitudes towards it. This shows that actual use of IT depends largely on teachers' personal feelings, skills, and attitudes towards IT. This implies that teachers who have positive attitudes towards IT and perceive it to be useful in promoting learning will evidently integrate IT in their classroom more easily than others.

Whatever new technologies introduced into the educational system cannot be done effectively without carrying the teachers along. Teachers are at the heart of any successful innovation in schools without their collaboration, nothing worthwhile can be achieved. However, in many schools, teachers are not skilled enough to make use of IT in instruction. Their initial training, which quite often the only one they have received, generally does not include the use of contemporary technologies for teaching. At the same time, most teachers are reluctant to invest their own time and resources in developing themselves in the area of information technology. Some of the teachers are not even convinced of the necessity of IT as a tool in instruction delivery. Such teachers need to be convinced, well motivated and made to appreciate the effect of the policy on national goals. Some studies have investigated the preparedness and competence of Nigerian teacher in ICT. Yusuf (2005) investigated the perceived self efficacy of teachers in the implementation of computer education in Nigeria secondary schools. The findings revealed that most of the teachers in Federal Government Colleges do not have the needed experience in the use of computer. Moreover, majority of the teachers – both male and female- do not have needed competence in basic computer operations. They also do not have needed skills and knowledge in the use of common computer software. The study further revealed no significant difference between male and female teachers use of common computer software.

In the same vein, Njoku (2006) investigated the awareness and use of ICT by teachers in selected secondary schools in Owerri, Nigeria. 177 teachers participated in the study. While 164 (92.7%) of the respondents claimed to be computer literate and eight (4.5%) admitted that they were not computer literate; five (2.8%) of the respondents did not disclose their computer literacy status. This shows that ICT awareness and use among teachers in secondary schools in Nigeria is generally low.

Facilities here include provision of functional computers and internet facilities. It is important to note that access to the computer is a very important factor in readiness to and use of IT in instruction. According to Kabonoki (2008) access to computers and hence to the Internet remains a significant factor in its use in instruction by teachers. In Africa generally, there is low access to basic equipment, low internet connectivity, low participation in the development of IT equipment as well as low involvement in software development (Yusuf, 2005). Some years back in Nigeria, more than 95% of public primary and secondary schools were yet to embrace the use of computers while most classroom activities were still dominated by chalkboard and textbooks (Egunjobi, 2003). Possible reasons for this have been identified to range from low level of computer literacy, lack of inner drive, lack of interest and lack of personal access to incessant power failures, poor organization of resources, poor quality hardware and inappropriate software (Becta, 2004). However, this situation seems to have improved a bit as observations revealed that more and more people are having access to information technology on a daily basis.

Some Efforts at Integration of ICT to Education

The computer is becoming a commonplace item most especially in the urban areas while the telecommunication agencies like MTN, MULTILINKS and STARCOMMS provide Internet access to their subscribers. And this does not leave out the teachers too. In the same vein, the Federal Government of Nigeria also embarked on a child a laptop project some years ago. Though the programme could not be sustained, it is worthy to note that it was an attempt made to achieve the integration of IT to educational instruction. In relation to training of teachers, introduction to computer science is presently a compulsory course to be taken in Colleges of Education at both 100 and 200 levels. The import of this is to expose these teachers in training to the use of information technology. This is also in realization of the fact that IT has become an indispensable tool in educational instruction in the contemporary age.

Moreover, it is becoming a reality that the process of admission in to colleges of education now involves the use of information technology, where students are expected to register for JAMB exams online, check results online and even register for courses after admission online. Thus, it is obvious that such

students may not escape the use of information technology. However, observations have shown that a larger percentage of incoming student teachers to colleges of education lack adequate IT skills as majority of these students pay for the services of cybercafé owners to assist them in all the processes involved in their admission.

It is also important to recognize the efforts by some Colleges of Education to create IT centres where students could be exposed to the use of IT. Some college libraries have also automated and make provisions for electronic libraries where IT is used to access and retrieve information. In the same vein, the NCCE made it compulsory for all academic staff to be computer literate by making it a requirement for promotion. It will also be an understatement to say that online retrieval of information is becoming a daily part of library services in academic settings.

The Realities: The Ogun State experience

A study was carried out recently by the author with a view to investigate the level of availability of ICT facilities and the ICT competence of teachers in Abeokuta south local government of Ogun state. The study investigated the ICT basic skills possessed by the teachers in the local government. Abeokuta South Local Government was purposely chosen because it comprise a major urban part of the state capital and as such expected to be at the forefront of ICT application to education.

The study

Abeokuta South Local Government has a total of twenty senior and twenty junior public Secondary schools. All these schools were included in the sample for the study. The instrument of observation and questionnaire were used to collect data for the study. A total of five hundred and twenty (520) teachers were randomly selected as respondents to the questionnaire, but a total of four hundred and seventy (470) participants returned the completed questionnaire. This forms 90.4% return rate. All these respondents participated in the basic skill aspect of the study. The 470 comprise of 238 teachers from senior school and 232 teachers from junior school. The participants at the junior school included 66(28.4%) male and 166(71.5%) female. While the participants at the senior school included 121 (50.8%) male and 117(49.2%) female. This gives a total of 187(39.8%) male and 283(60.2%) female.

Basic Skills of Participants

The specialization of the participants at the senior school level revealed that 45(18.9%) out of the 238 participants are from the Arts, 52(21.9%) are from Commercial while 89(37.4%) are from the sciences. This also includes 13 specialists in Computer Science. This forms 14.6% of the participants from the science. Moreover, 25(10.5%) are from Social Science while 27(11.3%) have Vocational based background. It is therefore obvious that the highest percentage of the participants have Science background. At the Junior Secondary School level, while 58(25%) and 31(13.4%) of the participants are from Arts and Commercial areas of specialization respectively. 63(27.1%) are from the Science while 37(16%) and 43(18.5%) are from the Social Science and Vocational. It is also obvious that the highest percentage at this level is also from the Science background.

In all 103(21.9%) are from the Arts, 83(17.6%) are from the Commercial, 152(32.3%) are from the Science. In the same vein, 62(13.1%) are from Social Science while 70(14.9%) are from the Vocational background. It is clear here that the highest percentage (32.3%) of the participants have Science background while (13.1%) have Social Science background. Out of the participants with Science background 29(19%) are with computer background. However, the measurement of skill in this study is based on practical performance by the participants in word processing, spread sheet and PowerPoint applications as well as the use of internet. Analysis of performance of the participants in these specific areas shows that only 93(40.1%) of teachers in junior school and 103(43.2%) of teachers in senior school are able to do word processing. In the same vein, only 35(15.1%) of the teachers in the junior school and 42(17.%) of teachers in senior school are able to perform in spread sheet. Moreover, only 30(12.9%) of teachers in junior school and 28(11.8%) of

teachers in senior could make use of PowerPoint presentation. However, 58(25%) of teachers in junior and 75(31%) of teachers in senior are able to use the internet. This is evident in table 1

Table 1: Basic Skills of Participants

School	Total no of teachers	Total no of COMPUTER Science teachers	%	No of Trs with Cop Skills							
				WP	%	SS	%	PP	%	Internet	%
Junior N=20	232	16		93	40	35	15.1	30	12.9	58	25
Senior N=20	238	13		103	43.2	42	17	28	11.8	75	31
total	470	29		196	41.7	77	16.4	58	12.3	133	28.3

It is also evident from the table that 196 (41.7%) of the total participants are able to demonstrate basic skills in word processing, 77(16.4%) are able to demonstrate skills in spreadsheet while 58(12.3%) and 133(28.3%) are able to demonstrate skills in PowerPoint presentation and the internet.

Policy Implications

This shows that a very low percentage of teachers have skill in PowerPoint presentation. This also applies to spreadsheet application where only (16.4%) could perform. It could also be observed that the most common basic skill in IT possessed by the teachers is in word processing. This is also followed at a distance by skill in the use of internet. It could therefore be concluded that the popular basic skill in use of IT among the teachers are word processing and Internet use. More importantly, the implication of this is that the number of participants who have basic skill in use of ICT among the teachers is low and this may not augur well for a nation that seeks to integrate ICT to education.

Availability of IT facilities in the Schools

The findings of the study on the facility readiness of secondary schools in Abeokuta South Local Government also serve as an eye opener on the availability of ICT facilities in the schools. Facilities here include provision of functional computers and internet facilities. It is important to note that access to the computer is a very important factor in readiness to and use of IT in instruction. According to Kabonoki (2008) access to computers and hence to the Internet remains a significant factor in its use in instruction by teachers. The findings presented in table 2 below shows that in all the 19 junior secondary schools there were only 131 functional computers while the 18 secondary schools have a total of 125 functional computers. This gives an average of seven computers to each of the schools. However, only one each of the senior and junior schools has internet facility,

Table 1: Presence of IT facilities in Senior Secondary Schools in Abeokuta

School	COMPUTER LAB	NO OF COMPUTERS	FUNCTIONAL COMPUTERS	Average	FUNCTIONAL INTERNET
Junior N=20	19	259	131	6.55	1
Senior N=20	18	149	125	6,25	1

As a matter of facts, it is obvious that while only one senior secondary school has up to 38 functional computers, another has 30. In the same vein only three have between six and ten while majority of the schools have between one and three functional computers. only one junior and two senior schools could boast of 30 functional computers. One each has between eleven and 20 while 20 junior and 17 of the senior schools have up to 10 computers. This is obvious from table 3.

Table 3: Number of Schools and Range of functional computers

School	1-10 Computers	11-20 Computers	21-30 Computers
Junior N=20	20	1	1
Senior N=20	17	1	2

A further analysis even shows that 12 each of the junior and senior schools have between one and three functional computers while only one out of the 20 junior schools, has 33 functional computers. In the same vein one has a total number of 11 while three have 10 functional computers respectively. Four of the schools have between six and eight while the rest have between one and three functional computers.

Policy Implications

. The implication of this is that just a few of the schools have enough numbers of computers to serve the school population; this is even not to talk about how accessible they could be to both students and teachers. The case of internet facility provision is not even anything to write home about.

Conclusion

It will not be out of place to conclude that the schools involved in this study are largely unprepared to use IT facilities in instruction. With a low number of teachers having basic skill in use of IT and just a few of the schools having enough numbers of computers to serve the school population, there is still a great deal to be done in achieving the goal of IT integration in secondary education. In addition, this is the picture of what is happening in urban schools, the situation in the rural areas is likely to be worse.

Recommendation

In the light of this it is therefore recommended that

1. Governments should provide mass and functional IT facilities all schools both in the rural and urban areas. These should also be made accessible to both students teachers.
2. Arrangements should also be made for mass training of teachers on the use of IT in instructional delivery. This will help to expose the teachers to the appropriate skills in use of IT.
3. To achieve this, a special budgeting should be done for secondary education at both federal and state levels. This should also be targeted towards provision of IT facilities and capacity building of teachers in IT only

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DATA AND INFORMATION SECURITY

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Abstract

Having observed carefully the dynamics of e- activity and technology in business, finance and other realms of human endeavour, the issue of data and information security with computer networks becomes more relevant in order to keep up with the growing trend, hence the need to carefully address some important issues concerning data and information security. Information and data security, computer security are often incorrectly used interchangeably. These fields are interrelated often and share the common goals of protecting confidentiality, integrity and availability of information. Computer security can focus on ensuring the availability and correct operation of a computer system without concern for the information stored or processed by the computer. Governments and other realms of human endeavour amass a great deal of confidential information about their employees, customers, products, research and financial status. Most of this information is now collected, processed and stored on electronics computers and transmitted across networks to other computer. Protecting confidential information is a business requirement and in various cases also an ethical and legal requirement. This article presents a general overview of information and data security and its core concepts in this era where e- activity and technology has been the prevailing trends in getting things done throughout the world.

Keywords: data, information, due care, due diligence, information, information security, vulnerability, threat, access control, cryptography

1.0 INTRODUCTION

Since the early days of writing, everyone, heads of state and military commanders inclusive understood that it was necessary to provide some mechanism to protect the confidentiality of written correspondence and to have some means of detecting tampering.

Julius Caesar is credit with the invention of the Caesar ca. 50 B.C which was created in order to prevented his secret messages from being read should a message fall into the wrong hands

World War II brought about much advancement in information and data security and marked the beginning of the professional field of data and information security.

The rapid growth and widespread use of electronic data processing and electronic business conducted through the internet, along with numerous occurrences of international terrorism, frieled the need for better methods of protecting the computers, data and the information they store process and transmit. The academic disciplines of computer security, information security and assurance emerge along with numerous professional organizations- all sharing the common goals of ensuring the security and reliability of information systems.

The end of the 20th century and early years of the 21st century saw rapid advancements in telecommunications, computing hardware and software, and data encryption. The availability of smaller, more powerful and less expensive computing equipment made electronic data processing within the reach of small business and the home user.

As a result, the field of data and information security has grown and evolved significantly in recent years. It offers many areas for specialization including: security network and allied infrastructure, securing applications and database to mention but few.

2.0 Definition of Terms

Data and information are often used as if they mean the same thing. Technically, they are different. Therefore, each and everyone of them will be well examined.

Data

Data can be defined as the facts, events, activities and transactions which have been recorded. It is the raw materials from which information is produced.

Types of Data

There are three main types of data which computer can store and process, they are:

(i). Numeric data (ii). Alphabetic data (iii). Alpha numeric data

Numeric Data: these are facts, events, activities and transactions that has been recorded in form of numbers or figures which can be subjected to a range of arithmetic operations (such as addition, subtraction etc.) in their natural state without loss of meaning. Numeric data are also referred to as quantitative data. Examples of numeric data are inventory figures.

Alphabetic Data: these are the facts, events, activities and transactions that have been recorded in form of alphabet. It could be the name of a customer, customer addresses, and product names. It could also be a sentence, idioms etc. any data supplied to computer that are entirely made up of letters will be automatically recognized to be alphabetical data unless it is otherwise stated by the programmer. They cannot be subjected to arithmetic operations in their natural form.

Alphanumeric Data: these are the facts, events, activities, and transactions which have been recorded in form both alphabetic and number. They are made up of letters and digits examples are: vehicles plate number (AX105 BDJ) serials no of equipments and street numbers etc.

Information: data and information are often used as if they are the same. Technically, information can be defined as the data which have been processed to a meaningful end.

Information Security: this means protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction.

Vulnerability: this is the weakness that could be used to endanger or cause harm to an informational asset.

A Threat: this is anything (man made or act of nature) that has the potential to cause harm.

Due Care: these are steps that are taken to show that a company has taken responsibility for the activities that take place within the corporation and has taken the necessary steps to help protect the company, its resources, and employees.

Due diligence: these are the continual activities that make sure the protection mechanisms are continually maintained and operational.

The definitions of both the due care and diligence was as offered in the field of information security by Harris

3.0 OVERVIEW

The CIA triad i.e. confidentiality, integrity and availability have been known as the core principles of information security for over twenty years. Meanwhile, accountability has been proposed to be an addition to this classic trio.

In 2002, Donn Parker proposed an alternative model for the classic CIA triad which he named the six atomic elements of information. The elements proposed are: confidentiality, possession, integrity, authenticity, availability and utility.

Confidentiality

Confidentiality is the term used to prevent the disclosure of information to unauthorized individuals or system. For examples, a credit card transaction in the internet requires the credit card number to be transmitted from the buyer to the merchant and from the merchant to a transaction processing network. The system attempts to enforce confidentiality by encrypting the card number during transmission, by limiting the places where it might appear i.e. (database, log files, backups, printed receipts etc), and by restricting access to the places where it is stored. If an unauthorized party obtains the card number in any way, a breach of confidentiality has occurred.

Breaches of confidentiality take many forms. Firstly, permitting someone to look over your shoulder at your computer screen while you have confidential data displayed on it could be a breach of confidentiality. If a laptop computer containing sensitive information about a company's employees is stolen or sold, it could result in breach of confidentiality. Giving out confidential information over the telephone is a breach of confidentiality if the caller is not authorize to have the information

Integrity

In information and data security, integrity means that data cannot be modified undetectably. Integrity is violated when a data is actively modified in transit. Information security systems typically provide information integrity in addition to data confidentiality.

Availability

The information must be available when it is needed, in order for any information to serve its purpose. This implies that the computing systems used to store and process the information, the security controls used to protect it, and the communication channels used to access it must be functioning correctly. High availability systems aim to remain available at all times, preventing service disruptions due to power outages, hardware failures, and system upgrades. Ensuring availability also involves preventing denial-of-service (DOS) attacks.

Authenticity

In computing, e-Business, data and information security, it is necessary to ensure that the transactions, communication or documents (electronic or physical) are genuine. It is also important for authenticity to validate that both parties involved are who they claim they are; Electronic commerce uses technology such as digital signature and encryption to establish authenticity.

4.0 METHODOLOGIES OF DATA AND INFORMATION SECURITY

There are two major methods of data and information security which will be discussed elaborately here; they are **Access Control** and **Cryptography**

1. Access Control: - Access to protected information must be restricted to people who are authorized to access the information. The computer programs, and in many cases the computers that process the information, must also be authorized. This requires that mechanisms be in place to control the access to protected information. The sophistication of the access control mechanisms should be in parity with the value of the information being protected – the more sensitive or valuable the information the stronger the control mechanisms need to be. The foundation on which access control mechanisms are built start with identification and authentication.

Identification is an assertion of who someone is or what something is. If a person makes the statement “*Hello, my name is Chika Abdullahi*” they are making a claim of who they are. However, their claim may or may not be true. Before Chika Abdullahi can be granted access to protected information it will be necessary to verify that the person claiming to be Chika Abdullahi really is Chika Abdullahi

Authentication is the act of verify a claim of identity. When Chika Abdullahi goes into a bank to make a withdrawal, he tells the bank teller he is *Chika Abdullahi* (a claim of identity). The bank teller asks to see a photo ID, so he hands the teller his driver’s license. The bank teller checks the license to make sure it has Chika Abdullahi printed on it and compares the photograph on the license against the person claiming to be Chika Abdullahi. If the photo and name match the person, then the teller has authenticated that Chika Abdullahi is who he claimed to be. There are three different types of information that can be used for authentication: **something you know, something you have, or something you are**. Examples of *something you know* include such things as a PIN, a password, or your mother’s maiden name. Example of *something you have* includes a driver’s license or a magnetic swipe card. *Something you are* refers to biometrics. Examples of biometrics include palm prints, finger prints, voice prints and retina (eye) scans. Strong authentication requires providing information from two of three different types of authentication information. For example, something you know plus something you have. This is called two factor authentications. On computer systems in use today, the Username is the most common form of identification and the password is the most common form of authentication. Usernames and passwords are slowly being replaced with some sophisticated authentication mechanisms.

Meanwhile, after a person, program or computer has successfully been identified and authenticated then it must be determined what informational resources they are permitted to access and what actions they will be allowed to perform (run, view, create, delete, or change). This is known as **authorization**.

Authorization to access information and other computing services begins with administrative policies and procedures. The policies prescribe what information and computing services can be accessed, by whom, and under what conditions. The access control mechanisms are then configured to enforce these policies.

Different computing systems are equipped with different kinds of access control mechanisms – some may even offer a choice of different access control mechanisms. The control mechanism a system offers will be based upon one of three approaches to access control or it may be derived from a combination of the three approaches.

The **non-discretionary** approach consolidates all access control under a centralized administration. The access to information and other resources is usually based on the individuals function (role) in the organization or the tasks the individual must perform. The **discretionary approach** gives the creator or owner of the information resources the ability to control access to those resources. In the **Mandatory**

access control approach, access is granted or denied base upon the security classification assigned to the information resource. Examples of common access control mechanisms in use today include Role-based access control available in many advanced Database Management Systems, simple file permissions provided in the UNIX and Windows operating systems, Group Policy Objects provided in Windows network systems, Kerberos, RADIUS, TACACS, and the simple access lists used in many firewalls and routers.

2. Cryptography: - Information security uses cryptography to transform usable information into a form that renders it unusable by anyone other than an authorized user; this process is called enciphered. The most prospective systems of cryptographic data protection are the systems with an open key. In such systems data are enciphered using one key and deciphered using another key. The first key is not confidential and may be published for using by all users of the system who encipher data. Data deciphering with the help of this known key is impossible. To decipher data the receiver uses another key, which is confidential. It is clear that deciphering key can not be determined based on the knowledge of the enciphering key. Cryptography is used in information security to protect information from unauthorized or accidental disclosure while the information is in transit (either electronically or physically) and while information is in storage. For example, in multimedia data transfer, **RSA** algorithm is one of the most prospective ciphering algorithms employed as depicted in the Figure 1 below. This is because the crypt resistance of RSA algorithm is based on the assumption that it is exceptionally difficult to determine the secret key by the known key,

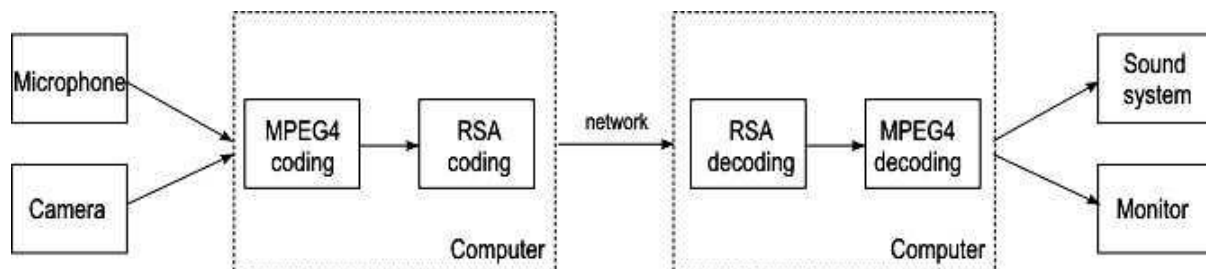


Fig.1 The procedure of data conversion

Cryptography provides information security with other useful applications as well including improved authentication methods, message digests, digital signatures, non-repudiation, and encrypted network communications. Older less secure application such as telnet and ftp are slowly being replaced with more secure applications such as SSH that use encrypted network communications. Wireless communication can be encrypted using protocols such as WPA/WPA2 or the older (and less secure) WEP. Wired communications (such as ITU-T G.hn) are secured using AES for encryption and X.1035 for authentication and key change. Software applications such as GnuPG or PGP can be used to encrypt data files and Email. Cryptography can introduce security problems when it is not correctly implemented. Cryptographic solutions need to be implemented using industry accepted solutions that have undergone rigorous peer review by independent experts in cryptography.

4.0 CONCLUSION

Data and information security is the on going process of exercising due care and due diligence to protect information and information systems, from unauthorized access, use, disclosure, destruction, modification, or disruption or distribution. The never ending process of information security involves ongoing training, assessment, protection, monitoring and detection, incident response and repair, documentation, and review. This makes information security an indispensable part of all the business operations across different domains.

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LINKS AND EXPERIENCE BETWEEN INSTITUTIONS, INDUSTRIES AND LOCAL COMMUNITY

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Abstract

The desire of the Federal Republic of Nigeria to emerge from her current position to a position of greater height with other developed countries prompted her to adopt education as an instrument per excellence for development. But due to enormous demand of educational institutions which exceed government budget allocation for educational sector, government sees it wise to involve the community and others in the establishment of schools. Federal republic of Nigeria through her National Policy on Education (2004:22) state that 'government welcomes the participation of voluntary agencies, communities, private individuals, and public organization in the establishment of schools...' This formed the basis for this paper and thus it examined historical background of knowledge industries; links between school and community; the conditions for successful transfer between institutions industries and local community, and benefits to the institutions and community.

Keywords: Links and experience; institutions; industries; local community.

Introduction

Education has been described as the bedrock of every society and tool for nation building. For quality education to be achieved in a nation, the institutions, industries and local community must co-corporately link together. Ordinarily, educational institutions and industries do not exist in a vacuum but within a community they serve. Although, the school may be regarded as a society of its own, but outside itself, it is a part of the wider society in which it is located.

In a normal situation, the school should reflect and teach the values of the contemporary society in which it is located. It is from this point of view that in educational administration, the relationship between an institution and its community is of vital importance. This fact may be illustrated with the tri-dimensional concept of educational administration namely; the job to be done, the man to do the job and the environment. The symbiotic relationship between the school and community and how this determines the quality of education is the focus of school community relationships in educational management. Likewise, since the school graduates/outputs are meant to serve in the local industrial organization where they are employed, then there must be a cordial relationship between the institutions, industries and local community.

Historical Background of Knowledge Industries

The link between institutions, industries and communities can be dated back to medieval age when the various questions of life were treated by the philosophers and corresponding solution were used to develop several items for the comfort of humanity. The questions of life as it have been used in this concept, were the challenges that emanates from the community due to the man's ways of life's. The philosophers then serve as the origin of ideas and the solution to any human challenges. During this there was clear demarcation between the communities, the local industries and institution of knowledge due to size of the community and the miniaturized nature of human needs and challenges. The challenges of human were basic need of life (physiological need) there were no distance separation between the body of knowledge (philosophers and the community). Philosophers were part the needful society and they generate the idea through research into various things that can solve human need.

Outburst of world population at the recent time makes the human needs to increase and there has the corresponding requirement for enormous needs of the world to be met. The community has grown in size, knowledge thus, the medieval ways of handling challenges of life has proved inadequate. While the modern ways of handling issue of life was introduced in other to increase the production to meet up with the enormous needs of people. The industrial revolution made life easier for the community by providing plenty of cheap food for the people. Thousands of families moved to industrial towns to work in coal mines, iron foundries and textile mills (Awake, 2009).

In conclusion, the need for sharing knowledge between institutions and industry has become increasingly evident in recent years. Historically research institutions were perceived as a source of new ideas and industry offered a natural route to maximizing the use of these ideas for the benefit of the community.

Links between School and Community

There are varieties of ways in which school and community interacts. Seven different channels of relationships between the two may be identified in a summarative table by Kenkwo quoted by Agabi and Oluwuo in Nnabuo, Okorie, Agabi and Igwe, (2004:316-319), Igwe, (1997:96-101) and Igwe, (2006).

Types of Link	School to Community	Community to School
(1) Use of physical school facilities.	<ul style="list-style-type: none"> i) Classrooms and halls for adult education classes and community occasions. ii) Venue for short in-service training courses particularly at the teacher training and secondary school levels. iii) School farm or garden as a model for locally-based farmers for demonstration work, or model farms. iv) The use of sports grounds for civic occasions. v) Ground for gazing 	<ul style="list-style-type: none"> i) Shared use of Church hall, water supply, Clinics, Hospitals, library etc. (ii) Providing houses for teachers. iii) Providing land for school buildings, sports field farms or gardens.
(2) Economic contribution	<ul style="list-style-type: none"> i) Labour contribution on local project. ii) Provision of employment opportunities. iii) Purchase of local 	<ul style="list-style-type: none"> i) Labour contribution ii) Financial contribution for new facilities. iii) Provision of materials and furniture.

	products.	
(3) General services and help	<ul style="list-style-type: none"> i) School as base for local groups, choirs, scouts, and guides, sports, teams, plays and concerts. ii) Help for old and sick peoples. iii) Help with harvesting participation in local national festivals. iv) Fund raising v) Schools as postal center and polling stations. vi) Use of school bus. vii) Loan of equipment, furniture viii) Premises and teachers in national campaigns such as census, elections and health education. ix) School as based for post school training. 	<ul style="list-style-type: none"> i) Maintenance of school facilities ii) Provision of school security iii) Lending of equipment iv) Housing of students. v) Serving as gardeners/caretakers. vi) Provision of resource persons.
4) Research, knowledge and cultural records	<ul style="list-style-type: none"> i) Recording and preservation of local traditions lore, historical events etc. ii) Providing the personnel for research into local history and problems. 	<ul style="list-style-type: none"> i) Provision of information for school museum. ii) Contribution of artefacts to school museum. iii) Opportunities for study of local activities and customs.
5) Teaching	<ul style="list-style-type: none"> i) Education (literacy) for adults and out of school youths. ii) Extramural classes, seminars and course for professionals. iii) Correspondence courses. 	<ul style="list-style-type: none"> i) Use of local people as instructors, religious leaders, story tellers, dancers, carpenters. ii) Parental help as teacher assistants, etc. iii) Practicing professional demonstration.
6) Curriculum	<ul style="list-style-type: none"> i) Sources of information and new ideas for use in community e.g. craft, linguistic influence, hygiene etc. ii) Transmission of culture, folk-lore, customs, music dance. iii) Courses geared to specific problems of the community. 	<ul style="list-style-type: none"> i) Use of and access to local facilities e.g. visit to local industry, farms, research stations and commercial centers. ii) General visit to areas of interest, parks, zoos. iii) Provision of case-study materials (colleges).

7) Management	i) Staff and students involvement in local affairs committees, church, mosque and agriculture. ii) Pupils involvement youth organizations. iii) Training in management	i) Participation in school committees ii) Local coaches helping in soccer, basketball, swimming, athletic etc.
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From the table above, there is no doubt that the school cannot operate independence of its community based on symbiotic relationships which have been enumerated above on school and community interactions. Since the industry is also located in the community and the community members are workers in the industry, the links above are also applicable to them. So, both the school industries and community need to see one another as partner in progress in educating the young ones who belong to the two worlds, the world of the community and the world of the school in order to ensure effective teaching and learning.

Creating the Conditions for Successful Knowledge Transfer between Institutions, Industries and Local Community.

It has been recognized that the involvement of industrial managers in the governance of institutions especially research institutions can help to orient education activities towards the need of society, bringing expertise to support knowledge transfer activities, and signal willingness to introduce innovation-oriented approaches in all activities. Such interaction will help the young graduates to secure employment in the industry.

Also, institutions especially research institutions should set up knowledge transfer offices which will help to improve collaboration and exploitation of research results and their uptake by industry. For instance, many European research institutions have set up knowledge transfer offices in recent years, aiming to improve collaboration and exploitation of research results and their uptake by business.

Moreover, the personnel working on knowledge transfer must possess a wide range of skills in order to carry out their task effectively. The European Commission is currently studying ways to address their problem of inexperienced staff by building a framework to provide new knowledge transfer officers with qualifications which are mutually recognized between them. Likewise Proton Europe, building on the U.K.'s institute for knowledge transfer, is looking to create an accreditation scheme for existing knowledge transfer officers based on their experience and track record. Also, research institutions should be given sufficient autonomy to recruit experienced knowledge transfer staff on a competitive basis and this will help them to identify the shared needs with industry and the community as a whole.

Furthermore, there is also a need for existing resources to be made more accessible and this will help catalyse links with industry. Also, community members should actively promote and support the pooling of resources among research institutions. (European Commission, 2007).

Balancing the Benefits

Examination of successful research collaborations in Europe and the USA show that sustainable 'win-win' can be obtained, which produce good science, publish results without unreasonable delay, contribute to the general education and training of new graduates, and generate valuable intellectual property that supports innovation by industrial partners. When managed in a professional and balanced way, knowledge transfer can be beneficial both for the institutions and community in general (European Commission, 2007).

Benefit to Institutions

- ❖ Institutions especially research institution generates money from their knowledge transfer to industry and this fund can also help fund other institutions activities.
- ❖ The development of mutual trust between the research institution and industry, beneficial to establishment of long-term strategic partnerships;
- ❖ The result of research institutions research activities improve understanding market need and of industry problems.
- ❖ The result from successful partnership and product resulted into gaining status and prestige.
- ❖ The enrichment of research institutions teaching and learning activities through the involvement of industry based lecturers with practical examples of teaching contents and materials which aid learning how to apply skills and knowledge to solve real business problems.
- ❖ The identification of potential new partners for further research;
- ❖ Attracting, retaining and motivating good scientist interest in entrepreneurial aspect of education;
- ❖ Contributing to public authorities better recognizing the socio-economic relevance of public funded research, potentially leading to increased funding thereof.
- ❖ Employment of new graduates (community children) from institution by industry is another good advantage.

Benefits to Community

The successful implementation of policies to deal with inventions and collaborations with industry can lead to a number of benefits for society at large and, in particular, the local economy. These benefits include new jobs, new products on the market and better education.

Conclusion

It is very clear from this paper that institutions and industries are located within community and their roles in educating the young ones and improving social economy cannot be overemphasized.

Moreover, this paper showed that to create the conditions for successful knowledge transfer between institutions especially research institutions and industry, the industry managers should be involved in the governance of institutions in other to orient education activities towards the community needs; research personnel must possess a wide range of skills in other to carry out their task effectively; and the existing resources should be made accessible and this will help catalyse link with the industry.

Finally, the paper examined the benefits to research institution resulting from knowledge transfer to industry and the benefits to the community which include new jobs, new products on the market and better education.

Recommendations

Recommendations on links and experience between institutions, industries and local community are as follow:

- ❖ The board of governors should develop policies and laws that encourage community. Industry participation in the management of institutions.
- ❖ Train school-industry-community liaisons who know the community history, language, and cultural background to contact community members and coordinate activities.
- ❖ Develop and outreach strategy to inform industry about their involvement in institution management in other to enhance better socio-economic.
- ❖ Regularly evaluate the effectiveness of community and industry involvement activities in the institution.

- ❖ The contractual arrangement for research must be established between the research institutions and industry.

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INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND BANKING INDUSTRY

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Abstract

Information and Communication Technology, the language of the new age and its grammar which is Science has become an indispensable and veritable tool for enhancing effectiveness and efficiency in all other aspects of life. Banking industry has learnt the grammar and understands the language of the new age and tremendously transforms the Industry from what it used to be to the economic mover of the whole wide world, through the magic hands of Computer Science innovations. The adoption of ICT in banks has improved customer services, facilitated accurate records, provides for Home and Office Banking services, ensures convenient business hour, prompt and fair attention, and enhances faster services. The adoption of ICT improves the banks' image and leads to a wider, faster and more efficient market. It has also made work easier and more interesting, improves the competitive edge of banks, improves relationship with customers and assists in solving basic operational and planning problems. This paper work analyses the impacts made by the Information and Communication Technology in the Banking Industry, and some of the unexploited areas of the Information and Communication Technology in the industry.

Keywords: Information, Communication, Technology, Banking & Industry

INTRODUCTION

New age business environment is very dynamic and undergoes rapid changes as a result of technological innovation, increased awareness and demands from customers. Business organizations, especially the banking industry of the 21st century operates in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. Information and Communication Technology (ICT) is at the centre of this global change. Archimedes said, "Give me a lever long enough and a fulcrum on which to place it and I shall move the whole world". (Archimedes, www.brainyquotes.com). The lever he was taking about then was not understood, until the invention of Information and Communication Technology.

The application of information and communication technology concepts, techniques, policies and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a prerequisite for local and global competitiveness. ICT directly affects how managers decide, how they plan and what products and services are offered in the banking industry. It has continued to change the way banks and their corporate relationships are organized worldwide and the variety of innovative devices available to enhance the speed and quality of service delivery.

Harold and Jeff (1995) contend that financial service providers should modify their traditional operating practices to remain viable in the 1990s and the decades that follow. They claim that the most significant

shortcoming in the banking industry today is a wide spread failure on the part of senior management in banks to grasp the importance of technology and incorporate it into their strategic plans accordingly.

Woherem (2000) claimed that only banks that overhaul the whole of their payment and delivery systems and apply ICT to their operations are likely to survive and prosper in the new millennium. He advises banks to re-examine their service and delivery systems in order to properly position them within the framework of the dictates of the dynamism of information and communication technology. The banking industry has witnessed tremendous changes linked with the developments in ICT over the years.

The quest for survival, global relevance, maintenance of existing market share and sustainable development has made exploitation of the many advantages of ICT through the use of automated devices imperative in the industry. This study evaluates the response of Nigerian banks to this new trend and examines the extent to which they have adopted innovative technologies in their operations and the resultant effects.

Information and Communication Technology

Information Technology (IT) is the automation of processes, controls, and information production using computers, telecommunications, software and ancillary equipment such as automated teller machine and debit cards. It is a term that generally covers the harnessing of electronic technology for the information needs of a business at all levels. Communication is the conveyance or transmission of information from one point to another through a medium.

An example of how ICT has had an impact on the Banking Industry is that its emergence allows banks to apply credit-scoring techniques to consumer credits, mortgages or credit cards. Hence, products that used to be highly dependent on the banks' evaluation of its customers have now become more standardized. Other examples of ICT impact on the Banking Industry include the increased process efficiency, which can reduce costs in banks, and the branch renewal, where focus is gradually shifting away from traditional brick and mortar banks towards the dual-bank concept presented earlier.

The tendencies above have also produced changes in the structure of bank income. As a result of increased competition that has lowered margins in lending operations (the banks' traditional business), banks have diversified their sources of income and rely increasingly on income from fees services rather than interest rate spreads. Fees charged for services include typical banking activities like payment transactions, safe custody and account administration.

Data storage and retrieval is another wonderful innovation brought into the Banking Industry, where specialized software is engaged to create database to be manipulated by Database Management Software (DBMS). A single database created could be used for several purposes within the system in order to eliminate data redundancy.

ICT infrastructure used by banks

This section presents and analyses the survey data of some selected Banks in Nigeria.

The table below shows the survey data of some selected Banks in Nigeria and their uptake in some ICT infrastructures

Serial numbers	ICT infrastructures		Percentage of Nigeria Banks that use a particular ICT infrastructure within year 2000 to year 2008.		
			2000 – 2002	2003 – 2005	2006 - 2008
1	Internet Access		27%	88%	91%
2	Internal Network	Wire based	68%	82%	92%
		Wireless	08%	19%	28%
3	SMS Alert		NIL	22%	98%
4	Substitution of Postal mail		18%	38%	88%
5	ICT Security measures		62%	81%	94%
6	Authentication		33%	76%	85%
7	Automated System	Payment	1%	28%	87%

Source: Research Survey, 2008

Internet Access: An important indicator of the general uptake of Information and Communication Technology (ICT) in the Banking Industry relates to the use and availability of Internet. Internet access is a precondition for e-Business, as this is the main channel for e-banking. The general availability of Internet allows for the analysis of overall ICT-readiness in the Banking Industry. The Table shows that 91% of Banks studied in Nigeria have access to the internet within year 2006 and 2008, While 27% and 88% from year 2000 to 2002 and from year 2003 to 2005 respectively. The drastic change that occurred from 27% to 88% from year 2000 to 2002 and from year 2003 to 2005 respectively was as the result of ICT awareness competitive products introduced by some the so called “new generation banks”. Virtually all other banks also braced up to satisfy their customers and there was general improvement in the services and products of Banking Industry.

Use of Internal Network: The application of networks is a vital part of an effective ICT-enabled system, which is especially true in the case of banks with a branch network. Local Area Network (LAN) may also be seen as a basic indicator of the minimum infrastructure required to enable companies to conduct e-banking at a substantial level. Wire-based LAN is currently the dominating technology. The survey shows that 92% banks surveyed use wire-based LAN from year 2006 to 2008. The fact that LAN is a relatively low-tech and easily attainable ICT solution, would to some extent explain the wide coverage of this technology from year 2000 to 2008. Wireless LAN is a relatively new technology in the Banking Industry, and is used to permit bank employees to access network resources from nearly any convenient location. The fact that, wireless LAN is relatively new technology accounts for its low percentage uptake in Banking Industry.

Use of SMS alert: Instant notification of transactions made was another innovation brought by ICT through the use of smart phone in conjunction with the internet facility in the Banking Industry. Virtually all banks studied in Nigeria use SMS-Alert, except some of the Micro-finance Banks. It was an ICT infrastructure that recorded no patronage between year 2000 and 2002.

Substitution of postal mail: The Banking Industry is currently being renewed in many areas. One of these areas relate to the digitalization of formerly paper-based processes. Electronic mail is increasingly being applied for especially non-legal correspondence like account statements, marketing and sales. More than 80% banks surveyed have substituted electronic mail with old postal mail within year 2006 to 2008. This outcome shows that, efficiency gains from electronic mail are yet to be reaped and indicates that the Industry is a bit fragmented in its uptake of electronic mail as means of communication.

ICT security measures: The security issue is of special concern in the Banking Industry, as banking is highly based on trust from its customers. Hence, the risk of hackers, denial of service attacks, technological failures, breach of privacy of customer information, and opportunities for fraud created by the anonymity of the parties to electronic transactions all have to be managed. Depending upon its nature and scope, a breach in security can seriously damage public confidence in the stability of a financial institution or of a nation's entire banking system. Hence, by introducing the appropriate security measures and putting security concerns at ease, the BI might be able to attract the segments among consumers who previously were not inclined to use e-banking. Furthermore, it is also in the banks' own interest to improve security, as digital fraud can be costly both in financial losses, and in terms of the damage it does to the brand of the bank in question.

Authentication: The common concern among users of e-banking is related to the authentication of users and data connections. The use of digital signatures is not as common as PIN codes or encryption, and reason is the fact that digital signature is relatively new technology. The research even shows that none of the studied banks uses digital signature as the form of authentication, but the up-take in other types of authentication is generally high, up to 85% within the year 2006 and year 2008.

Automated Payment System: Devices used in Automated Payment Systems include Automatic Teller Machine (ATM) and Electronic Funds Transfer. ATM still ranked higher in its spread than Electronic Funds Transfer, Low rate of spread of this technology might be due to cost, fear of fraudulent practices and lack of facilities necessary for their operation. But generally speaking, the adoption of Automated Payment System increased dramatically. The table shows the increase from 28% to 87% within the range of 3-years.

Effects of Information and Communication Technology (ICT) on Banking Industry

Agboola (2001) studied the impact of computer automation on the banking services in Lagos and discovered that Electronic Banking has tremendously improved the services of some banks to their customers in Lagos. The study was however restricted to the commercial nerve center of Nigeria and concentrated on only six banks. He made a comparative analysis between the old and new generation banks and discovered variation in the rate of adoption of the automated devices. Aragba-Akpore (1998) wrote on the application of information technology in Nigerian banks and pointed out that IT is becoming the backbone of banks' services regeneration in Nigeria. He cited the Diamond Integrated Banking Services (DIBS) of Diamond Bank Limited and Electronic Smart Card Account (ESCA) of All States Bank Limited as efforts geared towards creating sophistication in the banking sector. Ovia (2000) discovered that banking in Nigeria has increasingly depended on the deployment of Information Technology and that the IT budget

for banking is by far larger than that of any other industry in Nigeria. He contended that On-line system has facilitated Internet banking in Nigeria as evidenced in some of them launching websites. He found also that banks now offer customers the flexibility of operating an account in any branch irrespective of which branch the account is domiciled. Cashless transactions were made possible in our society of today.

The mover of the economy (Banking Industry) is now well positioned to met-up with the new challenges from the costumers, competitors and even from the nation's economy with right tool in their hand to reach limitless point of success. The Industry is now growing on daily basis with respect to new innovations that are coming out in the world of technology.

Conclusion

Adoption of ICT has influenced the content and quality of banking operations. From all indications, ICT presents great potential for business process reengineering of Nigerian Banks. Investment in information and communication technology should form an important component in the overall strategy of banking operators to ensure effective performance. It is imperative for bank management to intensify investment in ICT products to facilitate speed, convenience, and accurate services, or otherwise lose out to their competitors. The banking industry in Nigeria presents ICT providers with great opportunity to market their innovations. Success in this area however depends on how they can customize their services to appeal to the ready minds of various stake holders in the industry.

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RICH ENVIRONMENTS FOR ACTIVE LEARNING (REAL) AND SCIENCE LEARNING IN NIGERIA.

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Abstract

Science is part of human live and actions, despite its importance; there is crisis in learning science. Some of this problem can be traced to the emphasis of learning basic facts and definitions from text books as against the applications of knowledge in daily life or the development of higher order thinking. To implement a successful science education in Nigeria, there is need to help students transfer learning from one situation to another. Learners must be helped to see themselves as constructors of knowledge in a variety of forms; learning must be seen as a collaborative process; learners should be assisted to bring their own needs and experiences to a learning situation; they should be helped to acquire skills and knowledge within realistic contexts; and methods used for assessment must take more realistic and holistic forms. In order to meet the developmental challenges of Nigeria and developmental economies, science learning should be encouraged using REALS which have been shown to enhance the effective learning.

Keywords: Rich Environment, Active learning, Science, generative learning, learning.

Introduction

Science permeates the human lives and informs their actions, for example in Physics students learn how mirrors work, how glasses can aid one's vision and how heat is treated by various household materials (plates and utensils). Chemistry involves learning the principles of matter, like atoms, molecules and compounds. Students also learn many different ways substances are formed from the minutest variations within compounds. Water for drinking, the food eaten, the air being breath, the medicines taken when people are sick are all made from these atoms, molecules and compounds. Biology, the study of life, teaches why living things are the way they are, why they need what they need to survive, and how all living things are categorized. (Horan, 2010).

Science and technology are closely associated with our lives, they are closely linked to aspects of society, and studies and developments in both of science and technology are essential for the overall progress of society. Scientific research comprises of a wide variety of fields ranging from the study of different branches of science to relatively advanced fields like space exploration, human genetics and cloning. Scientific study attempts to explore and understand the working of the physical world. It tries to analyze the occurrences in nature and gain knowledge about nature through experimentation. As scientific research aims at gaining knowledge of the complexities of nature, it is important for the progress of mankind, the seemingly impossible feats have been made possible, thanks to the scientific research. (Oak, 2010).

Learning Science

Science is a process of investigation into the natural world and the knowledge generated through that process. This process of investigation is often referred to as the scientific method and it is a linear set of steps through which a scientist makes from observation through experimentation and to a conclusion Carpi & Egger (2003).

Carpi & Egger (2003) asserted that science is not a linear process - it doesn't have to start with an observation or a question, and it commonly does not even involve experiments. Instead, the scientific method is a much more dynamic and robust process. Scientists get their inspiration from the natural world, from reading what others have done, from talking to colleagues, or from experience. They further argued that:

Science uses multiple types of research toward investigating phenomena, including experimentation, description, comparison, and modeling. Some scientific investigations employ one of these methods, but many involve multiple methods, or some studies may even have characteristics of more than one method. Results from one research study may lead in directions not originally anticipated, or even in multiple directions as different scientists pursue areas of interest to them.

Several researches have shown that there are some crises in science education. Weiss (1987), Tobin & Gallagher (1987), Gallagher (1989) and Humrich (1988) in (Fraser, Tobin & Khale, 1992) reported that most science curricula emphasize learning of basic facts and definitions from science textbooks and relatively little emphasis is placed on applications of knowledge in daily life or on the development of higher-order thinking skills. Even though many programs purport to be inquiry-based, most show little evidence of inquiry on the part of students and teachers (National Research Council, 1996). This is so despite the fact that we are in the age of technological application and advancement where business and industry are having problems employing graduates with necessary knowledge of science.

Tobin & Gallagher (1987) and the National Research Council (1989) also noted that the activity types which are most prevalent in high school science classes involve the teacher working with the class as a whole group. They noted in their research, that:

Seatwork activities which allow students to work from the textbook and to undertake tasks from worksheets, the chalkboard and the textbook are common. However Small-group activities frequently do not occur and usually are confined to the data collecting components of laboratory activities. Despite bold rhetoric in school brochures and textbook forewords, science programs typically are not inquiry orientated, do not have a laboratory emphasis and do not excite the majority of students. Students learn science from textbooks and lectures, and the curriculum is focused by tests which emphasize rote learning of facts and procedures.

Tobin and Fraser (1987) reported that some exemplary science teachers however, focus on students' learning with understanding, use strategies to encourage students to engage in higher-level cognitive tasks and maintain a classroom environment conducive to learning. This shows that intensive investigations of teaching and learning environments can produce knowledge to guide practice, policy formulation and research. To be able to influence the quality of science learning in all classes, it is desirable to use 'learning Rich classroom', this will facilitate positive changes in science classrooms. The use of such a "Rich Environment" in learning science is the focus of this research article.

Rich Environments for Active Learning

Rich environments for active learning have been defined as comprehensive instructional systems that have the following elements:

- evolve from and are consistent with constructivist philosophies and theories;
- promote study and investigation within authentic (i.e., realistic, meaningful, relevant, complex, and information-rich) contexts;
- encourage the growth of student responsibility, initiative, decision making, and intentional learning;
- cultivate an atmosphere of knowledge building learning communities that utilize collaborative learning among students and teachers (Collins, 1995);

- utilize dynamic, interdisciplinary, generative learning activities that promote high level thinking processes (i.e., analysis, synthesis, problem solving, experimentation, creativity, and examination of topics from multiple perspectives) to help students integrate new, knowledge with old knowledge and thereby create rich and complex knowledge structures; and,
- assess student progress in content and learning-to-learn through realistic tasks and performances, (Dunlap & Grabinger, 1992, 1993; Grabinger & Dunlap, 1994a, 1994b):

There two major factors that show the characteristics of learning environments, these according to (Hannafin, 1992) are integration and comprehensiveness.

Integration is a process of “linking new knowledge to old and modifying and enriching existing Knowledge. Integration enhances the depth of learning to increase the number of access points to that information”. Goldman et al (1992), noted “that environments are meant to invite the kinds of thinking that help students develop general skills and attitudes that contribute to effective problem solving, plus acquiring specific concepts and principles that allow them to think effectively about particular domains”.

The second defining characteristic, comprehensiveness, refers to the importance of placing learning in broad, realistic contexts rather than in decontextualized and compartmentalized contexts. REAL learning strategies can guide and mediate individual’s learning and support the learner’s decision making (Hannafin, 1992). Hannafin also asserted that themes are used to help organize learning around interdisciplinary contexts that focus on problem solving or projects that link concepts and knowledge to focused activities within the environment.

There are 5 majors attributes of REALS identified by Grabinger and Dunlap (1995), these are :

- REALs are students centered; students centered learning environments place major emphasis on developing intentional learning and life long learning skills.
- Students engage in generative learning activities, people who learn through active involvement and use tools to build an “increasingly rich implicit understanding of the world around them, Brow et al in Grabinger (1995).
- Learning takes place within an authentic context. An authentic task activity or goal provide learning experience as realistic as possible, taking into consideration the age and maturation level of the students and environmental constraints such as safety and resource available
- The use of authentic assessment strategies to evaluate student’s performance.
- The fifth characteristic of REALS is that a shift be made to focus on social practice, meaning and patterns “ All cooperative learning methods share the idea that students work together to learn and are responsible for one another’s learning as well as their own” Slaving (1991).

Another REAL strategy that has been very successful in the process of learning is reciprocal teaching. Reciprocal teaching according to Palincsar and Klenk (1992) is:

An instructional procedure that takes place in a collaborative learning group and features guided practice in the flexible application of four concrete strategies to the task of text comprehension: questioning, summarizing, clarifying, and predicting. The teacher and group of students take turns leading discussions regarding the content of the text they are jointly attempting to understand.

They noted that Reciprocal learning strategy according to Grabinger are intentional learning strategies that encourage self regulation and self monitoring behaviors. The success of reciprocal teaching and by extension REALS according to Collings, Brown and Holum (1991) include engaging students in activities that help them form a new conceptual model of the task of reading. They see reading as a process that involves reflection and prediction rather than just the recitation of words. They learn to make what they are reading relevant to their needs and to monitor their progress and strive for clarification.

It is strongly recommended that Nigerian Science teachers should employ reciprocal methods of teaching in the science class; this will greatly improve the success of science in Nigeria.

Another method of learning activities associated with REALs is generative learning; this requires that students “engage in argumentation and reflection as they try to use and refine their existing knowledge as they attempt to make sense of alternate points of view” (CTGV, 1993b). According to Grabinger and Dunlap, generative learning requires a shift in the traditional roles of students and instructors, students become investigators, seekers and problem solvers. These methodology or approach is typical of methodology of teaching science. Teachers become facilitators and guides rather than presenters of knowledge. Grabinger and Dunlap noted that generative learning is one of the simple features of a REAL, it produce something of value. According to them it is probably the most exciting part of REAL because students work on projects and tasks that are relevant to them and their peers. It keeps students busy and happy or active while helping them construct and evolve their knowledge structures.

REALs and Constructivism

The Foundation of REALs is Constructivism and REALs (which means, constructivist learning environments, information rich learning environments, interactive learning environments, or knowledge building learning communities) are not new to education according to Grabinger & Dunlap, (1996).

Since the times of Socrates (470-390 BC) problems and questions have been used to guide students to analyze and think about their environments (Coltrane, 1993). Rousseau prescribed using direct experience (Farnham-Diggory, 1992). John Dewey (1910) proposed student-directed reforms and experiential learning. Bruner (1961) advocated discovery or inquiry learning around realistic problems. The idea of, practice, application, and apprenticeship, by which student learn have been in practice for many years. There has been renewed emphasis on the need to reform schools and teaching methods for Sciences.

In order to implement a successful science education in Nigerian Schools there is need to base teaching of science on some new assumptions about the nature of thinking, learning, instruction and achievement, the adoption of these strategies creates learning environment that are called rich environment for active learning (REALs), Grabinger (1999). There is need to accept that “[... the mere accumulation of factual or declarative knowledge is not sufficient to support problem solving. In addition to factual or declarative knowledge, students must learn why, when, and how various skills and concepts are relevant.” (CTGV, 1993c, p. 79).

The Cognition and Technology Group at Vanderbilt (CTGV) noted some flaws in America Conventional approach to Schooling and teaching, (this is applicable to Nigerian educational system.) these flaws which lead to inert knowledge according to them are:

- There is a constant battle of breadth versus depth — and breadth usually wins. Educators tend to fill students with facts and leave no time for dealing with topics in depth. For example students are expect to remember dates, formulae, algorithms, quotations, and whole poems, yet show little practical use for that knowledge despite the fact that it is known that students have difficulty transferring the knowledge. Robertson (1990) states that Students who rely on memorized algorithms for solving problems typically do not perform as well on transfer problems as do students who rely on an understanding of the underlying concepts
- Reliance on decontextualized instructional strategies. In a desire to cover as much material as possible, there is a need to focus instructional activities on abstract basic skills, concepts, and technical definitions. It is believed that decontextualized skills have broad applicability and are unaffected by the activities or environments in which they are acquired and used (Brown, Collins, & Duguid, 1989).
- When practice is provided for students, they are given arbitrary, uninteresting, unrealistic problems to solve. The example of story problems in math is overused. There are also examples of unrealistic and oversimplified problems in the sciences, language arts, and social studies. Again, this is done in the mistaken belief that there must be an emphasize on decontextualized skills that are applicable

everywhere. Yet, these unrealistic problems have no meaning to the students who then fail to find any contextual cues to relate to problems they may encounter in their lives.

- Students are treated passively for 12 to 16 years, rarely giving them the opportunity to take responsibility for their own learning, to explore ideas of their own choosing, to collaborate with one another or with teachers, or to make valuable contributions to the learning of others. They do not learn to take charge of their own learning nor do they learn the skills necessary to become life-long learners and daily problem solvers.

The intention of this research paper is to gain a broader understanding of the experiences of students in an active learning environment mediated by rich environment in a science classroom which can be applied to the Nigerian situation. In an attempt to improve science education in Nigeria, the Federal Government of NIGERIA UNDER HIS EXCELLENCY FORMER PRESIDENT OLESEGUN OBASANJO launched Project 931/NIR/100 on the 29TH OF SEPTEMBER 2005.

The major aim of the project was to achieve National Economic And Human Development Of The Country Using Mathematics, Science And Technology Education and to contribute to the realization of the Vision 2020 which targets Nigeria ranking among the 20 largest economies in the year 2020 (Federal Ministry of Education, 2006)

The publication also noted that “The Government of Nigeria took two complementary initiatives: - Promoting Science and Technology Education for Primary & Secondary Schools and Colleges of Education in Nigeria, and the Reform of the Nigerian Science, Technology and Innovation System”

The initiatives were made to address the global vision of Transforming the Society as defined in the Nigerian Economic Empowerment and Development Strategy (NEEDS).

The Project Coordination & Implementation Committee also noted that as a “matter of fact, Science has to play a leading role in transforming the present Nigerian Society into an emerging Knowledge Society. In this regard, there is need to build learning communities all over the country, and in particular among the younger generations. Hence, improving the teaching of Mathematics, Science and Technology stands as a major tool in promoting quality human resources indispensable for sustainable development.”

The assumptions about learning and teaching as made by Grabinger and Dunlop must be applied to teaching and learning in Nigerian schools, these include:

- Helping students transfer learning from one situation to another with difficulty. Learning is more likely to be transferred from complex and rich learning situations. Rich learning activities help students think deeply about content in relevant and realistic contexts (CTGV, 1993c).
- Learners must be helped to see themselves as “constructors” of knowledge in a variety of forms. They take an active role in forming new understandings and are not just passive receptors.
- Science students must be helped to see learning as a collaborative process. Students learn not solely from experts and teachers, but also from each other. They test ideas with each other and help each other build elaborate and refined knowledge structures.
- Since Learning is cognitive and involves the processing of information and the constant creation and evolution of knowledge structures. Students must focus on and make visible thinking and reasoning processes. This is not suggesting abandoning the teaching of content to teach only thinking and reasoning because “knowledge of concepts, theories, and principles — empowers people to think effectively” (Bransford et al., 1990, p. 115).
- Learners should be assisted to bring their own needs and experiences to a learning situation and are ready to act according to those needs. We must incorporate those needs and experiences into learning activities to help students take ownership and responsibility for their own learning.
- Students should be helped to acquire Skills and knowledge which are best acquired within realistic contexts. Morris, Bransford, and Franks (1979) call this “transfer appropriate processing.” Transfer

appropriate processing means that students must have the opportunity to practice and learn the outcomes that are expected of them under realistic or authentic conditions.

- Assessment of students must take more realistic and holistic forms, utilizing projects and portfolios and de-emphasizing standardized testing. Educators are increasingly aware that conventional achievement and intelligence tests do not measure the ability of people to perform in everyday settings and adapt to new situations (CTGV, 1993c).

Blakely and Spence (1990) in Grabinger and Dunlap also noted some instructional strategies that can be incorporated into classroom activities to help develop metacognitive behaviors. These strategies can also help in improving the effective learning of science in Nigeria classroom, the strategies include:

- Students should be asked to consciously identify what they “know” as opposed to “what they don’t know.”
- Students should keep journals or logs in which they reflect upon their learning processes, noting what works and what doesn’t.
- Students should manage their own time and resources including estimating time required to complete tasks and activities, organizing materials and resources, and scheduling the procedures necessary to complete an activity.
- Students must participate in guided self-evaluation using individual conferences and checklists to help them focus on the thinking process.

Information Communication Technology and Science Learning

Science teaching in different levels of education in Nigeria is still done mainly by the old conservative approach. Aladejana (2007) noted that the use of Information Technology (ICT) and a new kind of Science (NKS) for science teaching and learning science were said to make science more meaningful and encourages active student’s participation.

Sutton (2006) have shown that ICT can promote students intellectual qualities through high order thinking, problem solving, improved communication skills, deep understanding of learning tool and concepts being taught. Trinidad et al (2001) and Hawkings (2002) have also noted that the use of Information communication Technology can help in supportive, interactive teaching and learning environment. It can also create broader learning communities and provide learning tools for students, especially those of them with special learning needs. The use of computer graphics have been used to show different types of relationships, especially those dynamic processes that can not be shown by pictures.

In his work on ‘A New Kind of Science’ (NKS) Stephen Wolfram’s emphasized the use of Information Communication Technology (ICT) especially the use of Computers in learning and explaining concepts. In the work, wolfram noted that NKS is a concept consisting of over 800 programs that covers many computational functions and concepts. Wolfram discussed the connections and implications of his discoveries for subjects like mathematics, physics, biology, and computer science.

NKS has introduced a new paradigm for doing science; it is now used not only in science but also in technology, business, and the arts. According to Boquta (2004), NKS involves changing paradigms from the computational sciences to the science of computation. In reviewing the work of Wolfram New Kind of Science, Kadvany (2002) noted that the NKS book is a positive heuristic with key ideas for generating new models and problem solutions, predictions or explanation of novel facts, or novel explanation of existing known results. Its inventory of current successes is in solving existing problems or predicting, describing, or explaining existing natural phenomena.

Africa and indeed developing economies have enormous development challenges; therefore the scientific approach to problem solving must be promoted in all domains and at all levels in order to help address these problems. In doing this, Science must be used by man for the purpose of understanding his

environment, himself and the universe, discovering and designing means of transforming resources for quality life improvement and sustainable livelihoods. Science must therefore be seen as a key factor to Peace, Progress and Humankind Advancement. This is why it is very important to ensure that science and technology learning should be taken with all seriousness. It is believed that REALs can enhance the effective learning of science in Nigeria. This is what this paper attempted to bring to light. It is only an implementation of a successful science learning program that can help Nigeria achieve her National Economic and Human development and the realization of the vision 2020 which is to make Nigeria rank among the 20 largest economies in the year 2020.

In conclusion, for Nigeria to achieve her developmental goals, science teachers must shift from the traditional way of teaching scientific facts, principles and rules to the teaching science process skills and encourage students to explore their environment using REALs. This view was also expressed by Ameh – Anegebe (2009), who also emphasized need to re – think the Instructional strategy in science education to ensure that there is a meaningful learning. Science teachers must devise ways of motivating students. The decline in the trend of students' choice of science subjects at the secondary school must be nipped in the bud if Nigeria will attain its full technological potential in a changing world.

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EFFECT OF YEAST ON CHOLESTEROL CONTENT IN BROILER CHICKEN**Onwurah, F.B¹, Ifeanchi, M.O², Amaefule, K.U³ and Ndelekwute, E.K⁴***Federal College of Education (Technical), Omoku, Rivers State, Nigeria.*Email: onwurahben@yahoo.co.uk**Abstract**

The body synthesizes about 1500-2000mg of new cholesterol each day, while dietary cholesterol intake in chicken ranges from 28 – 116mg/dl (Collins, n.d) against the desirable cholesterol level of 200mg (<130 LDL, >40 HDL and <135mg/dl triglyceride). Cholesterol in the bile can crystalize to form gallstones that may block the bile duct, and in the development of atherosclerosis (fatty deposits that form inside the blood vessels) leading to heart attack. However, the major culprit seems to be LDL (Low Density Lipoprotein) that are in excess of the body need (Ultranet, 2006). Presence of chlorine elevates blood pressure by converting antiotensinogen to angiotensin. Increase in blood pressure may eventually result to heart attack or stroke (Web Project, 2000). This study is designed to investigate the effect of yeast on cholesterol content in broiler chicken.

Introduction

Cholesterol is a steroid; a fatty monoatomic alcohol derived primarily from bile (Webster's Comprehensive Dictionry, 1995). It is mainly found in the spinal cord and makes up to 10 percent of the dry matter of the brain and about 140g of the human body (Conn *et al.*, 1987). Cholesterol is probably the best known steroid because of its association with atherosclerosis and heart disease, but biochemically, is of significance as a precursor of a number of equally important steroids that include the bile acid, adrenocortical hormones, sex hormones, D vitamins, cardiac glucosides, sitosterols of the plant kingdom and some alkaloids (Kathleen, 2003). It plays a vital role in digestion and absorption (Tianshi, n.d).

Cholesterol serves as an intermediate in the biosynthesis of all steroids and thus is essential to life (Solomons, 1998). Cholesterol is widely distributed in all cells particularly in the nervous tissue. It is a major component of plasma membrane and of plasma lipoproteins. Cholesterol is an essential structural component of membranes and outer layer plasma lipoprotein (Kathleen, 2003).

The body synthesizes about 1500-2000mg of new cholesterol each day, while dietary cholesterol intake in chicken ranges from 28 – 116mg/dl (Collins, n.d) against the desirable cholesterol level of 200mg (<130 LDL, >40 HDL and <135mg/dl triglyceride). Cholesterol in the bile can crystalize to form gallstones that may block the bile duct, and in the development of atherosclerosis (fatty deposits that form inside the blood vessels) leading to heart attack. However, the major culprit seems to be LDL (Low Density Lipoprotein) that are in excess of the body need (Ultranet, 2006). Presence of chlorine elevates blood pressure by converting antiotensinogen to angiotensin. Increase in blood pressure may eventually result to heart attack or stroke (Web Project, 2000).

This study is designed to investigate the effect of yeast on cholesterol content in broiler chicken.

MATERIALS AND METHODS

A total of 150 Hubbard Broiler chicks were used in this study. The experiment was laid out in a Completely Randomised Design with 5 yeast application levels of 0g, 0.5g, 1.0g, 1.5g and 2.0g. The treatment was yeast in feed and in water. The birds were brooded using the conventional deep litter system in their respective replicate pens after 1 week of adaptation in the brooder house. They were fed *ad libitum* during the adaptation stage but only by day afterwards until the end of the 4th week.

Daily records on feed intake and weight gains were taken. At the end of the trial three chickens were randomly selected from each group. One chicken per replicate for abdominal fat and cholesterol content. Blood cholesterol was determined using the method outlined by Jain (1986).

All data generated were subjected to One-way analysis of variance (Minitab, 1996), and means separated using Duncan's Multiple Range (Duncan, 1955).

RESULT AND DISCUSSION

Table 1: Effect of yeast on feed intake, live weight, abdominal fat and cholesterol.

	0.0g	0.5g	1.0g	1.5g	2.0g
Feed intake (g)	812	831.1	866.1	849	849.4
Live weight (g)	1635.4	1728.24	1755.4	1726.9	1725.9
Abdominal Fat (g)	9.23	10.58	7.55	6.46	7.13
Cholesterol (g)	54.4 ^c	56 ^c	72 ^a	75 ^a	64 ^b

Means with different superscripts are significantly ($P < 0.05$) different.

Means without superscripts are not significantly ($P > 0.05$).

From the table above, feed intake, live weight and abdominal fat are not significantly ($P > 0.05$) different. This implies that yeast inclusion in water and in feed has no significant statistical difference at the probability level studied. However, there are numerical differences, which have all values higher than the control for the parameters studied. This indicates an interaction in the route of administration. This positive numeric differences could be statistically different ($P < 0.05$) when fed in water or in feed only. Secondly, the 4 weeks duration of the trial could also contribute to the non-significant ($P > 0.05$) in feed intake, live weight and abdominal fat. However, there is a significant ($P < 0.05$) difference in the blood cholesterol content. This could be attributed to increased cholesterol metabolism in treatments that received yeast inclusion levels. Yeast must have contributed this in its digestion of saturated fatty acids in the feed. The cholesterol levels however, are within the levels recommended by Collins (n.d) and Ultrnet (2006).

The implication of this result is that fatty acids in feed can be better utilized by broiler chicken by converting fats to cholesterol. There is a need to investigate the type of cholesterol (HDL or LDL) that is being produced.

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DIFFICULT SOUNDS IN IBIBIO 2 ½ TO 4 ½ YEARS OLD MONOLINGUAL CHILDREN: PEDAGOGICAL AND CLINICAL IMPLICATIONS

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Abstract

Our study aimed at finding out the difficult sounds that the Ibibio 2 ½ to 4 ½ years old monolingual children find difficult to acquire (50 subjects: 25 male and 25 female). We used imitation method of data collection and descriptive statistics for analysis. They were tested in the following sounds: 10 phonetic vowels [i ɛ e a ə ʌ ɔ o ʉ u] with [ɔ, o₁] as the sub-variations; 17 phonetic consonants [p b t d k ɓ m n ŋ ŋ r f s R ɰ j m] with [b₁ t₁ d₁ d₂] as the sub-variations, bringing the symbols to 21. The following vowel sounds [ʉ] and [o₁] and mid vowels were found to be difficult sounds for Ibibio children. Among the consonants, [R], [d₁], [ɰ], [t₁], [d₂], [r], [b₁]; tap, trill and back are the difficult sounds and sound classes. Our study has both pedagogical and clinical implications.

Keywords: Difficult Sounds, Ibibio, Monolingual Children, Pedagogical, Clinical

Introduction

So far, quite a few works exist on the development of the language of the Ibibio child, making it normal and appropriate that we start from the basics. This work focuses on the development of consonants and vowels in lexical items. When the norm for the phonology of the Ibibio child is established, a foundation would have been provided for further studies in child language development and disorders in Ibibio.

Statement of the Problem

Our problem in Nigeria is that there is no norm set like in developed communities for planning language teaching programmes and for screening children for language disorders. Thus, there is the need to establish a linguistic norm from which deviations can be studied and addressed.

Research Questions

In order to precisely investigate the research problem stated above, we attempted to answer the following questions:

- i. What are the difficult sounds in Ibibio normally developing monolingual children of the ages of 2 ½ to 4 ½ years?
- ii. What are the pedagogical and clinical implications of a study of the phonology of the Ibibio child?

Subjects

Twenty-five (25) male and twenty-five (25) female, normal monolingual children, had no formal education, all came from Western Itam community in Itu Local Government Area of Akwa Ibom State of Nigeria.

Target Sounds

Our target sounds in this study are 27 phonetic sounds of Ibibio with 6 sub-variations bringing the number to 33 sounds: 10 phonetic vowels [i ɨ e a ə ʌ ɔ o ɯ u] with [ɔ₁ o₁] as the sub-variations; 17 phonetic consonants [p b t d k kp m n ŋ ɲ r f s R ɰ j w] with [b₁ t₁ d₁ d₂] as the sub-variations, bringing the symbols to 21. The sounds with the subscripts which are so labelled for the purposes of calculations are those pairs of sounds used in free variation with each other, as presented:

[ɔ₁] and [o₁] are vowels used in free variation word medially before the velar nasal [ŋ]; [p] and [b₁] are used in free variation word finally; [t₁] and [d₁] used in free variation word finally; [d₂] and [r] used in free variation word medially or intervocalically.

Test Material

Our test material was made up of one hundred and sixty two (162) single words which were mainly nouns, with a few verbs.

Method of Data Collection

We used imitation method of child language collection to elicit data from our subjects.

Method of Data Analyses

Percentage analysis, mean, variance, and standard deviation, tables and graphs were used for our analyses.

Data Presentation, Analysis and Interpretation

General Articulatory Performance

Performance scores in both consonants and vowels. A higher performance in the articulation of each of the sounds means the emergence of that sound in the phonetic inventory of the subjects.

Vowels

Our subjects were tested on ten (10) phonetic vowels of Ibibio. These vowel sounds are: [i ɨ e a ɔ₁ ɔ o₁ o u ɯ ə ʌ] with [ɔ₁ o₁] as sub-variations, bringing the number to twelve (12). The sub-variations are vowels used in free variation word medially, before the velar nasal [ŋ].

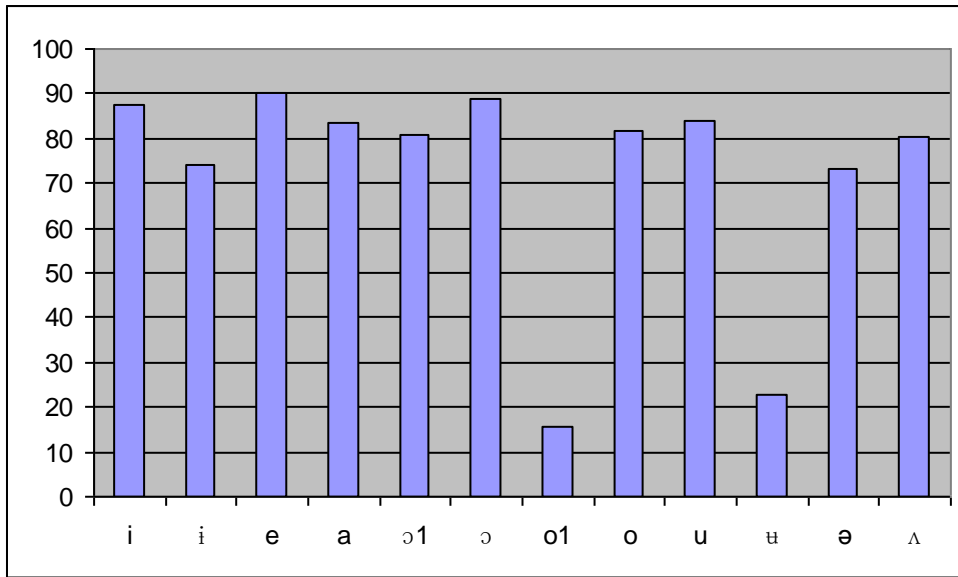


Figure 1: General Performance in Vowels

All the vowels [e ɔ i u a o ɔ₁ ʌ ɨ ə] have been established in the speech of our subjects, except [ɰ] and [o₁] which is the [o] that occurs in free variation with [ɔ] in the language.

The order of the emergence of back vowels are as follows: [ɔ u o ɔ₁ o₁].

Front Vowels

Our sound production test covered three (3) front vowels of Ibibio [i e a].

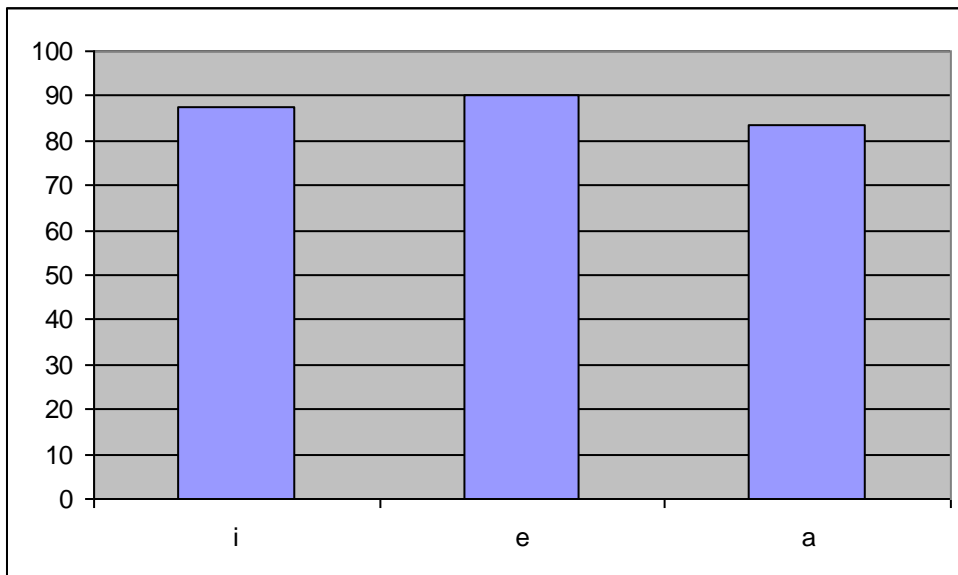


Figure 2: General Performance in Front Vowels

None of the front vowels constitutes an area of difficulty, agreeing with what is reported in the literature (Stork and Widdowson 1974: 143).

Back Vowels

Our subjects were tested on five (5) back vowels: [ɔ ɔ₁ o o₁ u], as presented below:

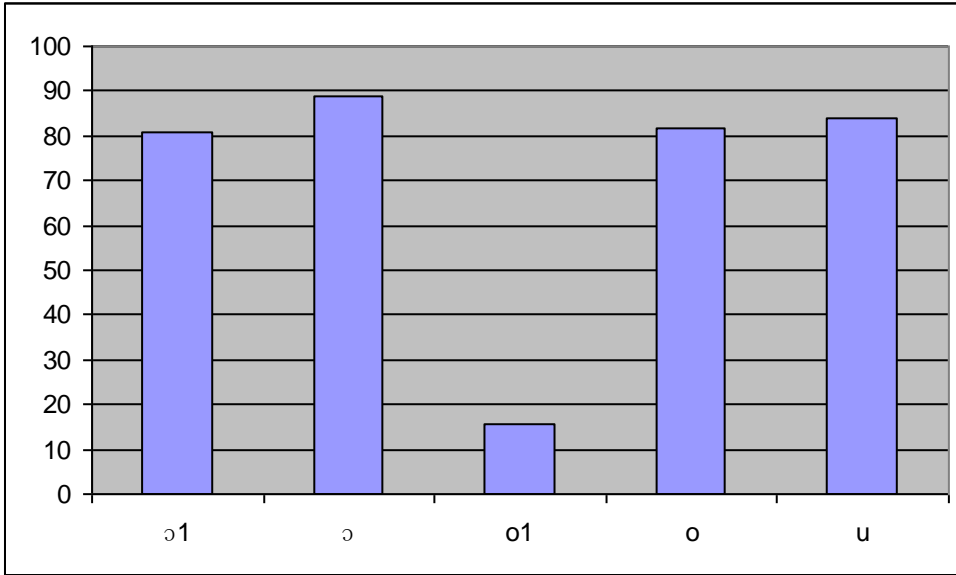


Figure 3: General Performance in Back Vowels

[o₁] is the difficult back vowel sound and it is used in free variation with [ɔ₁] before the velar nasal.

Central Vowels

Our subjects were tested on the production of four (4) central vowels of Ibibio: [ɨ ʉ ə ʌ].

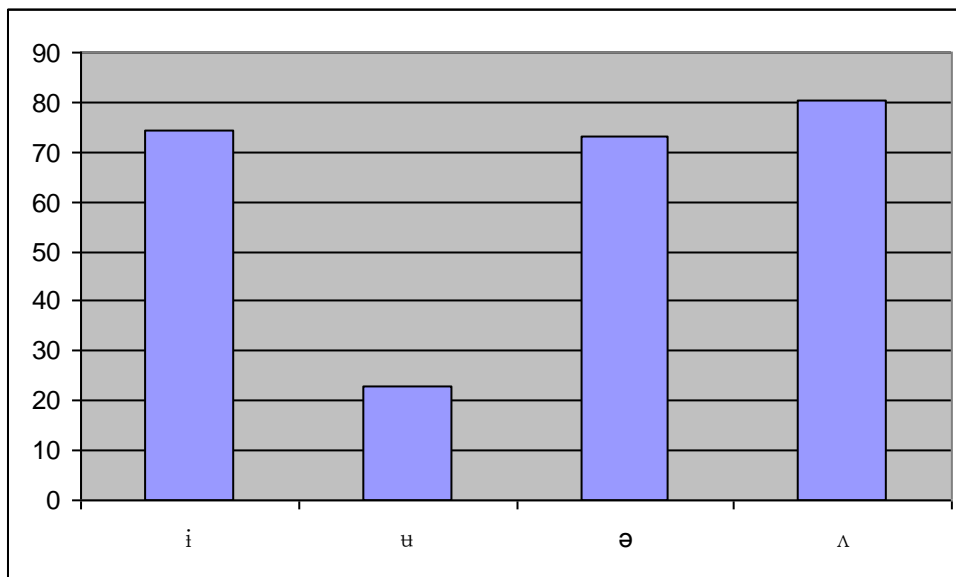


Figure 4: Performance in Central Vowels

The sounds emerge in the following order: [ʌ ð ə ʊ]. [ʊ] is the difficult central vowel sound. It is observed that our subjects performed better in the sounds that have higher frequencies of occurrence like [ð] and [ʌ] than in those that have lower frequencies of occurrence like [ə] and [ʊ], confirming Nicholas (1991) where Welsh children were found to acquire sounds which were more distributed in the language than those with more restricted distribution.

Performance in Different Classes of Vowels

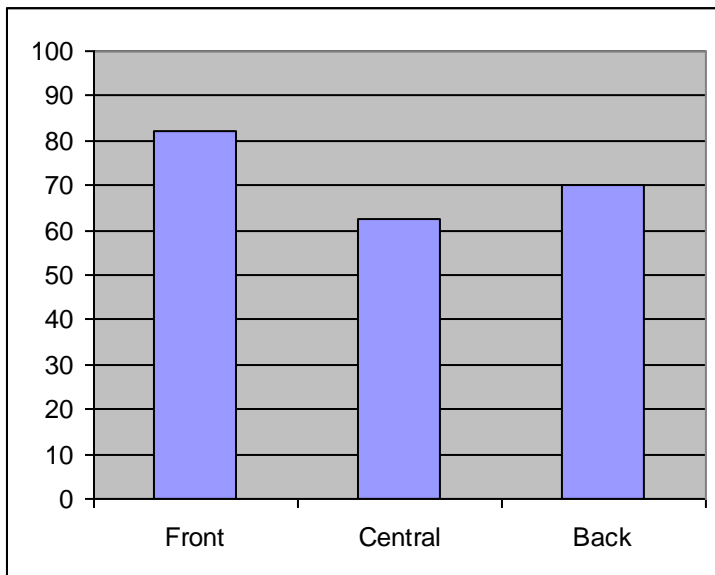


Figure 5: Performance in Front, Central, Back Vowels

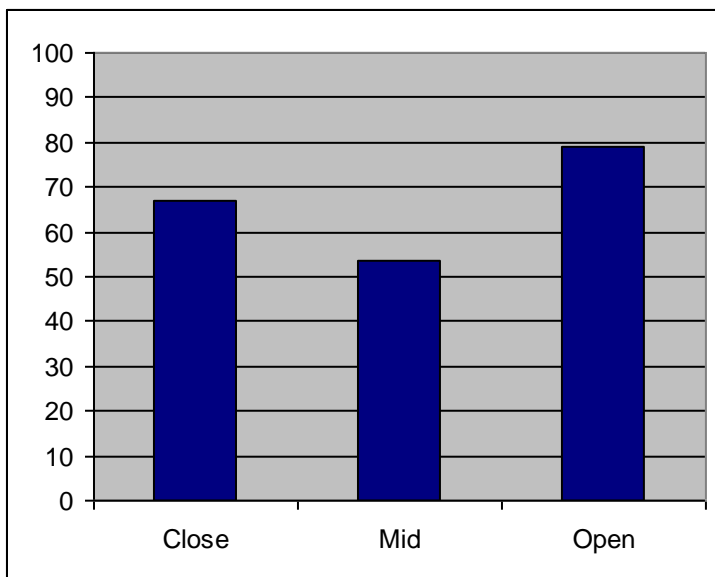


Figure 6: Performance in Close, Open, Mid Vowels

Our result shows that the order of emergence of different classes of vowels is as follows: front – back – central and open – close – mid. It is also reported that open and mid vowels appear before the close vowels, although the general performance of our subjects shows that the mid vowels appear last in their inventory.

The subjects find it more difficult to produce the central vowels indicating that [+ central] vowels are the most difficult vowel sounds for Ibibio children. This is also assumed to be so because these central vowel sounds are less distributed in the target language.

In summary, all the vowel sounds in our study have emerged. These are [i u e a ɔ ɔ₁ ʌ o ɨ ə o₁], except [ɘ] which is also a central vowel, observed to be the most difficult among the different vowel classes, for our subjects to produce. The result implies that the production of most of the vowels do not constitute a problem area to our subjects, confirming Anthony et al 1971; Akpan 2008.

Consonants

Our subjects were tested on seventeen (17) phonetic consonants [p b₁ b t₁ t d₁ d d₂ ʀ k kp m n ɲ ŋ f s ʋ ʀ j w] with some sub-variations [b₁ t₁ d₁ d₂] bringing the number of symbols to twenty-one(21).

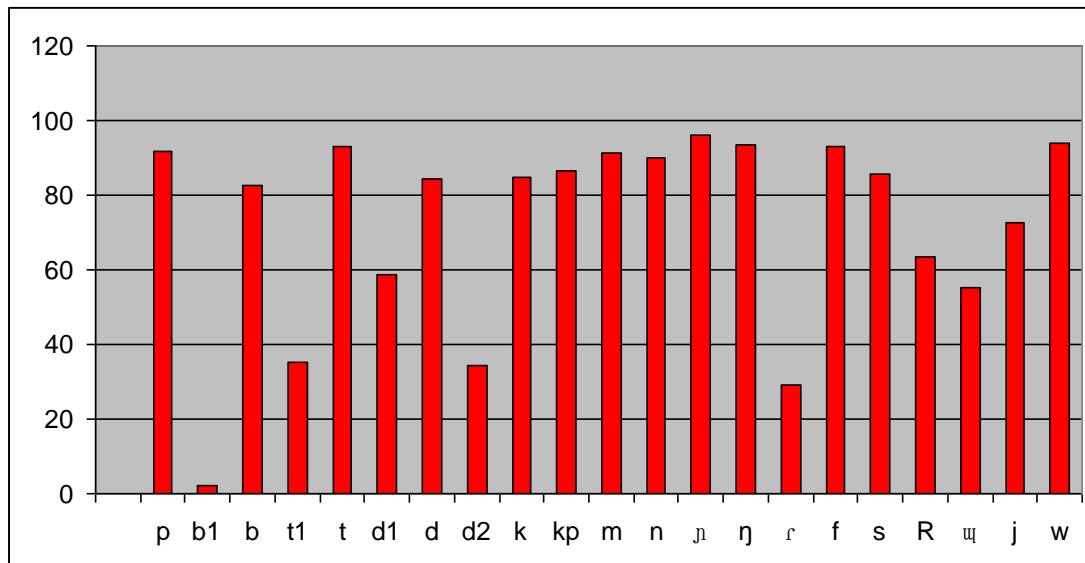


Figure 7: General Performance in Consonants

The order of correct articulation from highest to lowest is as follows:

[ɲ - w - ŋ - t - f - p - m - n - kp - s - k - d - b - j - R - d₁ - ʋ - t₁ - d₂ - ʀ - b₁].

Comparatively, [R], [d₁], [ʋ], [t₁], [d₂], [ʀ], [b₁] appear more problematic than other consonant sounds as shown above. This indicates that the subjects prefer the use of certain sounds that occur in free variation (Akpan 2003; Yul-Ifode and Akpan 2004). This does not constitute a difficulty, but a matter of preference for certain sounds in free variation. The approximant [ʋ], the tap and the trill constitute areas of difficulty.

Trill

There is only one trill [R] in Ibibio, a uvular trill. This result shows that even though the sound has emerged in their inventory, most of the subjects are unable to produce this sound which agrees with what is in the literature that the trill is one of the last sounds to be acquired by children.

Tap

There is only one tap [ɾ] in Ibibio, an alveolar tap. This sound has not yet been mastered by all our subjects. This tap sound is the one used in free variation with [d₂], as earlier found in the literature.

Approximants

These are [ɥ j w].

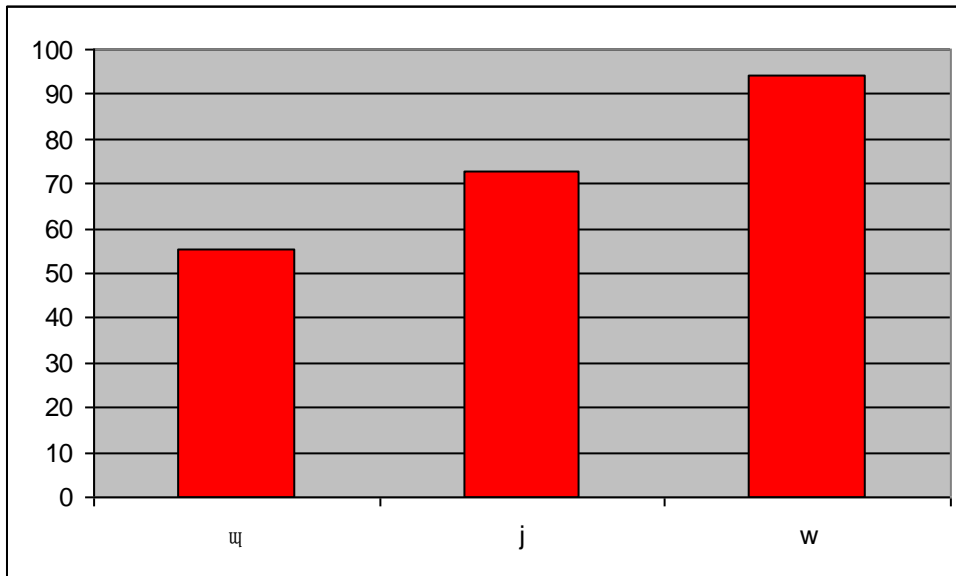


Figure 8: General Performance in Approximants

The approximants have emerged in their inventory. The labial-velar approximant [w] has fully emerged, while the palatal approximant [j] is in the process of being mastered by a lot of the subjects, considering the high degree of standard deviation of subjects from the mean which is 24.05. However, [w] is seen to emerge before [j] and [ɥ]. We therefore state the hypothesis that the higher the frequency of occurrence, the higher the performance. [w] is more distributed in the standard than [j] and [ɥ].

General Performance in Different Manners of Articulation

The manners of articulation are plosives, nasals, trill, tap, fricatives and approximants.

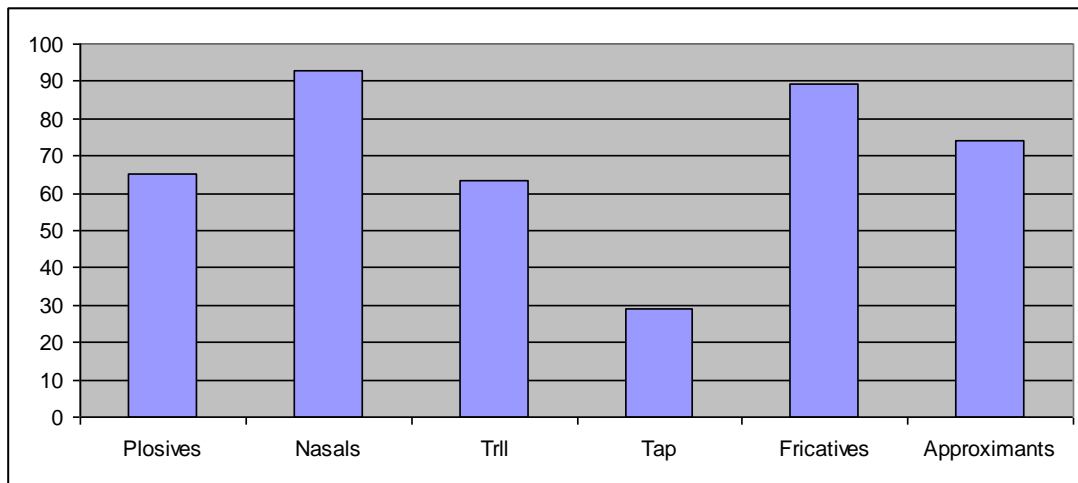


Figure 9: Performance in Different Manners of Articulation

The order of emergence of sounds according to manner of articulation is: nasals - fricatives - approximants - plosives - trill - tap. This order is contrary to what is in the literature that plosives emerge before fricatives. The situation is accounted for by the fact that a number of plosives occur in free variation with each other, resulting in divided attention of the subjects.

Standard deviation shows the order as: nasals - plosives - approximants – fricatives - tap – trill.

Subjects' scores are more consistent in nasals and plosives, than in the approximants, fricatives, tap and the trill, where some subjects score very high and others score very low.

The consonants which although they have merely emerged are still in the process of being fully established are [R d₁ ʋ t₁ d₂ r b₁], in a descending order.

Performance in Different Places of Articulation

The different places of articulation are bilabial, alveolar, labio-dental, palatal, velar, labial-velar and uvular.

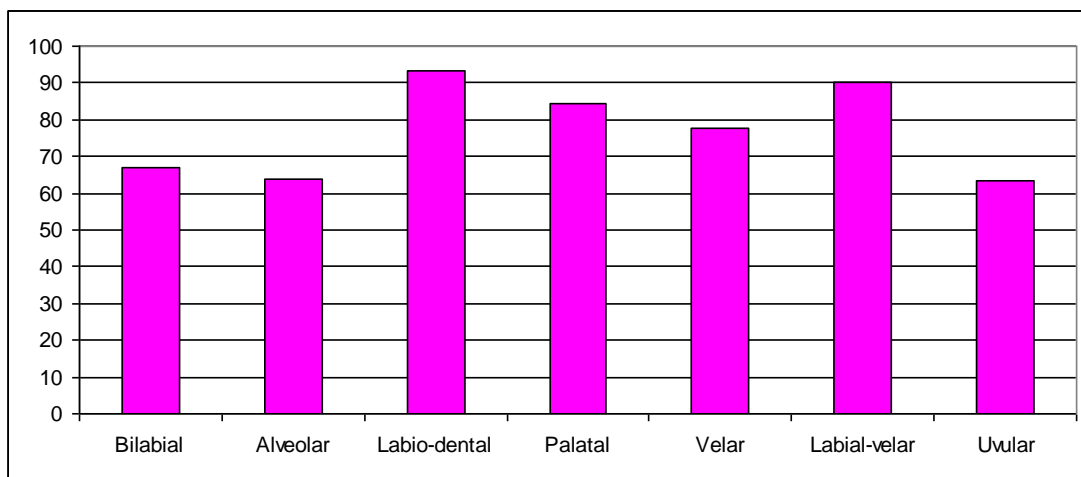


Figure 10: General Performance in Places of Articulation

The order of emergence of sound classes is as follows: labio-dental - labial-velar - palatal - velar - bilabial – alveolar - uvular.

Standard deviation of scores gives a different picture and corresponds to earlier reported cases in the following order: bilabials - labial - velar - alveolar - velar - labio-dental - palatal - uvular. A lot of bilabial and alveolar sounds occur in free variation in the Ibibio language. This accounts for divided attention among the subjects in the acquisition of sounds.

Pedagogical and Clinical Implications

The results of this work have some implications for language teaching especially in the areas of planning, training and teaching of English as a second language (L2), and French as a foreign language (FL). Teachers will predict what the problem sounds of the Ibibio child could be in L2 and FL situations. The problematic sounds include the central, the high vowels, the tap, the trill and the velar and the palatal approximants of English or French as would be applicable.

The clinical implications could be in the areas of screening, identification, diagnosis, assessment or therapy. When the language disordered children are identified, the necessary therapy would be planned and administered, if needed.

Conclusion and Recommendations

In conclusion, therefore, it could be predicted that areas of language difficulty in Ibibio are likely to constitute areas of difficulty in L2 or FL learning situations in Nigerian educational system or elsewhere. This in turn will guide the language teacher to plan and execute his teaching experience successfully. For the language pathologist/therapist, our study will guide him to establish whether the child's language difficulties are as a result of negative transfer of learning or a language disorder which should be taken care of. We do hope that this study is a good attempt which should be encouraged, as it will aid in designing language teaching materials to screen two to six years olds for phonological disorders. This is the period when children start pre-nursery, nursery and primary schools. The picture here implies that we need more of such studies on different languages of the world, to come up with a theory of language/phonological development in children.

It is by this recommendation that the training programme for language teachers should incorporate both the normal and abnormal stages of language development, the basic knowledge of the processes of identification and therapy for the language disordered children.

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INTEGRATING SELF-PACED E-LEARNING WITH CONVENTIONAL CLASSROOM LEARNING IN NIGERIA EDUCATIONAL SYSTEM

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Abstract

The advances in Information and Communication Technology (ICT) and its rapid growth are changing the way people use, develop, process and disseminate information and instruction {technology}. There is no doubt that ICT use in the classroom increase student's motivation to learn, engage in learning and give independence in learning. Evidence shows that there is a correlation between using ICT in schools and students academic achievement across a range of courses. Student are comfortable and fulfilled in an ICT environment and using this as a bench mark, [integrating it with a self-paced student centered learning] in conjunction with the conventional classroom learning will go a long way to improve learning thereby increasing academic performance of the students at large. This paper explores the potential of self-paced e-learning alongside with conventional classroom learning and the positive impact the integration of the two can have on student's academic performance when incorporated into the Nigeria Educational system.

Keywords: Information and Communication Technology (ICT), Self-paced e-learning, Conventional Classroom Learning, Integration, Nigeria Educational System

1.0 Introduction

ICT has been used in educational settings since its inception, but recent empirical research has affirmed that it plays a vital role in high-quality learning and teaching. Such research insights have shown that advances in technology have opened up new possibilities for the way in which teachers educate their classes, giving potential for innovative ways to encourage students to become more engaged in their schooling. To enable the best possible outcomes for their students it is vital that schools are able to keep up with this progress. (Condie and Munro, 2007).

In an extensive review of the ICT and performance levels in the UK Cox, Abbott, Webb, Blakeley, Beauchamp & Rhodes (2003) found evidence of positive effects on achievement levels in students across a wide range of subjects, which particularly indicates that in European schools ICT has positively enhanced performance in the primary years, particularly in the primary language of the country. Schools that have greater ICT infrastructure perform more highly than schools with less developed ICT infrastructure. Higher motivation is reported, particularly for primary students, with the use of ICT such as interactive whiteboards.

The majority of teachers report that students are more highly motivated, which in turn affects behaviour and communication when using computers and the internet in class. In order to reach European targets set for the year 2010, the numbers of computers in schools have increased dramatically in recent years (Balanskat and Blamire, 2007). Two thirds of teachers report being very confident in their usage of word processors, and a third feel that they have the necessary skills to develop electronic presentations. Almost all teachers in the UK and Denmark report using ICT regularly as a teaching aid, whereas in other countries such as Greece or Latvia, only a third of teachers report doing so.

Greater gains of achievement in students are seen when the teacher uses ICT in a planned, structured way that is integrated effectively into their lessons (Higgins, 2003).

2.0 Conventional Classroom Learning

According to Martin and Eugenio (1992), conventional classroom teaching is conceived as the transmission of “knowledge” or “information” from the teacher to the student. The teacher in this instance prepares for the lesson to be taken, therefore takes the most active role in the classroom [provide and guide] and students are required to listen, take notes, memorize, and be able to demonstrate their knowledge by filling in the proper blanks or choosing the appropriate alternative on the test.

Knowledge, in this view, is a set of beliefs that accurately mirrors the world. The emphasis in the classroom is on transmitting these beliefs clearly and precisely. Rarely, then, is interaction between teacher and student genuinely initiated by the latter. The teacher not only has all of the answers but also all of the relevant questions. Students are not, at the first instant are presumed to know nothing and may not necessarily contribute or ask questions to which the teacher can give clear and definite answers.

The conventional classroom has a certain theory of knowledge, in this view, is acquired passively rather than actively, is more the product of observation than of exploration. Principally, education has two aims: first, the transmission of the knowledge that has been acquired firsthand by those who have preceded us (which Bertrand called “knowledge by description”), and, second, to make sure that the student's mind remains accurately aimed and highly receptive-- so that it is itself capable of acquiring “knowledge by [direct] acquaintance”(Bertrand 1946).

The most vital relationship in a conventional classroom is between the teacher and student, and this is so, because the teacher transmits what he has learnt in the past and in tune with the present to the student. The tutor-students ratio is kept low to be able to produce the best result [the ideal learning situation is one to one]. Schools teach students in groups only because it is financially impossible to have a one-to-one teacher-student ratio. Keeping the ratio very low will improve teachers productivity and also beneficial to students with slow learning prowess.

Underlying the conventional wisdom, as Richard Rorty (1979) has emphasized, is a certain metaphor, or picture, that has dominated epistemology since Descartes. This is the picture of the mind as a great mirror containing various representations--some accurate, some not--of nature. It is the task of epistemology to identify the foundation and to provide a method that, when properly employed, will “polish” the mirror and ensure that all that is represented on it accurately reflects, or is true of, the world.

There is an important difference between students learning in a group and learning as a group. Students in conventional classrooms learn in groups largely because financial considerations make it impossible for each student to have his or her own tutor. The emphasis is on the transmission of “knowledge” from active teacher to passive student, and the (financially prohibitive) ideal is a one-to-one teacher-student ratio. In

contrast, the sort of classroom envisaged-- what is characterized as a “community of inquiry”--regards group learning as essential to education. Members of a class who work *as* a group learn to see themselves as active participants in the discovery, analysis, and justification of claims to knowledge. As such, they constitute a model of the nature and structure of knowledge as it exists outside of the classroom. The emphasis is on dialogue, interaction, and a joint cooperative undertaking guided by a skilled and sensitive teacher who is him- or herself an interested inquirer.

Conventional learning typically takes place in an identifiable classroom space, usually in a school or in an institution dedicated to learning. A traditional classroom usually has a number of specific features, including:

- an instructor/trainer who delivers information to students
- a number of students/learner who are all physically present in the classroom and regularly meet at a specific time
- student participation in lectures and discussions
- a set of chairs and desks arranged in rows and columns

2.2 Advantages of Conventional Classroom Learning

The following are some of the advantages of Conventional Classroom Learning

- Provides interactive classroom setting that promotes the open exchange of ideas: Having numerous students learning in the same classroom has the added benefit of allowing students to exchange ideas and questions with one another providing another valuable learning medium that online environments cannot replicate. First-hand interaction with the educating professor also allows for ideas to be exchanged freely and without any communication barriers.
- A classroom creates an environment of learning. While a student is attending a class s/he learns how to behave in an appropriate manner, how to make friends and interact with people. Such learning is not possible in online courses as the individual would interact with a computer.
- In a classroom the teacher decides the important areas of study and imparts the same knowledge to all the students, though the way each student absorbs information is different. The teacher can also identify learning issues with particular students and provide support. Such an environment is absent in online learning programs as the students are left on their own to study and have to develop the necessary skills alone.
- Exchange ideas with peers, not only about the training course but about other current issues.
- Benefit from a face-to-face learning approach that allows learners to address any difficulties or areas of confusion immediately. A classroom environment offers students the opportunity to have face-to-face interactions with their peers and instructors. This is an added social benefit as well as an educational aid. Because students see the same peers in class every session, they get a chance to form friendships. In the case of higher learning, pupils can find potential lifelong professional connections. On the educational side, students get a chance to participate in a lecture or class discussion physically. If something is not understood, interrupting to ask for clarification is always an option. The best classes not only include, but also insist that students get hands-on experience with the subjects being taught. This is particularly useful for those preparing for certification exams because analysis and problem-solving skills are learned best through trial and error, with access to a helpful mentor as needed.
- Access to a savvy, experienced instructor permits students to apply what they learn to real-world needs by asking questions and looking for connections to the job. Because learning works best when materials are relevant, good instructors add real value. (Ed, 2003)
- In some cases, the classroom environment is the only style of education the students know, and the change of pace online classes offer may prove difficult to adjust to. Students get the opportunity for hands-on, structured learning instead of being presented with the course books, written lectures and self-directed activities distance learning provides. Suddenly straying from the standard learning

experience may add unexpected strain academically, making the class material more difficult in the process. At this point, they enjoy the interaction between them and their teachers.

2.3 Limitations of Conventional Classroom Learning

Like other instructional methodologies, conventional classroom learning has its limitations.

- Neglect problem solving, critical thinking, and higher order learning skills: The classroom setting can also hinder ones ability to learn by allowing other, more vocal, students to dominate the bulk of the discussion environments. Quieter personalities are limited in their communication options for exchanging ideas and information
- Encourage passive learning: Depending on the level of interaction in the classroom setting, shy students may be allowed to attend classes without providing alternative ways to communicate ideas. Forcing students to learn by vocal exchange with a professor may limit their ability to learn.
- Ignore individual learning differences between students: Classrooms environments tend to group students together in large number often making it difficult for instructors to isolate learning deficiencies and provide the necessary close attention that individuals may need to learn.
- A campus-based learning experience means the class schedule is predetermined and not subject to change. Students must shape their personal schedules around school instead of the other way around. If plans unexpectedly change or an emergency comes up, the student cannot adjust the class schedule to turn in the work at a different time. If a scheduling conflict arises between work and school, students are forced to choose between their education and their income.
- Knowledge conveyed in the classroom tends to be situated in the context of the classroom and the school rather than the context in which the knowledge was created (Henning, 1998). This contextual dichotomy has been shown to negatively impact the learning process, adversely effecting learner motivation in particular.
- The teacher is the center of attention, not the students. That was the way education was, and still is in many regards. Learning follows whatever pace is dictated by its training materials, by the time allotted for the class and the instructor's approach.
- With classroom learning, students must physically attend the courses to get credit for attendance. Those who must travel long distances to get to school must allot enough time to arrive punctually, particularly in instances where inclement weather is involved. A long commute may also mean a hefty transportation cost over a long period of time which, when combined with the cost of education, may present an issue to financially challenged students.

3.0 Self-Paced e-Learning

As cited by Gurmak, John and Harvey(2005), e-Learning is construed in a variety of contexts, such as distance learning, online learning and networked learning (Wilson 2001). In the context of this paper self-paced e-learning is the one that utilizes information and communications technology (ICT) to promote educational interaction among students and their teachers [content provided] . Volery (2000) argues that the fast expansion of the Internet and related technological advancements, in conjunction with limited budgets and social demands for improved access to higher education, has produced a substantial incentive for universities to introduce eLearning courses.

Self-paced or individualized learning is defined as learning directed by the individual in order to meet personal learning objectives. Although self-paced learning and individualized learning have essentially the same meaning, there are some subtle differences. In self-paced learning, the learner controls the pace of the learning process. For example, in a self-paced computer-based course, two students might begin the course on the same day but one may finish days ahead of the other. By contrast, in individualized learning, there may be some time parameters. For example, a structured on-the-job training (OJT) course may require the individual to reach specific points in the course at specific times. The learning is still targeted to the

individual, but the pace of learning may be partially controlled by the trainer or facilitator. Here, the term self-paced learning is used to describe both approaches.

Self-paced courses provide a convenient alternative to the traditional classroom. In fact, recent meta analysis ([Means, 2009](#)) research is showing that online distance education students outperform campus based students.

Spring (2004) proposed five teaching and learning modes in which e-learning can provide gains in effectiveness, quality and cost benefits:

- Classroom interactive learning: between students and teachers and among students
- Independent learning: where students or teachers are learning and studying alone in a variety of environments and modes including aspects of self directed lifelong learning;
- Networked learning: through contact with groups, individuals and sources where quite different influences and experiences are creating a qualitative difference to both standard and blended teaching and learning;
- Organizational learning: including learning communities, learning precincts and learning cities; and
- Managed learning: where education technology is creating, through computer managed communication and learning management systems, capability to enable teachers to negotiate and provide individualized curricula and learning experiences for each student.

3.1 Examples of Self-Paced Learning

In self-paced learning, the content, learning sequence, pace of learning and possibly even the media are determined by the individual. Examples of self-paced learning include:

- Reading a book to acquire new information about a topic.
- Reading a book, listening to accompanying audiotapes and completing exercises in a workbook.
- Reading a reference manual and watching a video.
- Completing a computer-assisted learning (CAL) course that uses interactive computer modules for knowledge transfer and one-on-one work with the clinical trainer for skills transfer, first with models and then with clients.
- Completing a CAL distance learning course on the Internet (knowledge transfer only).
- Participating in a structured OJT clinical skills course that involves reading assignments in a reference manual, completing exercises in a workbook and working one-on-one with the clinical trainer for skills transfer, first with models and then with clients.

3.2 Advantages of Self-Paced e-learning

According to Anderson (2005), Self-paced e-learning maximizes individual freedom. Rather than making the obviously incorrect assumption that all students learn at the same speed, have access and control over their lives to march along with a cohort group of learners or are able, despite divergent life circumstances, to begin and end their study on the same day, self-paced study correctly puts the learner squarely in control.

In most group-based (conventional classroom) courses, the trainer attempts to present the information to the typical or average learner. The more capable learners may become bored or frustrated, while the less

capable learners may feel lost or overwhelmed. By contrast, a self-paced approach allows the learner to make many of the decisions about when, where, what and how quickly to learn. The trainer functions as a guide and facilitator of learning.

The other advantages to this approach of learning are:

- Learners can learn information and skills when they need them.
- Learners are not as dependent on the structure and pace established by the trainer.
- Assuming control of the learning process is highly motivating for many learners.
- Each learner has the same level of participation in the learning process. Participants are active rather than passive, and assume greater responsibility for their own learning.
- Because most self-paced learning courses allow participants to begin and end a segment of the training course at any time, it is an efficient use of training time and resources.
- Learning activities can be organized sequentially, because each component in a self-paced course has objectives that must be met before proceeding to the next component.
- Self-paced learning provides trainers with the time to focus more attention on participants who need assistance. Although participants who are not having difficulties certainly should not be neglected, this approach allows the trainer to spend time with participants who do require assistance.
- Essential equipment, materials and supplies used can be kept at a minimum because only one or two participants may be involved in training at any one time.

3.3 Limitations of Self- Paced e-Learning

As with any approach to learning, there are also limitations to consider:

- Most learners have not learned this way before, so they may feel uncomfortable with learning on their own.
- Students may lack the necessary motivation to work independently.
- Learners may have poor reading skills, because most self-paced learning approaches require reading, this can be a major limitation.
- Learners may possess poor time management skills. Procrastination may make the self-paced learning process less effective than it can be.
- Trainers may feel that they do not have time to manage a self-paced learning system.
- It may be challenging and time-consuming to design and develop the appropriate learning materials, in either print or electronic format.
- Without good planning, it may be difficult for the trainer to arrange for times to meet with the participant.
- Trainers may find that documenting, evaluating and updating Students progress is very time-consuming.

4.0 Advantages of the Integration of Self-paced e-learning and Conventional Classroom Learning

The following are some the benefits that would be derived from integrating self-paced e-learning and conventional classroom learning:

- The Self-paced e-Learning is not an exclusionary alternative to the traditional classroom, but really are an extension of that classroom into cyber-space and global networking. Traditional classroom teaching and learning are addressed with the leverage provided by technology-based instruction and testing.
- The power of the integration is in sequencing the activities, engaging the learner in different ways, and then optimizing the combined learning effect. The content of the course will be made interactive, graphical, voice enabled and with real life simulations.
- The student can make use of the advantages of self-paced e-learning by going through beforehand the course modules to be handled in the next class, making use of the interactive sections available in form of quiz. When such students appear in class, treating the same course module will be simplified and the student can learn better from the lecturer by asking questions on those aspects that were not clear on the self-paced e-module
- The learning process in some people takes quite a bit of time, so a self-paced e-learning setting is ideal for the patience and environment required. Such people can now make use of the advantage of going through the module online moving at their own pace to comprehend what was initially taught in class.

5.0 Conclusion

This research proposes a combination of online, intranet and internet (self-paced e-learning) and conventional classroom learning style for courses. This will allow the benefits of both types of learning to be realized. The truth of the matter is that there are advantages and disadvantages to every type of learning environment. It is best to use the advantages that each method offers to their fullest extent. It is obvious from this research review, that a combination of self paced e-learning and classroom learning to convey subject matter to students will be the best teaching method. This will on the long run translate on their overall performance of students in school.

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USING INFORMATION AND COMMUNICATION TECHNOLOGY IN A COLLABORATIVE CLASSROOM TO IMPROVE STUDENT ACHIEVEMENT

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Abstract

This paper discusses the fundamentals of cooperating teaching - the role of general subjects teacher as well as the role of the special education teachers in a collaborative classroom. Enhances was laid on two roles of the special education teacher which are - permanent and temporary co-teaching roles. Also discussed were necessary steps needed for effective planning for collaborative teaching. The paper later gave examples of some technology devices that could be used for educational application and steps to follow to improve students' achievement through the use of ICT. Finally, conclusion was drawn.

Keywords: Cooperating teaching, inclusive classroom, special education, planning, collaboration, ICT.

Introduction

Historically, teachers have worked in isolation - one teacher to a classroom. As children with disabilities entered the public schools in the 1970s, they were taught in separate classrooms with their own teachers. Over the past 25 years, these students have slowly moved into the flow of the regular classroom, thus the use of the term "mainstreaming." (Suzan Ripley, 1997). He further stated that students, although they were mainstreamed for selected subjects or parts of the day; they were not considered part of the typical class. Now the philosophy is to include all students in the same class, which has brought about teams of general education and special education teachers working

collaboratively or cooperatively to combine their professional knowledge perspectives, and skills. The biggest change for educators is in deciding to share the role that has traditionally been individual: to share the goals, decisions, classroom instruction, responsibility for students, assessment of student learning, problem solving, and classroom management. The teachers must begin to think of it as "our" class. This

Digest explores the facets of this new collaboration between general and special education teachers. The biggest change for educators is in deciding to share the role that has traditionally been individual: to share the goals, decisions, classroom instruction, responsibility for students, assessment of student learning, problem solving, and classroom management. The teachers must begin to think of it as "our" class. This write-up explores the facets of this new collaboration between general and special education teachers.

What is Cooperating Teaching?

Cooperative teaching was described in 1980s as "an educational approach in which general and special educators work in co-active and coordinated fashion to jointly teach heterogeneous groups of students in educationally integrated settings (Suzanne Ripley, 1997). In cooperative teaching both general and special educators are simultaneously present in the general classroom, maintaining joint responsibilities for specified education instruction that is to occur within that setting" (Bauwens, Hourcade, & Friend, 1989).

This type of co-teaching actually has a number of names. The way this model works is that a content area teacher is in the classroom all the time. The special education teacher comes in and co-teaches one to three

times a week. All students are able to benefit by having more face time with their teachers. Co-teaching gives each child that opportunity. For special needs children, this may mean help with reading a paragraph, learning a new language, or solving mathematical problems. Co-teaching brings special education's best practices, which are really best for all children, into normal classrooms where they can benefit all students.

The distinctive feature of cooperative teaching, which differs from earlier approaches, is that it is direct collaboration with the general education and special education teachers working together in the same classroom most of the day.

An effective team of teachers will work together as equal partners in interactive relationships, with both involved in all aspects of planning, teaching, and assessment. Areas for this collaboration will include curricula and instruction, assessment and evaluation, and classroom management and behavior. The key to making co-teaching work is joint planning. They must both know the entire curriculum so that they can switch back and forth and support each others efforts.

In developing and implementing cooperative teaching, school professionals experience great changes in the way they go about their daily work. To overcome the inevitable fears and stresses associated with change, the educators involved must feel that they are responsible for the change and that its success or failure lies directly with them (Bauwens & Hourcade, 1995).

The Role Played by Each Teachers in a Collaborative Classroom

In a collaborative model the general education and special education teachers each bring their skills, training, and perspectives to the team. Resources are combined to strengthen teaching and learning opportunities, methods, and effectiveness. The one point that clearly developed from this relationship was that both of them had expertise in many areas, and combining these skills made both teachers more effective in meeting the needs of all students (Dieker & Barnett, 1996).

Typically the primary responsibility of general education teachers is to use their skills to instruct students in curricula dictated by the school system. Also, the primary responsibility of special education teachers is to provide instruction by adapting and developing materials to match the learning styles, strengths, and special needs of each of their students. In special education situations, individual learners' needs often dictate the curricula.

General educators bring content specialization, special education teachers bring assessment and adaptation specializations. Both bring training and experience in teaching techniques and learning processes. Their collaborative goal is that all students in their class are provided with appropriate classroom and homework assignments so that each is learning, is challenged, and is participating in the classroom process.

A Special Education Teacher's Role in an Inclusive Classroom

An inclusive classroom is one of the placement options for a student with a learning disability. This is the least restrictive form of education for special needs students and it allows the student to be included in a typical classroom environment with his or her peers.

There are two roles a special education teacher may play in an inclusive classroom — permanent or temporary co-teaching.

Permanent Co-Teaching

Permanent co-teaching offers students many advantages. In a permanent co-teaching arrangement, there is a content teacher, someone who specializes in a specific subject like history, and a special education teacher. The teachers share in the planning, implementing, and grading of lessons. This is great for all the students, not just those that fall under the special education umbrella. The one-on-one teacher to student time is increased because there is literally an extra teacher in the classroom. With an average classroom size of 20 to 30, each teacher could focus her attention on only 10 to 15 students. For a special needs student, this additional individualized contact is invaluable.

Planning for Effective Collaboration

Collaboration involves commitment by the teachers who will be working together, by their school administrators, by the school system, and by the community. It involves time, support, resources, monitoring, and, above all, persistence. However, the biggest issue is time - time for planning, time for development, and time for evaluating. Planning should take place at the district and the building levels, as well as at the classroom level.

District planning helps ensure that all resources will be available, including time, money, and professional assistance. District-level planning will take into consideration the effect change in one place will have on other settings. Building-level planning will assist the teams in being sure adequate support is in place to sustain new initiatives. Principals play an extremely important leadership role in facilitating collaborative efforts by instructional personnel.

Both district and building-level planning should provide staff development opportunities to encourage teachers and administrators to participate in classes, workshops, seminars, and/or professional conferences on cooperative teaching. Motivation is an important ingredient for success, but additional skills will be needed to realize the goals teachers set for themselves and their classes.

Planning also is a factor in selecting the students who will be part of the collaborative process. It is important to keep natural proportions of typical students, students identified as being at risk, and students who have been found to have disabilities. Achieving a balanced classroom is easier at the elementary and middle school levels than at the secondary level, where a certain amount of grouping takes place with course selection.

A major consideration is in arranging planning times for co-teachers. Co-planning must take place at least once a week, according to studies. Planning sessions were viewed as priorities by both teachers; they refused to let other competing responsibilities interfere with their planning sessions (Walther-Thomas, Bryant, & Land, 1996). The planning must be ongoing to allow teachers to review progress on a regular basis, make adjustments, evaluate students, and develop strategies to address problems either in discipline or learning.

Walther-Thomas and her colleagues (1996) found that five planning themes were identified by co-teachers who considered themselves to be effective co-planners:

1. Confidence in partner's skills;
2. Design of learning environments for both the educators and students that require active involvement;
3. Creation of learning and teaching environments in which each person's contributions are valued;
4. Development of effective routines to facilitate in-depth planning; and

5. Increased productivity, creativity, and collaboration over time. Participants in collaborative programs agreed that the time required for planning does not decrease during the year, but the quality of instruction continues to improve.

Different Types of Technology and their Educational Applications

Many different types of technology can be used to support and enhance learning. Everything from video content and digital moviemaking to laptop computing and handheld technologies (Marshall, 2002) have been used in classrooms, and new uses of technology such as podcasting are constantly emerging.

Various technologies deliver different kinds of content and serve different purposes in the classroom. For example, word processing and e-mail promote communication skills; database and spreadsheet programs promote organizational skills; and modeling software promotes the understanding of science and math concepts. It is important to consider how these electronic technologies differ and what characteristics make them important as vehicles for education (Becker, 1994).

Technologies available in classrooms today range from simple tool-based applications (such as word processors) to online repositories of scientific data and primary historical documents, to handheld computers, closed-circuit television channels, and two-way distance learning classrooms. Even the cell phones that many students now carry with them can be used to learn (Prensky, 2005).

Each technology is likely to play a different role in students' learning. Rather than trying to describe the impact of all technologies as if they were the same, researchers need to think about what kind of technologies are being used in the classroom and for what purposes. Two general distinctions can be made. Students can learn "from" computers—where technology used essentially as tutors and serves to increase students basic skills and knowledge; and can learn "with" computers—where technology is used a tool that can be applied to a variety of goals in the learning process and can serve as a resource to help develop higher order thinking, creativity and research skills (Reeves, 1998; Ringstaff & Kelley, 2002).

The primary form of student learning "from" computers is what Murphy, Penuel, Means, Korbak and Whaley (2001) describe as discrete educational software (DES) programs, such as integrated learning systems (ILS), computer-assisted instruction (CAI), and computer-based instruction (CBI). These software applications are also among the most widely available applications of educational technology in schools today, along with word-processing software, and have existed in classrooms for more than 20 years (Becker, Ravitz, & Wong, 1999).

According to Murphy et al, teachers use DES not only to supplement instruction, as in the past, but also to introduce topics, provide means for self-study, and offer opportunities to learn concepts otherwise inaccessible to students. The software also manifests two key assumptions about how computers can assist learning. First, the user's ability to interact with the software is narrowly defined in ways designed specifically to promote learning with the tools. Second, computers are viewed as a medium for learning, rather than as tools that could support further learning (Murphy et al, 2001).

While DES remains the most commonly used approach to computer use in student learning, in more recent years, use of computers in schools has grown more diversified as educators recognize the potential of learning "with" technology as a means for enhancing students' reasoning and problem-solving abilities. In part, this shift has been driven by the plethora of new information and communication devices now increasingly available to students in school and at home, each of which offers new affordances to teachers and students alike for improving student achievement and for meeting the demand for 21st century skills

describe earlier. No longer limited to school labs, school hours and specific devices, technology access is increasingly centered on the learner experience.

Bruce and Levin (1997), for example, look at ways in which the tools, techniques, and applications of technology can support integrated, inquiry-based learning to "engage children in exploring, thinking, reading, writing, researching, inventing, problem-solving, and experiencing the world." They developed the idea of [technology as media](#) with four different focuses: *media for inquiry* (such as data modeling, spreadsheets, access to online databases, access to online observatories and microscopes, and hypertext), *media for communication* (such as word processing, e-mail, synchronous conferencing, graphics software, simulations, and tutorials), *media for construction* (such as robotics, computer-aided design, and control systems), and *media for expression* (such as interactive video, animation software, and music composition).

In a review of existing evidence of technology's impact on learning, Marshall (2002) found strong evidence that educational technology "complements what a great teacher does naturally," extending their reach and broadening their students' experience beyond the classroom. "With ever-expanding content and technology choices, from video to multimedia to the Internet," Marshall suggests "there's an unprecedented need to understand the recipe for success, which involves the learner, the teacher, the content, and the environment in which technology is used."

Universal Design for Learning (UDL) takes advantage of the opportunity brought by rapidly evolving communication technologies to create flexible teaching methods and curriculum materials that can reach diverse learners and improve student access to the general education curriculum (Rose & Meyer, 2002). UDL assumes that students bring different needs and skills to the task of learning, and the learning environment should be designed to both accommodate, and make use of, these differences (Bowe 2000; Rose & Meyer, 2002). To promote improved access to the general curriculum for all learners, including learners with disabilities, Rose & Meyer (2002) have identified three key principles or guidelines for UDL:

1. Presenting information in multiple formats and multiple media.
2. Offering students with multiple ways to express and demonstrate what they have learned.
3. Providing multiple entry points to engage student interest and motivate learning.

For example, printed reading materials pose substantial challenges to the learning of students with disabilities (J. Zorfass: personal communication, October 2005). Technology can assist with such difficulties by enabling a shift from printed text to electronic text, which Anderson-Inman and Reinking (1998) assert can be modified, enhanced, programmed, linked, searched, collapsed, and collaborative. Text styles and font sizes can be modified as needed by readers with visual disabilities; read aloud by a computer-based text-to-speech translators; and integrated with illustrations, videos, and audio. Electronic text affords alternative formats for reading materials that can be customized to match learner needs, can be structured in ways that scaffold the learning process and expand both physical and cognitive access, and can foster new modes of expression through revision and multimedia (J. Zorfass: personal communication, October 2005). It represents one way that technology can support the achievement of students with disabilities.

Steps to Improving Students Achievement Through ICT

Teachers can take the following steps to improve student achievement through technology.

- Determine the purpose of using technology in the classroom, as determined by the specified educational goals. Is it used to support inquiry, enhance communication, extend access to resources,

guide students to analyze and visualize data, enable product development, or encourage expression of ideas? After the purpose is determined, select the appropriate technology and develop the curricula. Create a plan for evaluating students' work and assessing the impact of the technology.

- Coordinate technology implementation efforts with core learning goals, such as improving students' writing skills, reading comprehension, mathematical reasoning, and problem-solving skills.
- Collaborate with colleagues to design curricula that involve students in meaningful learning activities in which technology is used for research, data analysis, synthesis, and communication.
- Promote the use of [learning circles](#), which offer opportunities for students to exchange ideas with other students, teachers, and professionals across the world.
- Encourage students to broaden their horizons with technology by means of [global connections](#), [electronic visualization](#), [electronic field trips](#), and online [research](#) and [publishing](#).
- Ensure that students have equitable access to various technologies (such as presentation software, video production, Web page production, word processing, modeling software, and desktop publishing software) to produce projects that demonstrate what they have learned in particular areas of the curriculum.
- Encourage students to collaborate on projects and to use peer assessment to critique each other's work.
- In addition to standardized tests, use alternative assessment strategies that are based on students' performance of authentic tasks. One strategy is to help students develop [electronic portfolios](#) of their work to be used for assessment purposes.
- Ensure that technology-rich student products can be evaluated directly in relation to the goals for student outcomes, rather than according to students' level of skill with the technology.
- Create opportunities for students to share their work publicly--through performances, public service, open houses, science fairs, and videos. Use these occasions to inform parents and community members of the kinds of learning outcomes the school is providing for students.
- Learn how various technologies are used today in the world of work, and help students see the value of technology applications.
- Participate in professional development activities to gain experience with various types of educational technology and learn how to integrate this technology into the curriculum.
- Use technology (such as an e-mail list) to connect with other teachers outside the school or district and compare successful strategies for teaching with technology info@ncrel.org (2005).

Conclusion

The concepts of individualized instruction, multiple learning styles, team teaching, weekly evaluation, and detailed planning are all of direct benefit to students. The purpose of the collaboration is to combine expertise and meet the needs of all learners.

It is important that teachers receive preparation and classroom support. It is also important that planning time continues to be available throughout the school year. "Most important, all students win by being challenged by collaborating teachers who believe that they are responsible for all children in the classroom" (Angle, 1996).

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**EFFECTS OF INTERNATIONAL EXCHANGE PROGRAMS ON SUBJECT SPECIFIC
COMPETENCES: INVESTIGATION OF THE EXCHANGE PROGRAM BETWEEN THE
MEDICAL SCHOOL OF JIMMA UNIVERSITY (ETHIOPIA) AND THE LUDWIG-
MAXIMILIANS UNIVERSITY (MUNICH)**

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Abstract

To meet the requirements of the increasing globalization in the field of health care, international exchange programs have to be more effective and their influences on the participants must be explored in a more detailed way. Based on the socio-cultural learning theories of Vygotsky, the medical exchange program between Jimma University in Ethiopia and Ludwig-Maximilians University in Munich has been investigated. The list of competences of the Tuning Project for health professionals and the self-assessments of participants to influence their course of education formed the basis for this study. In five qualitative interviews, the participants estimated their competence high in the field of doctor-patient relationships and in the area of specialized communication. It could be shown that it is necessary to use open qualitative Questions to find out which gains participants of this exchange program have, in regard to subject specific competencies.

In terms of the influence on educational careers, the research could show that rather single participants reported a change in their educational careers through the experience during the exchange program. Overall, this study could declare positive effects on international exchange programs on their participants.

Keywords: education; socio-cultural learning; medicin; clinical competence; international cooperation; internationalisation; exchange programs

Introduction

University exchange programs and networks have higher significance in the context of globalization as well as information society. Currently it is unclear, whether the objectives of exchange programs, like qualification and international university networking (DAAD, 2008) have an effect on professional competences, because the design of former studies has been focusing rather on methodical aspects than on theoretical principles (Palthe, 2004 as well as Thomas, Chang, & Abt, 2007, p. 283).

The research concerning exchange programs, especially in the area of medical training, has recently become more important and there is a diverse discussion about the impact of exchange programs (Balandin, Lincoln, Sen. Wilkins & Trembath, 2007 p. 786; Mc Allister, Whiteford, Hill, Thomas & Fitzgerald, 2006, p. 367). This is a result of the increasing implementation of exchange programs in the curriculae of the universities. In this case Drain and colleagues (2009) advocate additional increases in international exchange programs as well as in their funding (Drain, Holmes, Skeff, Hall & Gradner, 2009, p. 320).

The evaluation of exchange programs demonstrates different influences on their participants. In regard to competence training, softskills and job specific competence are promoted (McAllister, Whiteford, Hill, Thomas & Fitzgerald, 2006, p. 369). Professional careers are influenced especially through job specific competence. Moreover, a specific training location (learning culture) influences and decides what will be learned (Wertsch, 1985, p. 67; Zurcher, 2007, p. 71). Based on this assumption the question rises up with influences a specific training location in the field of medicine has on the participants of exchange programs. A closer examination of the existing research documents show that many of the studies and their results are based on a narrow research project. Most of the time, the influence of exchange programs on individuals who travel from an industrial country to a developing country, is examined without searching about the mechanism of this impact.

There is a lack of research about the question why there should be an impact through different “learning cultures” on individuals. The present research wants to verify this topics.

Theoretical framework

At the theoretical level this research has investigated the question, to what extent considerations on social and cultural learning can provide a useful approach to explain learning processes and if they can be extended to contexts of exchange programs.

This requires not only the critical consideration of the educational content offered in these programs, but it must also analyze and evaluate the occurring learning processes. This analysis must be done on a scientifically-founded theoretical basis. So far there are only a limited number of studies that meet exactly this claim. The present work is trying to make a contribution to fill this gap.

The learning theory view of Vygotsky, with his socio-cultural approach is providing a theoretical basis for this study. Vygotsky's approaches are especially suited for this because he turned at his time from an individualistic to a more sociocultural perspective of learning. Learning was placed into a different context, possibly similar to that of an exchange program

Thus at first the central foundations of Vygotsky will be clarified. The concept of the "zone of proximal development” will be discussed and the relationships between learning and culture will be explained.

Socio-cultural learning:

Based on Vygotsky²⁰ a theoretical framework of “socio cultural learning” was acquired. These construct represents a theoretical formation, correspond to the process of learning.

The central construct of Lew Vygotsky’s work about how individuals learn, was the zpd (zone of proximal development). Essential was to comprehend interrelationships between social species in their development of mind (vgl. Vygotskaja & Lifanova, 2000, p. 78). The zpd is based on how Vygotsky understands learning. For him to learn means „promoting subsequent higher levels of development“

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Based on Vygotsky²¹ a theoretical framework of “socio cultural learning” was acquired. These construct represents a theoretical formation, correspond to the process of learning.

Methodology

The research project consists of several research steps with the objective to investigate the subject of research systematically from different perspectives. To analyze the exchange program, a qualitative interview study was conducted.

Overall, the research literature of exchange programs often criticizes the methods which have been used (Edwards, Piachaud, Rowson & Miranda, 2004, S. 689). This refers to possible biases and confounding

variables. The underlying examination attempted to minimize this interference. Therefore it was necessary to use qualitative interviews in first place to clarify processes within the present field of research.

The examined subject-specific competences related to the competence catalog of the Tuning project for physicians (Cumming & Ross, 2007, p. 636). The tuning program understands itself as an "initiative [which was] funded by the European Commission to develop learning outcomes / competences for degree program in Europe and to promote harmonization in the Higher Education Sector" (Cumming & Ross, 2007, p. 636). Therefore the tuning project has formed competence catalogs for different occupational fields e.g. medicine. Due to the high relevance of the competence catalogs for practice, it is advisable to use them as recourse to detect competences. Since there are difficulties to define competences exactly it helps to use a competence catalog created with much effort. In the qualitative interviews this competence catalog was used to discover if participants of exchange programs have a gain in subject specific competence.

Therefore Physicians who were involved as former participants in the exchange program between Jimma University, Ethiopia and Ludwig-Maximilians University, Germany were interviewed. There was a total number of N = 5 people interviewed, one woman and four men. The age range was from 26 to 32 years. The time period of the interviews was from April to June 2009. Overall, the duration was 45 to 65 minutes. Two interviews were face-to-face interviews and three were conducted by telephone.

The experiences of these participants belong to the longer past (around 8 years) and it was expected that they can relate with the necessary distance on their experiences. It was the assumption to find long term effects, because of the long time period between their stay in Ethiopia and the interviews.

Problem-centered interviews were chosen to be the best for the survey. The interviews were theory-based manual-guided and the data-analysis was conducted with qualitative content-analysis (Mayring, 2008). In contrast to the narrative interview, in which a scientific concept was created after the interview, the problem-centered interview was formed by the scientific concept which was conducted before (Lamnek, 2005, p. 361).

Thus, a specific interview guide was written based on the theoretical considerations described so far. The guideline was tested with regard to the intelligibility of the questions of time and the reasonable sequence of questions. Overall, the manual consisted of 31 open questions, intervening short explanations, and a small quantitative survey. The content of the questionnaire was divided as follows:

general conditions and previous experience:

Expectations and goals:

Experiences and impressions:

Important experiences:

Problems or challenges:

Impressive Experiences:

Contact with natives:

Effects and changes:

Tuning „Level 1“ competences:

12 Level 1 learning Outcomes:

education courses

The qualitative content analysis according to Mayring (2008) was used as a deportation proceeding. The content analysis of Mayring verifies and explains the text material methodologically strictly. The material was divided into units and has been processed in stages. Qualitative content analysis is essentially based on a predefined category system. This category system was conducted before analyzing the data.

The entire analysis proceeds were conducted from an initial low level of abstraction to a higher of generalization. The aim was to get closer to a theory-based generalization. Therefore the analysis of the findings is visualized by a table.

Result

First it was important to examine whether the assumption is applicable, that the participants of the exchange with Ethiopia have learned socio-culturally. This is the requirement for the investigation of all further

assumptions concerning this inquiry. In the next step the results of the qualitative interviews used to determine, if the socio-cultural learning in Ethiopia has an influence on subject-specific competencies of physicians. The tuning competency catalog was used for this purpose.

Evidence to socio-cultural learning in exchange programs

In the theoretical framework, the approach of Vygotsky has been used as a theoretical model to explain socio-cultural learning. Central core theses of this theoretical approach have been used to explain the learning process in exchange programs.

Based on statements from the interview of the participants, it was possible to comprehend, that the social interaction, the increased competences and the mentality of local people as teachers were crucial for the learning process. The perceived differences between the two cultures and the different kind of place of learning seem to be important intermediaries of learning. As an example, Interviewer C can be mentioned, who commented on this "by interacting with locals, I learned something that I would not have learned otherwise".

Overall, the qualitative findings show, that most participants in the exchange program indicated, that they had learned socio- culturally within the exchange. It has been determined that the learning process is initiated by the perception of differences between the current attitudes and opinions in its private and professional groups and the foreign social environment.

Influence of socio-cultural learning on subject-specific competencies

The results, to what extent subject specific competences are achieved through exchange programs in socio-cultural learning, is based primarily on the drafted catalog of competences of the "Tuning outcomes of medicine" (Cumming & Ross, 2007 p. 637). The analyzed and abstracted findings of the Level 1 learning outcomes of the qualitative interviews are illustrated in table 1.

table 1: Evaluation of the outstanding questions concerning the level 1 learning outcomes concerning reported gains

Tuning Level 1 Outcomes	person A	person B	person C	person D	person E	Overall
carry out a consultation with a patient	Physicians are not speaking with there patients	Much contact with the patient, diagnoses I've never seen before. But no significant gain	Difficulties, because patient contact has not played a role	Only partly, rarely questions to the patient	Not learned much because of language barriers. Altogether, this is not taken place in Ethiopia	If, then only minor increase - Language Barrier - Patient contact plays no role
assess clinical presentation, order investigation, make differential diagnoses, and negotiate a management plan	no gain	Differential diagnosis a little, but not yet benefited, In the other cases no gain	no gain	no gain	Germany: in training little personal responsibility Ethiopia: you get patient himself (you have to carry the entire sequence itself) negative: a lot of	Up to E, no gains For E important point. The largest gains

					responsibility with little experience	
Provide immediate care of medical emergencies, including First Aid and resuscitation	no gain	no gain	no gain	no gain	one can learn very much, also because in Germany you are not allowed to do it	Except E no gains
Prescribe drugs	no gain	no gain	no gain	no gain	You have to make it on your own, for the German system only medium gain	Except E not gain
carry out practical procedures	no gain	no gain	no gain	no gain	In contrast to German education more because it is really needed and not as in Germany, where it disturbs more.	Except E not gain E In comparison to Germany much gain
communicate effectively in a medical context	Gain because one has to speak English	much discussion on specific systems, syndromes at both sides. How it is in Ethiopia	Communication in general, yes, medically a little	little	Little communication with patients; With colleagues yes, especially in emergencies	the most gains
apply ethical and legal principles in medical practice	no gain	no gain	Most likely, growth to speak at eye level and in dealing with patients	no gain	In ethical principles they are just not interested, but one learns to appreciate it in reverse in Germany	little gains,
assess psychological and social aspects of a patient's illness	Just a little bit, patients from other culture	High gain, syndromes have different significance, and how to deal with it and how to	In the villages, a little learned by seeing the living conditions and hygienic	no gain	Is not taken seriously, Social environment only a little bit	Three had gains, E barely

		declare the patient	conditions			
assess psychological and social aspects of a patient's illness	Just a little bit, patients from other culture	High gain, syndromes have different significance, and how to deal with it and how to declare the patient	In the villages, a little learned by seeing the living conditions and hygienic conditions	no gain	Is not taken seriously, Social environment only a little bit	Three had gains, E barely
apply the principles, skills and know-ledge of evidence-based medicine	no gain	no gain	no gain	no gain	Tried to carry out but is difficult, it is not possible there	no gains
use information and information technology effectively in a medical context	no gain	In the German assistance yes but rather not extremely	Seen how difficult it is to get information	No gain in the Medical Context	Little, because information is only sparsely	no gains
apply scientific principles, method and knowledge to medical practice and research	no gain	no gain	no gain	no gain	Research does not exist, no gain	no gain
work effectively in a health care system and engage with population health issues	no gain	little gain	no gain	no gain	Working independently, to explore disease areas that are not important for germany (areas such as tropical medicine)	little gain

Based on this results it may be noted, by asking about gains in regard of the specific tuning outcomes only minor implications can be found. But looking at the statements of the Interviewees regarding the open Questions, there are a variety of statements which can be attributed to gains in the field of the specific tuning outcomes.

From the qualitative findings regarding the question to what extent the socio-cultural learning in exchange programs has an impact on the acquisition of specialized skills, following can be noted:

The result of the five qualitative interviews indicates the difficulty in determining effects by using the level 1 outcomes. It turned out to be much easier when the participants were able to report freely from their experiences. Considering the statements of the interviewees, there were statements, which suggest a variety of influences on subject-specific competencies. Most respondents reported gains in the area of doctor patient consultations. Overall communication and interaction with locals is most important for the participants of the exchange with the Jimma University.

Discussion

In the following section, not only the question appears if the exchange program has an impact on the competences of the participants, but it is also interesting which learning process leads to these results.

In this study it was demonstrated that the socio-cultural learning in exchange programs is characterized through the process of mirroring. By interacting with local people there is a raising awareness of the difference between ones attitudes and opinions and those of the locals. Participants are confronted with challenges and situations of crisis, so that this leads to a learning process. Gutierrez and Stone (2000) and also Engeström (1986) illustrate this point, as already shown in the theoretical part, thus it can be triggered by raising awareness of uncertainties and crises. Crisis means the questioning of its own position by reflecting on the foreigners, the deviants. There is a change in perspective, which plays an important role in successful learning, especially in socio-cultural contexts. These learning mechanisms could be identified in the exchange program between the Jimma University in Ethiopia and the Ludwig-Maximilians University Munich.

After having discussed the processual aspect of learning, now the results of learning, the so called outcomes, are discussed. It is primarily adjusting to the doctor - patient relationship, where gains were described by the respondents. Through the experience of another doctor- patient relationship in Ethiopian Hospitals, participants are receiving an insight into how much important this area is for the medical practice. At the same time they will be clear in mind of current practice in Germany. This shows the learning mechanism that is triggered by differences. It is remarkable that the interviewees reported mostly gains in the area of doctor patient interaction and on communication with colleagues. This specific communication competence has recently become much more important in medical education as well as it appears to be particularly important for clinical practice (Cumming & Ross, 2007). This is also the area which was increasingly focused through the introduction of a new Medical Licensure Act in Germany launched in 2003 (Güntert, Wanner, Brauer, and Stobrawa, 2003, p. 22).

Looking at the different increases, it is possible to find similarities between them. The areas are characterized by interaction. It is both the interaction between doctor and patient and the professional interaction with other doctors which are covered by these gains. Therefore it can be considered that staying in Ethiopia is leading to a higher self-assessment, when it comes to the ability to interact with others. Remarkable is the close connection between the learning process itself and what is being learned. In other words, it means that the participants achieve a gain in interaction by interacting through socio-cultural learning.

The requirement of Balandin, Lincoln, Sen, Wilkins and Trembath (2007) through medical exchange programs especially outcomes should be promoted, which have a high relevance especially for their own health care system, is fulfilled in the present results (Balandin, Lincoln, Sen, Trembath & Wilkins, 2007, p. 786). As the research could show, the participants had gains in communicative competences. This again is highly important for medical practice in Germany.

The main contribution Vygotsky made for the explanation and understanding of learning was that he stressed out the importance of mediation, e.g. the mediation of tools. The effect of mirroring ones cultural background on the foreign culture and consciousness of diversity is also a subject of mediation process. The local people in an exchange program can be understood as mediator, as a "mediation tool". These considerations are an extension of Vygotsky's ideas, because here in the exchange program two main

approaches are linked together. On one hand there is the role of locals as an intermediary, on the other hand, there are the experienced differences between cultures, which set in motion a learning process. According to Vygotsky the place of learning or the learning environment is a very important factor for learning.

When discussing learning locations it has to be distinguished between the place of learning, and where it is applied. For the organization of international exchange programs the question raises, where learning programs should take place in the most useful way. This current examination provides evidence that the learning process at such an extraordinary place like Ethiopia, causes processes which have particular importance to meet the requirements in a globalized world.

In total the use of the Tuning outcomes, as an already elicited catalog of competences, turned out to be helpful only as evaluation tool of the free statements of the interviewees. For future studies it would be necessary to explore these results by using quantitative analysis.

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FITTING ICT AND TECHNICAL WRITING SKILL INTO TEACHERS' PRODUCTION PROGRAMME FOR QUALITY ACHIEVEMENT OF THE MILLENNIUM GOAL

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Abstract

This paper puts forward another idea that can enhance the achievement of the educational goal with specific skill such as introducing the course 'Technical and Scientific writing for all students in Colleges of Education. The paper suggests some measures in the method of impacting the skill that can be improved upon for the realization of the national millennium development goal in developing countries. It highlights the goals of teacher's education in consonants with technical writing. The paper approaches the agitation in a semi-empirical style of presentation using such elements as statement of problem, purpose questions and significant of the idea. It further states the scope necessary for implementation of the agitated idea. The part that teaching and learning play in this proposal and the specific perspective of each were fully explained and conclusion drawn with summarized strong worded appraisal which agitates that Technical and Scientific Writing as a course be made compulsory to all students of teachers training programmes especially in Colleges of education.

Introduction

The most common and effective slogan of the millennium development goal is “*education for all...*” initially completed with the phrase *....in year 2000*” but Nigeria with more than ten years behind that schedule has not dropped the idea. Several efforts have been put in places awaiting the fulfillment of that dream. One of such efforts for the achievement of that dream is here in this paper postulated.

The provision of education for all has been a major concern of most countries since the international declaration in 1990. According to Obinajo (2008), the issue has gained global impetus with five international agencies such as (UNESCO; UNDP; UNFPA; UNICEF and the World Bank) spearheading the movement. She further affirms that precisely 189 heads of governments including Nigeria reached an agreement to end extreme poverty, target education, environmental sustainability, etc. popularly known as the Millennium Development Goals (MDGs). Technical and Scientific Writing is an information communication technology skill that entails all learning experiences that have to do with proper writing presentation of the information communication technology. Ensuring education for all in this modern technological era should best be done through the actual knowledge and understanding of all that are entail in written presentations.

Since the independence of some developing countries, the society generally has witnessed a lot of phenomenal developmental changes in areas of Politics, Agriculture, Science and Technology. Communication as well has keen competition in education sectors. ICT now plays a dominant roll and presented written information in every student-teachers' life becomes very vital. In all, quality and modernization of concepts and ideas written information to covey the intended meaning adequately have in recent time always been identified as one area mostly in need of attention for student teachers' improvement in developing countries to achieve certain goals by socio-economic analysis.

The idea in Technical and Scientific Writing is as important as human in resource for national development. Man in nature's demands and requirements, must respond to instruction accordingly. Everything man does is for the achievement of objectives. Technically in writing is as eminent as man. Accordingly, information presented in written form is as man desire and require such in correct order and form. The proper presentation of information to actually depict real intent in appreciative form, adequately calls for one who is also perfectly groomed for the work for perfect or adequate result. Technical and scientific writing training is the only art that can offer such skill. Just as word are produced in the right terms, sequence and tenses for a given or intended meaning, so must the presentation of such be sine-qua-non and apt to be effectively handled for the best way of giving adequate training as to achieve these goals.

The National Policy on Education (NPE) in its philosophical base stipulates among others education is for the development of the individual into a sound and effective citizen and for the provision of equal access to educational opportunities. It intends to achieve its goals among others through the inculcation of the right type of values and attitudes for the survival of the individual and the acquisition of appropriate skills and the development of mental physical and social abilities and competencies as equipment for the individual to live in and contribute to the development of the society. To this end teachers' education which is the pivot around which this aim can be achieved need be properly equipped to provide the best intended. In consequence, the quality of instruction at all levels especially in teacher education programmes has to be oriented towards inculcating the values of the acquisition of competencies necessary for self-reliance. The NPE further affirms that teachers' education shall continue to be given major emphasis in all educational planning and development. This in effect endorses the facts agitates here in this paper on offering technical and scientific writing to all levels of educational programmes. To this end, the goals of teachers' education need be revisited.

The Goals of Teachers' education in Consonant with Technical Writing

The National Policy of Education spelt out the goals of teachers' education among others to include, the production of highly motivated, conscientious and efficient classroom teachers for all levels of our education system. It also intends to encourage further the spirit of enquiry and creativity in teachers; and provides teachers with the intellectual and professional background adequate for their assignment and make them adaptable to changing situations.

On the other hand technical and scientific writing is a specialized form of exposition or writing which is concerned with the communication of idea in a form that the reader can understand and use. Technical writing covers a broad spectrum of expression that transcends science and technology. It provides the technical knowledge and vocational skills necessary for development to certain individuals. It also gives training and imparts the necessary skills to individual who shall be self reliant economically. The techniques of technical writing that comprises orderly delivery of ideas, consideration of audience intelligence levels for medium of expression and explanation of new concepts used has the quality of clarity, logically, accuracy and brevity highly maintained.

The fact that the understanding level of audience and terms assumed to be out of place for the audience are put into consideration before imparting new knowledge are technical writing skills that are in agreement with the making of teachers.

According to Ozuruoke (2007), universities, colleges of education, polytechnics and other vocational institutions have curricula in the field of business and vocational education that they embrace. This does not cover technical and scientific writing.

Statement of Problem

Several nations are witnessing lots of phenomenal developmental changes in every sphere of life from the industrial revolution through the jet age down to the present computer and other electronic media age that now hinge on Information Communication Technology. Even Newspaper, magazines, periodicals of various nature as well as reports of organizations are rolled out daily for the consumption of the general public. Techniques are required to make these write-ups palatable. Again, teachers are in the most expected point of discharging these functions of making any one adequate in this area of writing. Good writing techniques certify the conditions of enable any written contact system all over the globe. The *art of these writing techniques* in operations ought to be perfect and accurate to really conform to the quality desire associated with the global rapid growing socio-economic reading and writing life. This is the state everyone who conveys message or information through written documents ought to be operating on in life now. But not all can do it due to the ignorant and or inability of some to realize that there are techniques that are involve in communicating that makes it adequate, creating a gap in the fast intended global communication link. Some have to wait or seek for others to assist them in editing or even doing the writing itself. This becomes the problem identified and proposed to be tackled herein with the assurance that critical look and implementation of the agitated idea will yield the anticipated positive improvement especially in the process of making the teachers.

Purpose

This skill development technique, if adopted is capable of ensuring that information communication techniques can be applied, perfectly handled by almost every productive person in the teaching profession if not all as a sure quality education for millennium development goal in the developing countries.

Inducing Questions

1. What is or are the specific degree or course programme pre-requisite to the learning of writing techniques and their application and operation?
2. Who are the specific set of persons that ought to know and use writing techniques for communication of information?
3. What are the relevant programmes associated with the skill acquisition of technical and scientific writing?
4. On what occasion or condition does the use of technical and scientific writing becomes necessary in the society.

Significance of this development Option

Fruitful objectives in investment are gainfully reaped when results are promptly communicated. This skill educational option of ensuring that every teacher becomes technical and scientific writing compliance will definitely encapsulates both private and societal economic growth which is the main goal of any developing nation.

Scope of Implementation

This education development technique can be adopted by any nation, state or area as technical and scientific writing is paramount these days. However, this is highly recommended for especially those within the teaching profession. Concentration can be on those who may be running the teaching profession programmes in tertiary institutions.

Teaching and Learning as Relating to Technical and Scientific Writing Skill

The art of imparting and receiving education, as relating to ICT and Keyboarding will fully be comprehended with a revisit to their meanings. Arolasafe (2004) has ICT defined as “Information and Communication Technologies are computing and communicating facilities and features that varies by support teaching and learning, and that it includes a range of activities in education”. Technical and scientific writing is one and major among the activities so stated, especially in the present written media

revolutionary trend. It's concept and application involves the use of elements such as charts, graffiti, cartoons, silhouette, connotation, etc. Most among technical and scientific writing related activities include clarity, logical, accuracy succinctness or preciseness and other devices to reveal effective and sequences on technical writing, developing special awareness and psycho-motor control. It is further stated that technical and scientific writing has a number of features which makes it particularly suitable for teacher education. This includes:-

- (a) Combination and integration of full range of media essential for effective learning since technical and scientific writing uses sound and vision from electronic media, text and periodicals like newspaper, magazines, signposts, etc.
- (b) Provision of new opportunities to teachers and learners as well as involving all in the prevailing global village through writing.
- (c) Provision of new economic and business participation involvement opportunities in the world no matter the distant apart as newspaper and other periodicals are found in almost every nuke and cranny.
- (d) Interest increase and involvement on the part of students and even teachers' relationships as provided by lesson aids, instructions, information in written form that even enhance enthusiasm.
- (e) Then opportunity of enabling students or learners generally to work and learn on their own with the aid of reading and writing.

From the above facts it should be understood that the major objectives of scientific and technical writing are to produce a clear, logical, accurate, and succinct piece of literature for a specific use or purpose.

These new technology have become central to contemporary teachers whether you are working in an office or in the field of studies. Every person in one way or the other is using scientific and technical writing. Arolasafe (2004). Summarized the general use of ICTs in which technical and scientific writing is included that will enhance national development in the present dispensation that it:

- Help in school administration
- Train students in skill for future use and for learning process
- Provisions of assess to information and communication out-side via written media
- To support teacher development via external written materials
- Support and potentially transform the learning and teaching process.

For so, it is crystal clear that skill of technical and scientific writing is eminent and ought to be embarked upon since our nation have a very high need for achieving the intended millennium development goal. A clear process of doing this is through a formal educational system of teaching and leering. It becomes imperative here for this paper to specifically outline the perspective through which it can be achieved.

Teaching Perspective for Developing Technical and Scientific Writing Skill

This part of the paper considers the teaching or training aspect of developing the KEYBOARDING SKILL for the ICT compliance, for pre-service and the in-service personnel and others generally refers to as learners. This should be seen as an essential component for successful application of ICT skill across societal technological acquisition generally. This implies that Keyboarding for ICT is a tool for enhancing education and training of students, teachers and others as well as a tool that teachers can use to enhance their development and job at hand. Arolasafe (2004), sees training as a key requirement.

Teachers have been polarized in their acceptance of the new technologies while some have enthusiastically integrated computer and the internet into the classroom, others have been cautions in their welcome and some have simply rejected the technologies probably for fear and lack of keyboarding skill. There is a level of unjustifiable cynics base on previous experience of disregard for secretarial skill (Shorthand Typewriting)

yet the reversible love for electronic typewriter as down to the present computer has not completely wiped out the disrespect and dishonour for the so called “Commercial Subjects” Osofisan (2004) in support said that with the inevitable proliferation of ICT even in the classrooms, the role of the teacher must change to bridge the lax gap created by the previous perceptions. Arolasafe (2004), has four recommendations as reasons for this to happen. Thus:

- (a) Because ICT will cause certain teaching to become absolute and new electronic forms of distributed information communication must be employed.
- (b) ICT may also make some assessment methods redundant as on-line test can easily be used as information associated with previous score records of each successive tests results can be entered automatically.
- (c) It will be crucial for teachers to encourage critical thinking skill, promote information literacy, and nurture collaborative working practices to prepare children for a new world in which no job is guaranteed for life and where people switch careers several times, as the internet gives access to an exponentially growing storehouse of information sources due to almost unlimited networks of people and computers and unprecedented learning, research and jobs or working opportunities. Unfortunately, misinformation and inaccuracies are similarly present in great numbers on the internet so one of the new roles of the teacher within the electronic classroom will be separate out quality information from misinformation identification, classification and authentication of electronic information sources will be critical new tasks for teachers.
- (d) Teachers must begin to reappraise the methods by which they meet children’s learning needs and match curricula to the requirements of human thought. The internet can be the most excellent way to adapt information to meet their characteristics of human information processing. Traditional methods of imparting knowledge such as lectures, books and the conference papers are characterized by a linear progression of information. Human minds are more adaptable than this and refocusing for national development achievement becomes students with the non linear means to match human thinking process.

In addition to the above, various significant and unique opportunities are provided by ICT which technical and scientific skill can enhance for national development when used for developments of human resources. Among them are:

- It provides stimulation of specific psycho-motor skill through mini and micro-lessons which can be watched, manipulated and tested with signs, illustrations, abbreviations etc. ICT with technical and scientific writing can also provide demonstrations of real teachers in real classroom settings representing a range of subjects, approaches and methodologies. These demonstrations can then be dissected, analyzed, watched again, and assessed over time without disrupting an actual class.
- It enables teachers education to be provided at a distance to the trainees location, thereby saving travel time and cost and also avoiding disruption of classroom routines as teachers can learn at their own time.
- It allows education to take place any time and any place as well as allows learning on demand whether they are ready or not.
- Since teachers often have to deal with changes in knowledge methodologies, pedagogical issues, students or learners and school culture, professional isolation on initial and specialized training ought no longer to be invoke ICT keyboarding skill allows education especially the finger skill to communicate, exchange information, interact in chat rooms and on bulletin boards, and hold discussion forum and visual conferences on screen with the use of the finger on keys of the ICT equipment.
- Use of technology for teacher also enables the teacher to acquire extra finger usage technology.

With the bountiful benefits so far highlighted here, the numerous barriers and challenges which Arolasafe (2004) stipulated may be considered to affect the smooth implementation of the idea in context here as stated below thus:

- Lack of teachers' confidence and computer anxiety
- Lack of technical and scientific writing skill competence as combination to computer knowledge.
- Lack of access to resources to technical equipment required
- Lack of time for the inculcation of both in learning periods
- Technical problems especially power source
- Resistance to change and negative attitudes
- No perception of benefits
- Impact of public examinations
- Age differences and gender differences

Challenges such as programme seem to often cover one aspect only; not training teachers in the productivity skills development of both. Course may be programmed as only being supply-driven without teachers demand as inputs. Benefits often overstated leading to fanaticism and frustration when not readily realized. Training is never enough once-off especially international and some never-do0without learning purposes.

All these are ideas of the past with the inculcation of ICT and technical writing skill national development technologically through teachers' programmes us really assured to be achieved.

Conclusion

Proper adoption into the rapid changes in technology including technical and scientific writing skill will ensure that ICT and technical writing skill will proliferate into all classroom activities being scientific in nature and subsequently into a general all round digital techniques in information presentation operations. It is predicated that there will be many benefits for both the learner and the teacher. ICT with technical writing skills will also require a modification of the role of the teachers, who in addition to classroom teaching will have other skills and responsibilities in information communication management and control. Many will become specialist in the use of distributed learning technique the design and development of shared working spaces and resources and visual as well as real guides for students who use electronic media in relation to technical and scientific means.

Ultimately, the use of ICT will enhance the learning practice experiences for teachers, students as well as for other intended learners, helping them to operate, think and communicate creatively. This no doubt enhances national development. ICT keyboarding will also prepare our children and/or all categories of learners for successful live and skilled career in an increasingly technological world as the present global digital dispensation. The goal education for all no matter how delayed, must definitely be achieved at the long run.

This paper so far, tried to bring to light the importance of refocusing on ICT keyboarding in education processes generally and how the different and varying components underlining this current global digital revolution can be used for teaching and learning in both the classroom and outside learning environments. It also brought to light what individuals and co-operate bodies can achieve as per national development with these skill and however stressed that this absolutely depends on the support of trainees and trainers as well as from all educational administration institutions, organizing or managing bodies as well as the prevailing intentions. In fact, this paper assures that you can be your own boss today with a national education development goal generally on ICT Keyboarding in particular.

SUMMARY

Technical and scientific writing skill ought to be a must task for any professional teacher in an Information Communication Technology compliance society to enhance societal individual development. Thus invariably will result to sustainable poverty alleviation as well as achieving major development goals of any given country.

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A NUMERICAL MODEL FOR STABILITY ANALYSIS OF PRE-CRACKED BEAM-COLUMNS

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Abstract

The paper reports results of the stability analysis of pre-cracked beam-columns. A stiffness reduction parameter due to pre-crack is first calculated, which is used in the equilibrium equations for buckling analysis. Stiffness and stability matrices are derived from the resulting equilibrium equations using the finite difference procedure. An object oriented code in java is developed based on the inverse power method for the extraction of the smallest eigen value corresponding to the critical load. The calculated parameter is then used to calculate the reduced buckling load due to pre-crack. Results obtained compare well with published results in the literature. It is concluded that the parameter k is a good indicator for monitoring stiffness degradation due to pre-crack and that java programming language which is mainly used for commercial and internet applications is a candidate tool for fracture mechanics computations.

Keywords: Pre-crack, stability, Beam-columns, Java code, Stiffness reduction.

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1. Introduction

It is well known that imperfections such as cracks and initial crocked ness reduce the load carrying capacity of columns and beam-columns [1-7,9]. The presence of cracks in structures has the consequence of changing the dynamic characteristics such as changes in mass distribution, natural frequencies which can lead to resonance and damping properties. Modification of stress fields due to cracks and the decaying nature of these stress fields with distance away from the crack location, renders quantification of these defects for the purpose of failure analysis difficult [1-7,9,11-13].

Cracks also introduce a zone of discontinuity in the region of interest, which makes choice of solutions and analytical modeling of the problem difficult.

Analytical research on buckling of circular rings and columns with cracks have been reported by Dimarogonas [19] using perturbation method, Liebowitz et al [1] and Liebowitz and Claus [2] used sine and cosine functions to model buckling loads for pre-cracked columns. Their model was approximate as it disregarded the discontinuity of the sine and cosine functions in their study. Capuani and Willis [11] have used asymptotic expansions to study wave propagation behaviour of cracked structures and concluded that the presence of a crack introduces wave scattering at the crack location. Analytical studies on conservatively loaded beam-columns have been reported by Jiki [9] who used Liapunov's second method of stability analysis in conjunction with eigenvalue in equalities to obtain reduced load carrying capacities of pre-cracked beam-columns and concludes that the presence of cracks accelerate the process of failure either by buckling or by fracture.

Numerical studies employing the finite element method to study pre-cracked structures have been reported by: Papadopolus[12], Chondros and Dimarogonas[6]. It is interesting to point out here that most of the finite element programs used to process the above cited numerical studies used procedural codes mainly using fortran. However, for the past decade or so, attempt has been made by shifting emphasis on

procedural codes to object-oriented codes to process the finite element equations as can be seen from works by Mackie [14], Jiki [8] and Nikishkov [20].

However, to the best knowledge of the present writers, no numerical code using Java programming language has been used to process the stability characteristics such as eigenvalues and eigen vectors for pre-cracked columns or beam-columns employing either the finite element, boundary element or the finite difference methods.

The choice of Java programming language as a tool for processing our eigenvalue equations is in line with current development in computational technology where object-oriented programming is considered more efficient in terms of program modification, code reuse, data abstraction, encapsulation and program extendibility. More so, a java code is platform independent as the compiler comes with a complete Java Development Kit (JDK).

Thus, the purpose of the present work is to use the newly developed java code to process the stability characteristics of the pre-cracked columns of interest.

Contribution:

- (a) Stiffness reduction parameter k due to crack is proposed.
- (b) A new object oriented code in java for stability analysis is announced in Jiki [8].
- (c) A specific class coded in java for rapid calculation of the proposed stiffness reduction parameter k is proposed to extend the code reported in Jiki [8] and is shown here in appendix A.

2. Calculation of stiffness reduction parameter k .

Consider an open thin-walled column with section as shown in figure 1. The column has width w , length L and thickness b . For such a structural member with an edge crack Erwin and Griffith (Knott and Elliot [7]) have shown that the compliance derivative is related to the strain energy release rate of the cracked body in bending as:

$$G_1 = \frac{1}{2} Q^2 \frac{dF}{dA} \tag{1}$$

In which

Q provides the bending tension opening up the crack.

F is local compliance (flexibility) due to crack

A is surface area of the cracked section.

The stress intensity factor k_1 for mode 1 opening (failure) as shown in figure 2 for the cracked body is defined by Knott and Elliot [7] as a measure of the magnitude of crack tip singularity. It is related to the strain energy release rate G_1 of the cracked column as:

$$G_1 = \frac{1-\nu^2}{E} k_1^2 (\nabla \text{ plain strain}) \tag{2}$$

in which

ν is Poisson's ratio

E is Young's modulus

From equations (1) and (2) we have

$$\frac{1}{2} Q^2 \frac{dF}{dA} = \frac{1-\nu^2}{E} k_1^2 (\nabla \text{ plain strain}) \tag{3}$$

It is assumed in the present work that the column buckles due to (P δ) moment Q . Q can also be provided by eccentricity of loading. Q is needed to provide the driving force to open up the crack leading to crack propagation.

The mode 1 opening stress intensity k_1 , is given by Bentham and Koiter [4] as:

$$k_1 = \frac{6Q}{a} k_0 \left(\frac{c}{aw}\right)^{1/2} \tag{4}$$

In which k_0 is dimensionless stress intensity factor given as [9]

$$k_0 = 1.122[1 - 2.217(\frac{c}{w}) + 0.523(\frac{c}{w})^2] \quad (\forall(\frac{c}{w}) \rightarrow 0) \quad (5)$$

H is the width of the strip or column section.

$a = w - c$ (see figure 1)

$c =$ crack length

$Q =$ moment opening crack.

A buckling problem is a plain strain problem and by using equation (3), the compliance derivative of the cracked section is given as:

$$\frac{dF}{dA} = \frac{2(1-\nu^2)}{EQ^2} k_1^2 \quad (6)$$

The surface area of the cracked section per unit width of crack is given as:

$$A = c \times 1 \quad (7)$$

and

$$\frac{dA}{dc} = 1 \quad (8)$$

Therefore

$$\frac{dF}{dc} = \frac{2(1-\nu^2)}{EQ^2} k_1^2 \quad (9)$$

Usually it is expected that for buckling, $k_1 \ll k_{1b}$ in which k_{1b} is the buckling stress intensity factor.

From equation (4) we have:

$$k_1^2 = \frac{36Q^2 k_0^2}{a^3} (\frac{c}{w}) \quad (10)$$

Substitution of equation (10) into equation (9) and integrating gives the compliance as:

$$F = \frac{72(1-\nu^2)}{Ea^3} \int k_0^2 (\frac{c}{w}) dc \quad (11)$$

in which

$$k_0^2 = \{1.122[1 - 2.217(\frac{c}{w}) + 0.523(\frac{c}{w})^2]\}^2 \quad (12)$$

Therefore

$$\int_0^c k_0^2 (\frac{c}{w}) dc = c[-1.25888 + 4.098(\frac{c}{w}) - 2.6339(\frac{c}{w})^2 + 1.15968(\frac{c}{w})^3 - 0.7845(\frac{c}{w})^4 + 0.579(\frac{c}{w})^5] \quad (13)$$

Substitution of equation (13) into equation (11) gives the local compliance F as:

$$F = \frac{72(1-\nu^2)c\xi}{Ea^3} \quad (14)$$

In which

$$\xi = [-1.25884 + 4.0498(\frac{c}{w}) - 2.6339(\frac{c}{w})^2 + 1.15968(\frac{c}{w})^3 - 0.7845(\frac{c}{w})^4 + 0.579(\frac{c}{w})^5] \quad (15)$$

If F is the compliance of a cracked body obtained by stress function method and F_0 is the compliance of the same body obtained by crack mouth opening displacement (COD) then the non-dimensional compliance $F^* = \frac{F}{F_0} = \frac{1}{k}$

$$(16)$$

Now

$$F_0 = \frac{v}{Q} = \frac{\text{crack mouth opening displacement}}{\text{Applied moment}} \quad (17)$$

Remark 1. The assumption made for this case of edge crack is that failure will be due to buckling by crack mouth opening at one side providing maximum opening on that side during bending of the column. To achieve this Liebowitz and Claus [2] have used load eccentricity. In this work we use either load eccentricity or $p\delta$ to achieve the above goal.

Thus for the edge crack shown in figure 1, it can be shown that (Liebowitz and Claus[2])

$$2v = \frac{4\sigma}{E} (1-\nu^2)(c^2 - x^2)^{1/2} \quad (18)$$

For maximum v we have $x = 0$. equation (18) becomes:

$$v = \frac{2\sigma c}{E} (1-\nu^2) \quad (19)$$

Substitution of equation (19) into equation (17) we have

$$\frac{v}{Q} = \frac{2\sigma c}{EQ} (1-\nu^2) \quad (20)$$

but

$$\sigma = \frac{Q}{Z} \quad (21)$$

$$\text{Therefore } \frac{v}{Q} = \frac{2c(1-\nu^2)}{EZ} = F_0 \quad (22)$$

In which Z is the elastic modulus of the section given for a rectangular section as:

$$Z = \frac{bw^2}{6} \text{ (the strip shown in figure 1)} \quad (23)$$

Thus the non dimensional compliance

$$F^* = \frac{1}{k} = \frac{72(1-\nu^2)c\xi}{Ea^3} x \frac{EZ}{2c(1-\nu^2)} \quad (24)$$

$$F^* = \frac{36Z\xi}{a^3} \quad (25)$$

Substitution for Z from equation (23) into equation (25) gives:

$$F^* = \frac{6bw^2\xi}{a^3} \quad (26)$$

But from figure (1) and equation (7) we have:

$$a^3 = (w^3 - 3w^2c + 3wc^2 - c^3) \quad (27)$$

Therefore the non dimensional stiffness

$$k = \frac{(w^3 - 3w^2c + 3wc^2 - c^3)}{6b^2w^2\xi} \quad (28)$$

By dividing equation (28) top and bottom by w^3 gives:

$$k = \frac{[1 - 3(\frac{c}{w}) + 3(\frac{c}{w})^2 - (\frac{c}{w})^3]}{6(\frac{b}{w})\xi} = \frac{Y_1}{Y_{11}} \quad (29)$$

in which

$$Y_1 = [1 - 3(\frac{c}{w}) + 3(\frac{c}{w})^2 - (\frac{c}{w})^3] \quad (30)$$

$$Y_{11} = 6(\frac{b}{w})\xi \quad (31)$$

3. Finance Difference Model

The buckling loads for axially loaded non uniform columns which buckle in flexure can be obtained from the governing differential equation for small deflection theory of bending as [15]:

$$EI_x \frac{d^2 y}{dx^2} = -M_x \quad (32)$$

In which

E is Young's modulus, x is distance along the length of the column measured from one end and I_x is the second moment of area about the mid axis of the non uniform column and M_x is bending moment. When our proposed stiffness reduction parameter k of equation (29) is introduced into equation (32) we have:

$$EI_x (1 - k) \frac{d^2 y}{dx^2} = M_x \quad (33)$$

Then the finite difference form of equation (33) is written as [15]:

$$EI_x (1 - k)(y_{i-1} - 2y_i + y_{i+1}) = M_x \quad (34)$$

In which y_{i-1} , y_i and y_{i+1} are lateral displacements at three stations covering two segments length h for a column of length L which is divided into L/h equal segments. Application of equation (34) and other similar difference equations at a number of stations yields a set of homogeneous equations leading to the matrix eigen value equation of the form

$$[A]\{y\} = \lambda[B]\{y\} \quad (35)$$

In which

[A] and [B] are matrices, $\{y\}$ is eigen vector and λ is an eigen value. Solution of equation (35) by the inverse power method of matrix iteration leads to the smallest eigen value corresponding to the lowest (critical) load for the column. To show the form of finite difference equations leading to matrices [A] and [B] we consider a fixed-free column from ref[15] as shown in figure 4 of the present work. The bending equilibrium equation for this column is[15]:

$$EI_x (1 - k) \frac{d^2 y}{dx^2} = M_x = P(y_o - y) \quad (36)$$

In finite difference form equation (35) is written as:

$$y_{i-1} - 2y_i + y_{i+1} + \lambda(y_o - y_i) = 0 \quad (37)$$

In which

$$\lambda = \frac{Pl^2}{\pi^2 EI} = \frac{P}{P_e} \quad (\forall l = \frac{L}{3}, \text{ and no crack}) \quad (38)$$

By using our derived stiffness reduction parameter k into equation (38) we have

$$\lambda = \frac{Pl^2}{\pi^2 EI(1 - k)} \quad (39)$$

The boundary conditions for the fixed –free and other column types are available in ref[15] and are not reproduced here. Equation (37) is further discretised as follows:

$$\left. \begin{aligned} y_0 - 2y_1 + y_2 - \lambda(y_0 - y_1) &= 0 \\ 2y_1 - 2y_2 + y_3 - \lambda(y_0 - y_2) &= 0 \\ 3y_2 - 2y_3 + y_4 - \lambda(y_0 - y_3) &= 0 \end{aligned} \right\} \quad (40)$$

Equation (40) is written in matrix notation as [15]:

$$\begin{bmatrix} 1 & -2 & 1 \\ 0 & 1 & -2 \\ 0 & 0 & 2 \end{bmatrix} \begin{Bmatrix} y_0 \\ y_1 \\ y_2 \end{Bmatrix} = \lambda \begin{bmatrix} 1 & -1 & 0 \\ 1 & 0 & 1 \\ 1 & 0 & 0 \end{bmatrix} \begin{Bmatrix} y_0 \\ y_1 \\ y_2 \end{Bmatrix} \quad (41)$$

Equation (41) is exactly in the form of equation (35). This completes our finite difference discretization of the cracked non uniform column. Equation (41) is transformed to standard eigen value format for solution by the inverse power method.

4. Characteristics of pre-cracked columns

In this section we study the effect of pre-crack on strength and deflections of columns. We use ideas presented in the previous sections to achieve our goal. In section 2 of the present work we have derived a parameter k that reduces the stiffness of a cracked column progressively as the crack grows or propagates to failure. Figure 5 shows plot of relationships between the stiffness reduction parameter k and the flexural stiffness EI which in this case is a linear relationship.

One of the effects of an edge crack on the strength of a beam column in flexure is that it reduces the flexural stiffness of the cracked beam column making it more flexible to deflect under the applied load. In order to study this particular effect, Okamura et al [5] have proposed an equation for the calculation of deflection in pre-cracked columns and beam columns under eccentric axial load as:

$$\frac{\delta}{e} = \frac{1}{\cos \alpha L - \beta \alpha \sin \alpha L} - 1 \quad (42)$$

or

$$\frac{\delta}{e} + 1 = \frac{1}{\cos \alpha L - \beta \alpha \sin \alpha L} \quad (43)$$

In which

$$\alpha = \sqrt{\frac{P}{EI}} \quad (44)$$

β is crack parameter, δ is deflection, e is eccentricity needed to open the crack, L is effective length of the column. However, in order to calculate the deflection of pre-cracked beam columns and columns using our proposed crack parameter k , we modify equation (42) by Okamura et al [1] as follows:

Let

$$\beta \alpha L \tan \alpha L = k \quad (45)$$

in which

k is our proposed mode 1 crack opening parameter. Then we write equation (42) in our method as:

$$\frac{\delta}{e} + 1 = \frac{1}{\cos \alpha L (1 - k)} \quad (46)$$

Equation (42) by Okamura et al [1] and our modified equation (46) are plotted in figure 6 and the comparison is very good.

Still on the calculation of deflection we consider a column which is simply supported at both ends with an initial imperfection of the form [10]:

$$y_0 = a_0 \sin \frac{\pi x}{L} \quad (47)$$

When the strut is loaded by a force P, the compressive stress at any cross section is given as the sum of $\frac{P}{A}$ and $\frac{M}{Z}$. The additional deflection at a point x from the origin is v and we have the equation of equilibrium for the uncracked column as [10]:

$$EI \frac{d^2 y}{dx^2} = P(y + y_0) = M_x \quad (48)$$

or

$$\frac{d^2 y}{dx^2} \alpha^2 y + \alpha^2 y_0 \sin \frac{\pi x}{L} = 0 \quad (49)$$

when the column has a crack at the middle in addition to an initial imperfection of amplitude a_0 we modify equation (48) as:

$$EI(1-k) \frac{d^2 y}{dx^2} = M_x \quad (50)$$

Similarly equation (49) is modified to:

$$\frac{d^2 y}{dx^2} \alpha_c^2 y^2 + \alpha_c^2 a_0 \sin \frac{\pi x}{L} = 0 \quad (51)$$

in which

$$\alpha_c = \sqrt{\frac{P}{EI(1-k)}} \quad (52)$$

We observe here that equation (52) accounts for the presence of an edge crack in the column. If the total deflection in equation (48) is:

$$y + y_0 = d \quad (53)$$

It can be shown that the amplification of the deflection in the un-cracked column is given as [10]:

$$d = \frac{1}{\left(1 - \frac{P}{P_e}\right)} a_0 \sin \frac{\pi x}{L} \quad (54)$$

in which the amplification factor is $\frac{1}{\left(1 - \frac{P}{P_e}\right)}$. The effect of crack is to amplify the deflection further to:

$$d = \frac{1}{\left(1 - \frac{P}{P_e}\right)(1 - k)} a_0 \sin \frac{\pi x}{L} \quad (55)$$

Figure 7 shows plots of deflection against $\frac{P}{P_e}$ which further highlights additional amplification due to pre-crack for different values of parameter k.

Next we study the response characteristics of pre-cracked uniformly tapered columns. We use our proposed java code reported in Jiki [8] to perform a convergence study which compares well with results of [15] when the column has no crack. Cases of pre-cracked columns are considered for values of the crack parameter k ranging from 0.0, 0.1, and 0.15 which are plotted in figure 8. As it is expected the presence of a crack re

7. Main Results.

The main findings of our present study are as follows:

- (i). The presence of an edge crack at the middle of a column amplifies the deflection of the buckled column.
- (ii). The presence of an edge crack at the middle of the column also accelerates the rate of buckling, that is, it leads to early buckling of the column.
- (iii). The use of a derived stiffness reduction parameter k aids in determining the rate of decay of the pre-cracked stiffness of the column. The parameter can thus be used as a failure indicator.
- (iv) A java class has been developed in this work for the purpose of calculating rapidly the proposed stiffness reduction parameter k. The class is now used to extend the java code reported in Jiki [8] which has been used for stability calculations reported in the present work.
- (v) We have also found in the present study that the stiffness reduction parameter k derived in the present work is a good candidate for structural health monitoring applications. A java class called kclass for rapid calculation of the proposed parameter k is attached here in appendix A.

8. Conclusion.

From the findings of the present work as detailed in section 7 we conclude as follows:

- * A model for numerical stability analysis using the finite difference procedure is presented.
- * A stiffness reduction parameter k is proposed and is used to calculate reduced buckling loads due to the presence of an edge crack in a pre-cracked beam-column.
- * A linear relationship between reduced stiffness and the proposed parameter k has also been established.
- * The derived parameter k presented here is a good candidate for future structural health monitoring applications.
- * The present work also encourages the use of object oriented java codes for fracture mechanics application.

Appendix A

A class for calculating parameter k is separately attached here for clarity

```

import java.math.*;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
import java.text.DecimalFormat;
public class Kclass {

    /** Creates a new instance of Kclass */
    public Kclass() {
    }
    public static double calculatek (double b, double c, double w)
    {
        double y1 = (1 - 3*(c/w) + 3*Math.pow((c/w),2) - Math.pow((c/w),3));
        double y2 = (6*(b/w))*(-1.25884 + 4.0498 * (c/w) - 2.6339 * Math.pow((c/w),2) + 1.15968 * Math.pow((c/w),3) - 0.7845 *
Math.pow((c/w),4) + 0.579 * Math.pow((c/w),5));
        double y3 = y1/y2;
        return y3;
    }
    public static void main (String [] args)
    {
        InputStreamReader sr = new InputStreamReader(System.in);
        BufferedReader br = new BufferedReader(sr);
        double b = 0.0, c = 0.0, w = 0.0;
        String txt = null;
        try
        {
            System.out.println("Enter the value of b");
            txt = br.readLine();
            b = new Double(txt).doubleValue();
            System.out.println("Enter the value of c");
            txt = br.readLine();
            c = new Double(txt).doubleValue();
            System.out.println("Enter the value of w");
            txt = br.readLine();
            w = new Double(txt).doubleValue();

        }
        catch (IOException ee){}
        System.out.println(" chk this "+ calculatek (b,c,w));
    }
}

```

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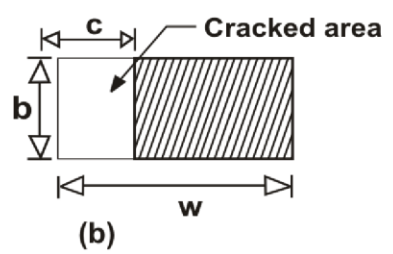
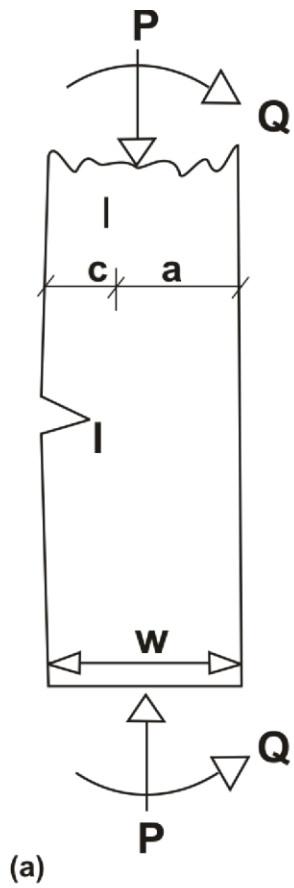


Fig. 1. Pre-Cracked Beam-Column Model: (a) Edge crack in a rectangular strip loaded by axial load P and applied Moment Q ; (b) Cracked Section of the Strip.

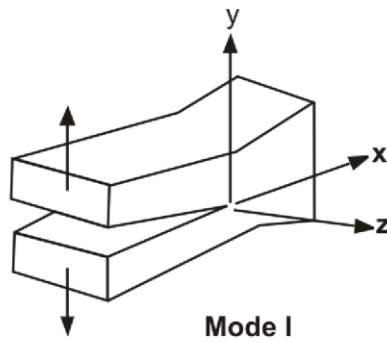


Fig. 2. Failure mode for calculation of stress intensity factor k_1

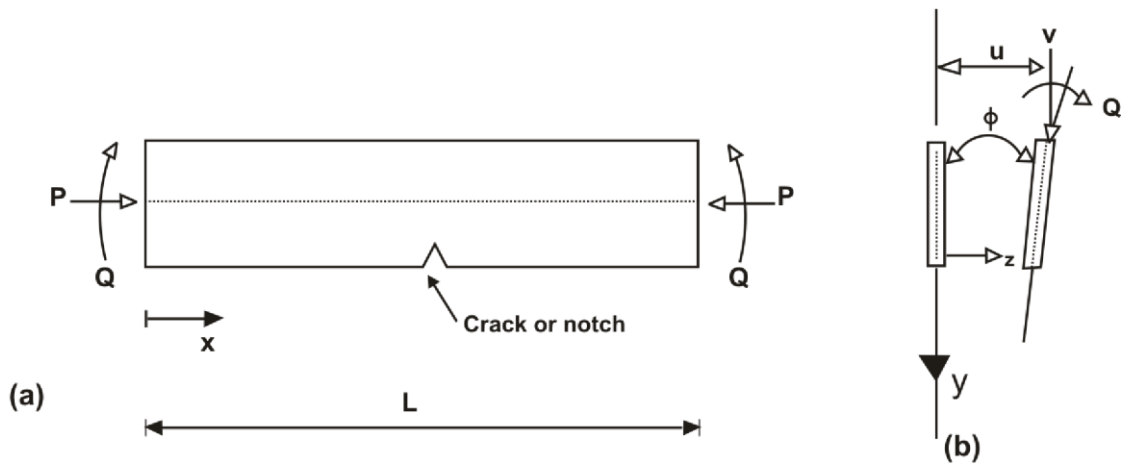


Fig. 3. Thin bar under axial load P and uniform bending moment Q : (a) Beam-column with applied loads; (b) Section of the deflected column

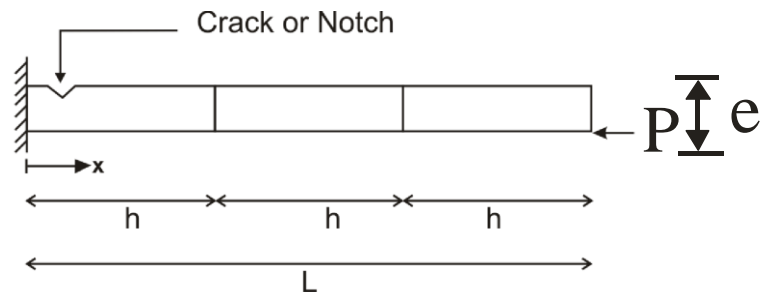


Fig. 4. Finite difference discretization of a cantilever column with load P at eccentricity e and an edge crack

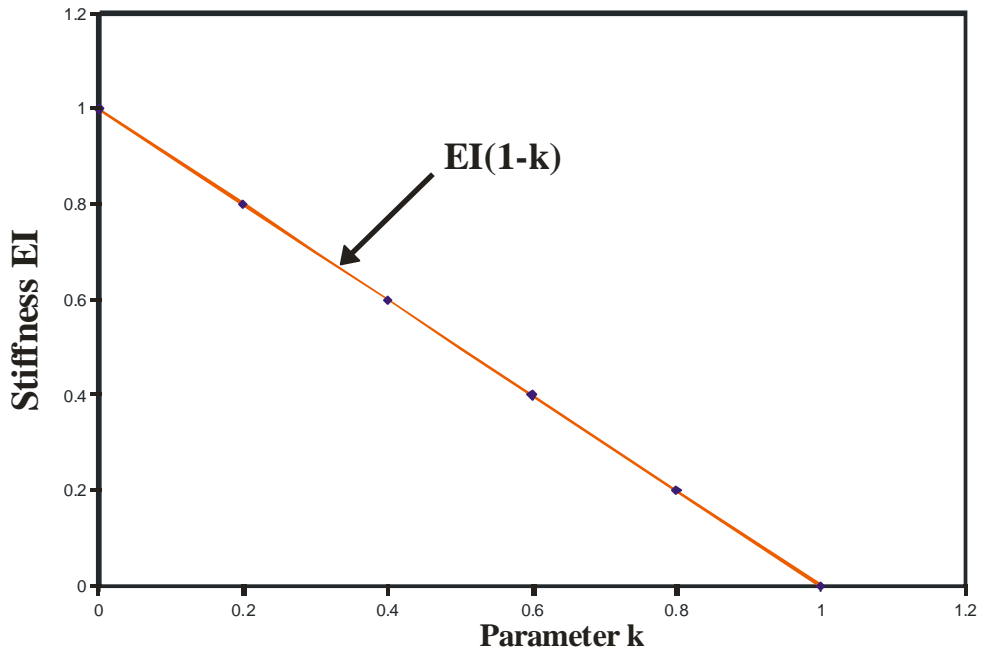


Figure 5: Linear Relationship for stiffness decay in a cracked column

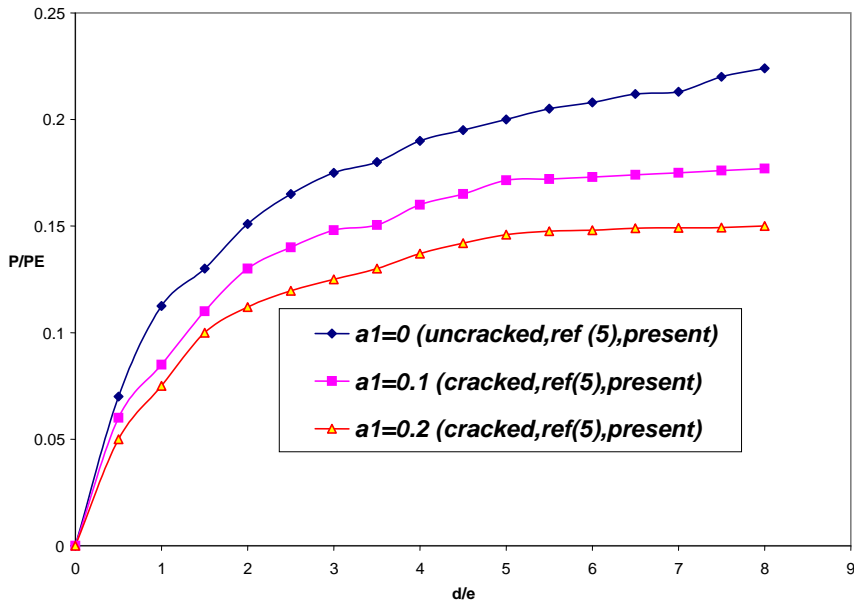


Fig.6. The deflection of a cracked column subjected to an eccentric compression load.

SURVEILLANCE ARCHITECTURE: THE WIRELESS MESH NETWORK APPROACH

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Abstract

The state of security in the country had been created a lot of panic in many areas to the extent that individuals now send a lot to protect their lives and properties. This state had not justified to a large extent the huge amount the government had spent, presently spending and had budgeted to spend in the present year on providing adequate security for her citizenry. Even at the state level we hear and see several donations running into millions of naira made by state governors to the police force just to increase the level of security in the state. However, all these had been geared towards improving the physical capability of the police force and other security agents rather than improving the technological infrastructure through the use of Information Technology to create a nationwide video-surveillance security system. A Security Surveillance Architecture will be proposed in this paper, and it is believed that it will go a long way in alleviating the security problems of our nation.

Keywords: Security, Security Agent, Information Technology, Video-Surveillance Architecture, Mesh Network.

INTRODUCTION

Mention video surveillance most people think of video cameras mounted in the corners of train stations and banks or private detectives videotaping an earring spouse for a messy divorce case. The truth is that the history of video surveillance is much more complex and goes back much farther than most people realize. Considering video in the simplest of terms, video surveillance began with simple closed circuit television monitoring. As early as 1965, there were press reports in the United States suggesting police use of surveillance cameras in public places. In 1969, police cameras were installed in the New York City Municipal Building near City Hall. The practice soon spread to other cities, with closed circuit television (CCTV) systems watched by officers at all times.

When video cassette recorders hit the market, video surveillance really hit its stride. Analog technology using taped video cassette recordings meant surveillance could be preserved on tape as evidence. The seventies saw an explosion around the world in the use of video surveillance in everything from law enforcement to traffic control and divorce proceedings.

England installed video surveillance systems in four major Underground Train Stations in 1975 and began monitoring traffic flow on major highway arteries about the same time. In the United States, the use of video surveillance wasn't quite as prevalent until the 1980 for public areas, but store owners and banks quickly understood the value of it.

Businesses that were prone to theft, including banks, mini-marts and gas stations, began mounting video surveillance systems as a deterrent and in hopes of apprehending thieves, particularly in high crime areas. The insurance industry also found video surveillance compelling worker's compensation fraud; bogus accident claims and a variety of other cases began to turn in the industry's favor when they could provide tapes of supposedly disabled workers doing the limbo at a family reunion.

For the private citizen, analog technology was primarily used in the 1970's and 1980's for capturing the worst side of human nature – cheating spouses and poor parenting. Private detectives were able to provide more graphic and compelling evidence of affairs and parental stupidity with film than with still shots, and video tapes became frequent evidence in family court. The drawback in many cases was that after a while, owners and employees would become complacent and not change the tapes daily or the tapes would wear out after months of being re-used. There was also the problem of recording at night or in low light.

While the concept was good, the technology hadn't yet peaked. The next step was the Charged Coupled Device camera (CCD), which used microchip computer technology. These new cameras broadened the practical applications of video surveillance by allowing low light and night recording possible.

In the 1990's a new advancement in the history of video surveillance made great strides in practicality – Digital Multiplexing. When digital multiplexer units became affordable it revolutionized the surveillance industry by enabling recording on several cameras at once (more than a dozen at time in most cases). Digital multiplex also added features like time-lapse and motion-only recording, which saved a great deal of wasted videotape.

By the mid-1990's, ATM's across the United States and in most parts of the world had video cameras installed to record all transactions. After the first attack on the World Trade Center in February of 1993, the New York Police Department, FBI and CIA all install surveillance cameras throughout the area. Soon many countries are also using either CCTV or videotaped surveillance to cover major sporting events that could be potential hot spots, including the World Cup Soccer games at Giants Stadium in 1994.

Digital makes video surveillance faster, clearer, more efficient. Digital video surveillance made complete sense as the price of digital recording dropped with the computer revolution. Rather than changing tapes daily, the user could reliably record a month's worth of surveillance on hard drive because of compression capability and low cost. The images recorded digitally were so much clearer than the often grainy images recorded with analog that recognition was immediately improved for police, private investigators and others utilizing video surveillance for identification purposes. With digital technology you could also manipulate the images to improve clarity even further by adding light, enhancing the image, zooming in on frames, etc. The second wave of increased video surveillance corresponded with the emergence of digital in the United States. From 1997 on, police departments across the country installed more and more video surveillance cameras in public buildings, housing projects and areas like New York's Washington Square Park. The NYPD also began using mobile surveillance vans at political rallies and other large gatherings (including festivals and parades) under the auspices of the Technical Assistance Response Unit (TARU).

EVOLUTION OF VIDEO SURVEILLANCE SYSTEMS

The first CCTV system was installed by Siemens AG at Test Stand VII in Peenemünde, Germany in 1942, for observing the launch of V-2 rockets. The noted German engineer Walter Bruch was responsible for the design and installation of the system. In the U.S. the first commercial closed-circuit television system became available in 1949, called Vericon. Very little is known about Vericon except it was advertised as not requiring a government permit.

CCTV recording systems are still often used at modern launch sites to record the flight of the rockets, in order to find the possible causes of malfunctions, while larger rockets are often fitted with CCTV allowing pictures of stage separation to be transmitted back to earth by radio link.

In September 1968, Olean, New York was the first city in the United States to install video cameras along its main business street in an effort to fight crime. The use of closed-circuit TV cameras piping images into the Olean Police Department propelled Olean to the forefront of crime-fighting technology.

The use of CCTV later on became very common in banks and stores to discourage theft, by recording evidence of criminal activity. Their use further popularized the concept. The first place to use CCTV in the United Kingdom was King's Lynn, Norfolk.

However, CCTV which uses traditional radio frequency (RF) technology, rather than photographic technology, was introduced in the 1980s and provided a more cost-effective and real-time method of video surveillance. This involves changing the recording tapes very few hours since it is the CCTV that feeds a VHR recorder with images. But as VHS-based systems become obsolete and the production VCRs themselves were discontinued, users were forced into a hybrid solution using Digital Video Recorder (DVR) to digitally record video from analog cameras in the 2000s. But these DVRs still have a short fall, while they provide higher quality recording and faster playback they still tend to be proprietary systems with limited scalability.

In this vein, corporations and government agencies had to move to an all-digital component scheme and managing Digital Video Surveillance (DVS) on their information system infrastructure, making video surveillance just another application on their IT network. Centrally controlled digital cameras will have IP addresses that can be monitored by several distinct analytical applications, enabling organizations not only to enhance existing physical security, but make more intelligent and even predictive decisions on security.

Upgrading to DVS solutions provided a significant number of advantages:

1. Major Enhancement in image quality: provide more precise identification
2. Megapixel Cameras can provide two to 16 times the resolution of traditional analog cameras. Megapixel cameras can cover a large area than analog cameras while providing superior digital zoom capabilities that show real detail instead of blurred faces.
3. Better analytics and remote cameras control allow fewer security personnel to monitor more cameras
4. With On-Demand recording, digital systems can be configured to record only when there is motion or some specified actions rather than recording hours of uneventful video or an endless loop.
5. DVS solution requires less manual intervention, since there is no need for the periodic replacement of videotapes. This not only reduces time and cost, but also operator's error causing the loss of critical images, such as by swapping and over writing the wrong tapes.
6. DVS solutions are built on scalable, flexible storage. Storage is no longer limited the number of videotapes on the disks that a company can manage. Images can be stored on traditional hard drives when necessary, and virtually otherwise.
7. Remote accessibility is the core benefit of DVS solution, in that images can be accessed from any secure computer or workstation in the network even via wireless connectivity.

As good as the DVS solution is, its wide use is limited by cost. Due to this the use of DVS solution was limited to banks, offices and generally small areas, in other to reach large areas, town and cities the need to look for a more cost effective solution with good surveillance quality become necessary.

To this end, a Wireless Mesh Network (WMN) powered DVS was introduced in the last 2000s.

Mesh networking is a type of networking wherein each node in the network may act as an independent router, regardless of whether it is connected to another network or not. It allows for continuous connections and reconfiguration around broken or blocked paths by "hopping" from node to node until the destination is reached. A mesh network whose nodes are all connected to each other is a fully connected network.

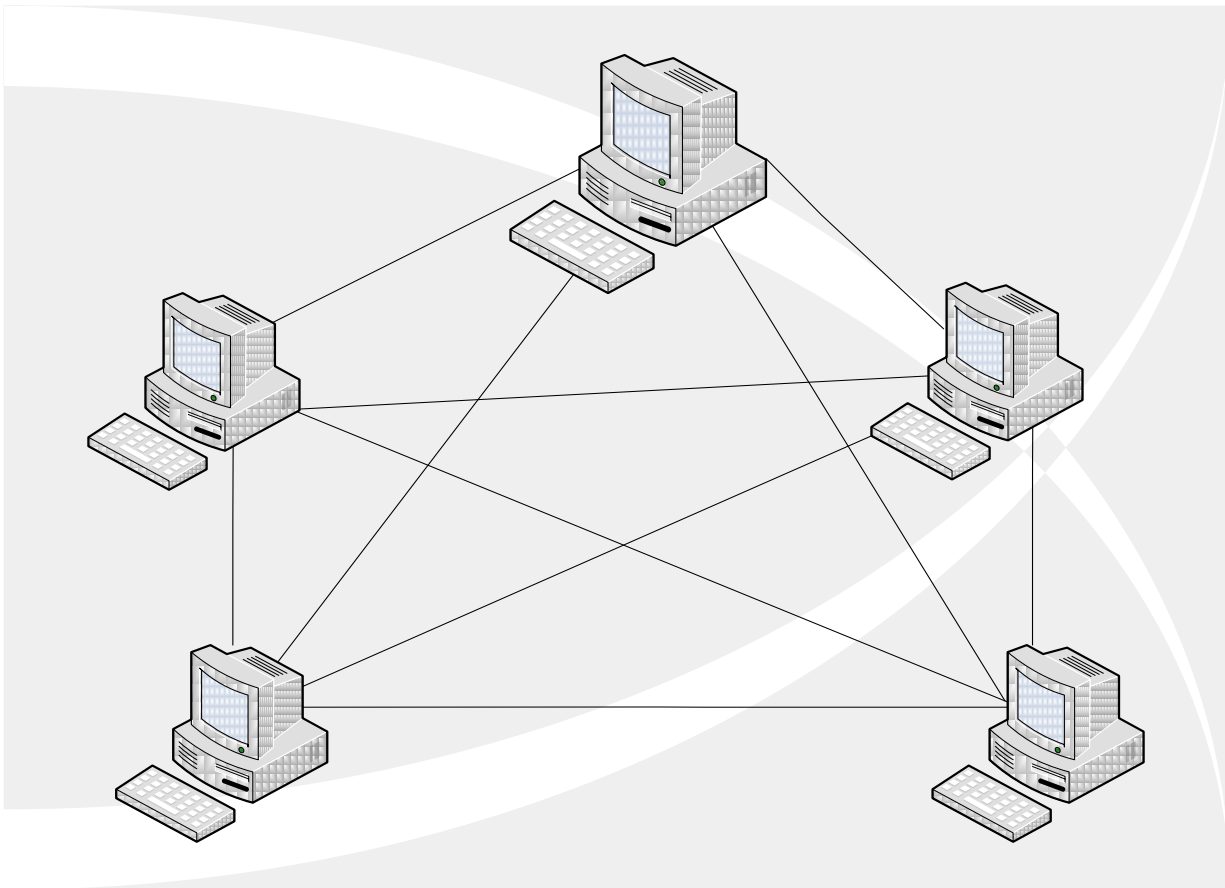


Fig 1: Fully Connected Mesh Network

As a result, the network may typically be very reliable, as there is often more than one path between a source and a destination in the network. Although mostly used in wireless scenarios, this concept is also applicable to wired networks and software interaction.

Wireless mesh networks were originally developed for military applications and are typical of mesh architectures. Over the past decade the size, cost, and power requirements of radios has declined, enabling more radios to be included within each device acting as a mesh node. The additional radios within each node enable it to support multiple functions such as client access, backhaul service, and scanning (required for high speed handover in mobile applications).

Additionally, the reduction in radio size, cost, and power has enabled the mesh nodes to become more modular—one node or device now can contain multiple radio cards or modules, allowing the nodes to be customized to handle a unique set of functions and frequency bands

3.0 EXISTING WIRELESS MESH NETWORK SURVEILLANCE ARCHITECTURE

3.1 Gauge Architecture

A few architecture had been developed for surveillance with WMN been the backbone for the designs. One of such architecture is the Gauges

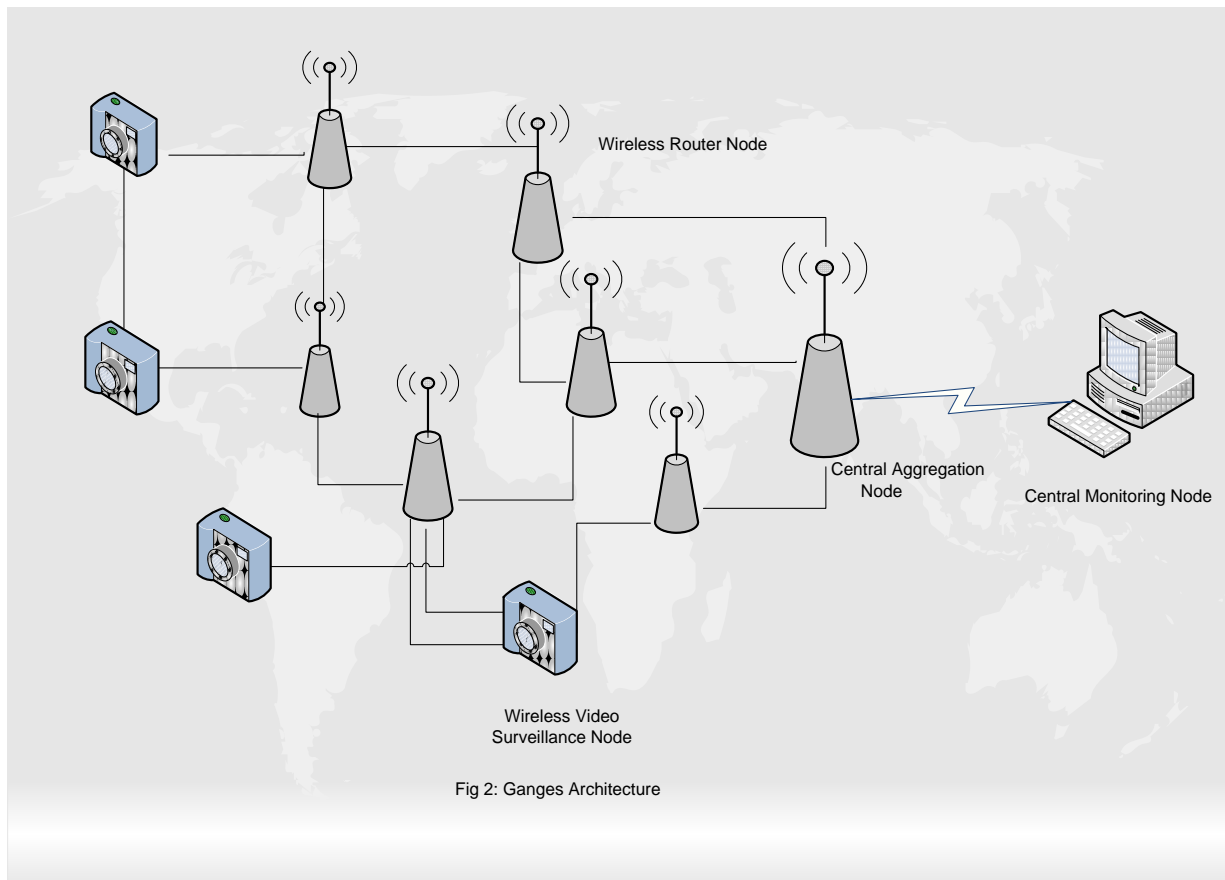


Fig 2: Ganges Architecture

Fig. 2: Ganges Architecture

The Ganges architecture consists of several identical video sources such as video surveillance spread over a large geographic region for remote monitoring purposes. They could be mounted on rooftops or lampposts that have continuous supply of electricity. These sources are equipped with a Central Monitoring Node, Wireless Router Node, Wireless Video Surveillance Node, and Central Aggregation Node wireless interface for communication. There is a central monitoring node (CMN) where video streams from all these sources needs to be viewed in real-time. Providing wired connectivity between the video sources and the CMN may be expensive and inconvenient. Due to the significant deployment advantage, we utilize a WMN to transport the video streams from each source to the nearest wired gateway node. The WMN consists of a Number of low-cost wireless routers each equipped with a single wireless interface. Some of these nodes (Central Aggregation Nodes or CAN) have an additional wired interface and are connected to the CMN via the Internet or some private network. All video streams are aggregated at the CAN over wireless multihop backbone network and then forwarded over the wired link to the CMN.

Gauges was designed with specialized wireless routers that are optimized to handle real-time traffic efficiently. High bandwidth routes are established between the video sources and the CMN. These routers are capable of reliably delivering high-quality video streams to the CMN using several fine-grained adaptations at different layers to counter the dynamic wireless conditions. Optimizations at the network layer are implemented to efficiently share resources between multiple owns as well as delivering packets in time to reduce the end-to-end packet delay jitter.

3.2 Wireless Video Surveillance Network Architecture

Another is Wireless Video Surveillance Network (WVSN) Architecture.

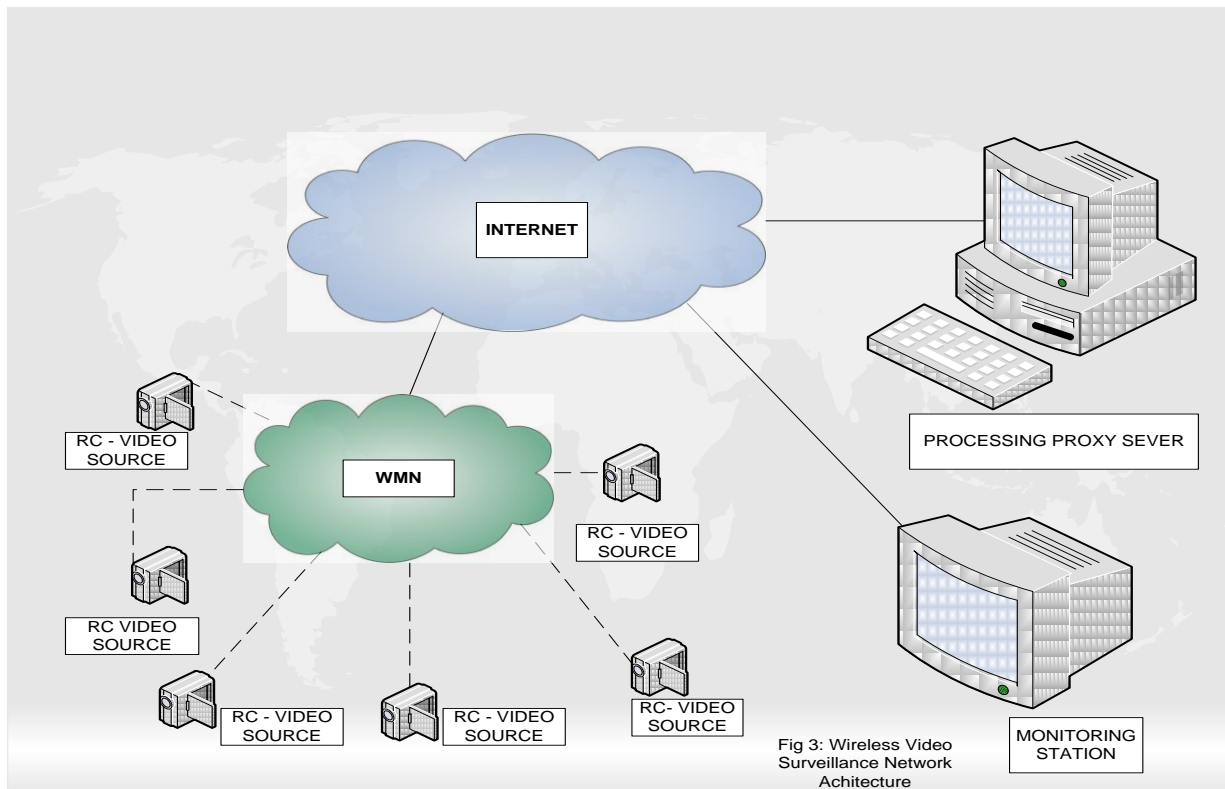


Fig 3: Wireless Video Surveillance Network Architecture

Fig 3: Wireless Video Surveillance Architecture (Francesco, 2007)

The distributed architecture consists of a number of wireless networked rate-controlled video cameras (*RC-video sources*) which, thanks to the WMN, access the Internet and continuously transmit their video flows to a *processing proxy server* (PPS) for processing and filtering. The PPS is directly, or again through the Internet, connected to one or more *monitoring stations* (MS). Not every video stream that is sent to the PPS for processing is shown to the end user at the MS. In fact, the PPS analyses all the received video flows, and alerts the MS only if a suspicious event is detected. The focus of our paper is concentrated on the RC-video sources (and video stream destination at the PPS) and the wireless mesh network.

4.0 PROPOSED ARCHITECTURE

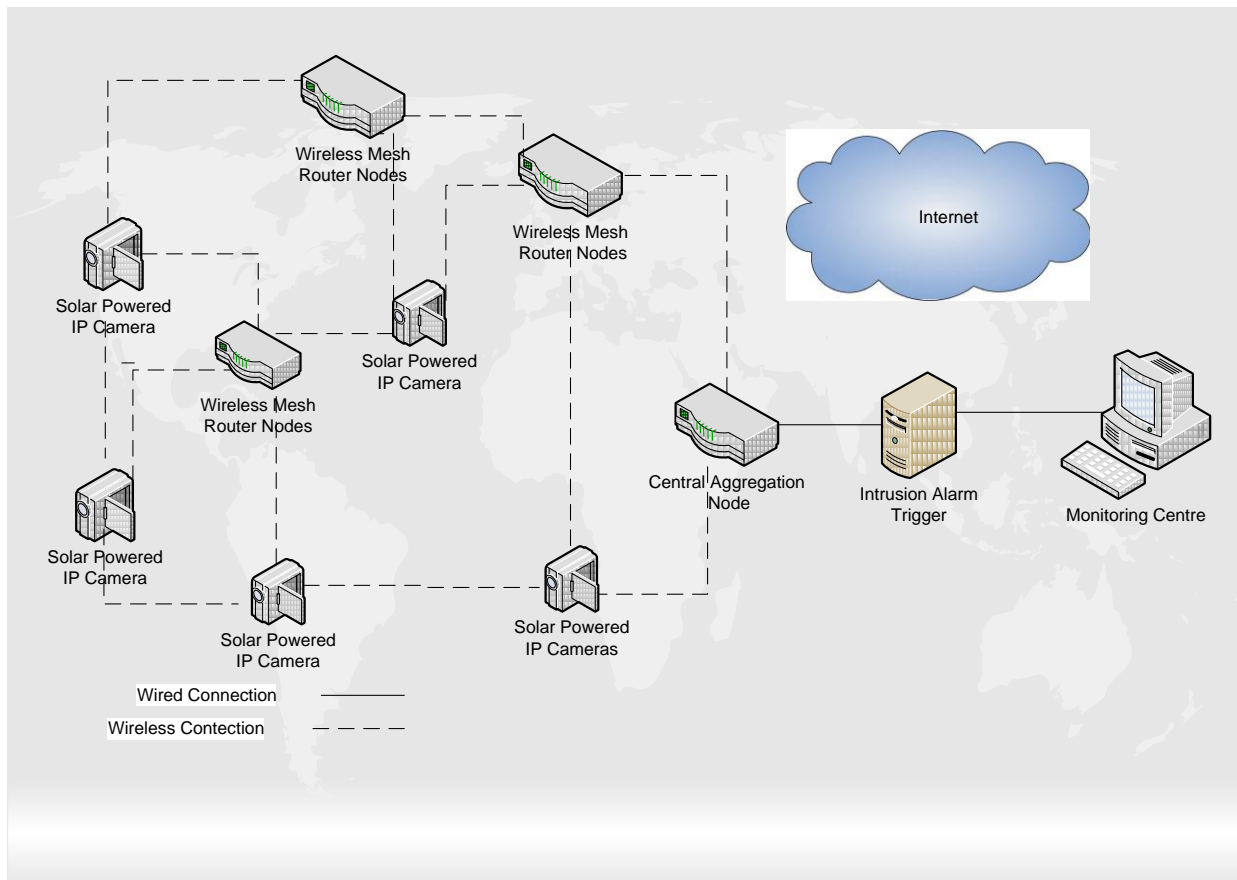


Fig 4: Typical IP-BASED Surveillance System Transmitted over a MESH NETWORK.

The proposed surveillance architecture consists of Solar Powered IP Cameras spread across a large area (e.g. School Campus, Town) and the choice of a Solar Power is to guarantee constant power supply added to the architecture is Wireless Mesh Router node that carries the video signal across any free node to the Central Aggregation Node (CAN). The CAN takes a record of the entire video signal and passes them in over serious security treatments based on pre-determined conditions programmed in the cameras. This signal will go through the intrusion alarm and if there is any security treat in any of the camera signal the alarm will be triggered and the image from the camera with the highest security bridge will be displayed at the monitoring centre and an auto recording of that event will be done. However, the monitoring centre screen has the capacity to display images from six cameras at the same time and record same.

This architecture will be part of a website so that authorized personnel from the website owner can gain access to the cameras through the WMN and view real-time images from any of the cameras as the event is happening in such areas.

5.0 CONCLUSION

The use of this architecture will bring about adequate surveillance to a large geographical area at a cheap rate because of the mesh network used for connection since each item on the network serves as a transmitter and receiver thereby removing the cost of repeater on the network. Comparing this architecture with other, the ability to view real time images as the events are unfolding is an advantage since it will make surveillance every body's duty wherever this architecture is in use.

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**REPOSITIONING ADMINISTRATIVE AND SUPERVISORY FUNCTIONS IN
VOCATIONAL TECHNICAL EDUCATION FOR FUNCTIONALITY:
THE E-ACTIVITY APPROACH**

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Abstract

The world all over are of the opinion that quality and functional education are pre-requisite for the attainment of a country's development economically and technologically. Monumental studies and achievements in various spheres of life by developed and developing Nations of the world are often attributed to products of high standards of education. The efficacy and efficiency of educational system lies in its ability to deliver quality education in cost-effective ways. For such educational system to stand tall in attaining these goals, a re-invigorated or repositioned administrative and supervisory functions in all our educational systems in general and vocational technical education in particular must be put in place. e-activity with all of its components have the potentials of bringing these experiences to bare in vocational technical education. This paper therefore reflects on e-activity and its ability to reposition administrative and supervisory functions. It conceptually looks at administration; supervision and functionality of vocational technical education and the potentials of e-activity, its impact on education, challenges and limitations.

Introduction

Education has long been identified as one of the most crucial allies of development. This view is supported by FRN (2004) where it stated that “no nation can rise above the quality of its education system”. Education in human societies has come a long way, from its dependency on environment through its labour and craft orientation, its stage of serving as a personal embellishment and then today, from serving as a means of fostering socio-economic development to have become synonymous with growth and economic development.

Vocational Technical Education (VTE) which is seen by many as an essential educational system going by its great and intimidating qualities and potentials should be properly and adequately administered and supervised if its goals and objectives are to be attained. Also, for VTE to be functional, all processes that are involved must be strengthened, adequately and properly packaged, efficiently and effectively delivered. In order to achieve the foregoing, a purposeful and focus, based Administration and Supervision is imperative. VTE with the following potentials, namely:

- Acquisition of skills of work;
- Development of work attitudes;

- Acquisition of knowledge relating to occupations of economic and social values; and
- Development of work behaviour in its four domains, cognitive, affective, psycho and perceptual (Usoro and Edu, 2003)

Calls for more pragmatic administration and supervisory functions functionality, wealth creation and poverty eradication.

e-activity Concepts

For the purpose of this paper, e-activity is viewed as having three (3) mutually inclusive components namely: Information Communication Technology (ICT), Computer Assisted Instruction and e-learning.

ICT is a computer based tools used by people to work on information and communication processing needs of an organization. Basically, it encompasses the computer hardware and software, the network and several other devices (video, audio, photography, camera etc) that convert information (text) images, sounds, motion into digital forms. It is an application of the combination of computing, communication, telecommunication and satellite technology. ICT when appropriately applied has the potential tools for enriching traditional means of teaching, learning and conducting research. According to Lopez (2003) ICT have provided innovative opportunities for teaching and learning experiences. ICT can be used to improve the quality of teaching and learning in any academic environment. Supporting this view, Yusuf (2005), it is widely accepted that ICT can be used to improve the quality of teaching and learning in any tertiary institution. Furthermore, he stated that ICT can make the school more effective and productive, thereby engendering a variety of tools to enhance and facilitate teachers professional activities. From the foregoing, ICT can be viewed as a tool that can enhance teaching and learning through its dynamic, interactive and engaging content and can provide real opportunities for individualized instruction and has the potential to accelerate, enrich and deepen skills, motivate and engaging students in learning; relate school activities to work practice, help to create economic viability for tomorrow's workers; contributes to radical changes in schools, strengthens teaching and provides opportunities for connection between the school and the world,.

On the other hand, Computer Assisted Instruction (CAI) is a programme of instructional materials presented by means of a computer or computer systems. Batey (1985) in his research stated that CAI is the use of computer in educational settings and most often refers to drill and practice tutorials, or simulate activities offered either by themselves or as a supplement to traditional, teacher directed instruction. He also stated that as a supplement to traditional teacher-directed instruction produces achievement effects superior to those obtained with traditional instruction alone.

Furthermore, Batey (1986), Kulik and Kulik (1987) and Rupel (1986) came out with the fact that CAI enhances learning rate. Student's learning rate is faster with CAI than with the conventional instruction and that this learning rate is accompanied with high retention.

Thus, the potential use of computer based technology in the classroom is immense and show the range of computer use as a tool for learning and as tool employed by teachers. The use of CAI in education provides student with both skills of using the available CAI, and provides another medium by which they might make sense of the information with which they are presented.

e-learning is the facilitation of human learning through the web (internet and intranet) with the use of digital technologies by creating on-line and off-line experiences. It provides the framework of its applications in the

education settings synchronously and asynchronously. According to Abimbade (2005), e-learning occurs through internet or intranet using some instructional delivery systems. The system will use a platform web browser such as: Microsoft internet explorer or Netscape navigator.

To access the viability of e-learning, consider management support, cost-effectiveness, target audience, acceptability of a web-based programme. Again, one can ask the following questions: Will e-learning provide a method of instruction that is easier, faster, cheaper, safer, or more engaging than other delivery systems? Answers to these questions will lead to the advantages/potentials of e-learning as enumerated by Abimbade (2005) as follows:

- Flexibility, accessibility, convenience to the learner;
- Learning at once space and own place;
- Access the content at any time;
- Cross-platform – sourcing from other platform
- Web-browser software and internet connections are widely available
- In-expensive global delivery and distribution of e-learning material which is accessible from any part of the world;
- Updating is easy, courses can be delivered from anywhere of the global; and
- Promotes ICT's in education and training.

Reflections on the foregoing, shows that e-activity has the capability and potentials to reposition any aspect of our educational system for greater productivity including administration and supervision.

Administration of VTE Concepts

Generally, Administration is the co-ordination of human and material towards the attainment of predetermined goals and objectives Akpan (2001) saw administration as the of persons and material resources for effective and functional teaching and learning. According to her, Vocational Technical Education Administration is a service through which the fundamental objectives of VTE system can be more fully and efficiently realized. VTE Administration involves: planning, organizing, directing, co-ordinating and controlling human and material resources to attain it's goals and objectives.

In the light of the above; the following, outlined the tasks of a VTE Administrator:

The VTE Administrator:

- Adopts a management style,
- Develops an organizational structure,
- Plans and executes an overall strategy for the content and delivery of instruction,
- Plans for and controls the fiscal resources necessary to pay for the VTE programme,
- Plans for and controls the personal resources necessary to staff the various VTE programmes
- Plans for and controls the auxiliary services necessary to operate the VTE programme
- Develops and executes a system for attending to student services
- Plans, constructs and maintains the buildings necessary to conduct the VTE programmes,
- Maintains liaison with public, private groups and individuals to whom the VTE is accountable.
- Provides for the evaluation of both the administrative structure and most crucial, the VTE programme through research.
- Participates in cooperation with the governing body, in overall policy formulation,
- Develops a system of internal and external communication. (Akpan, 1994).

Repositioning VTE for functionality connotes strengthening these tasks and their effective application for attainment of VTE objectives

Supervision of VTE Concepts

VTE supervision is that phase of school administration which focuses primarily on the achievement of appropriate instructional expectations of the school system (Akpan, 2001). This definition when critically examined has three (3) major components, namely;

- That supervision is a phase of administration.
- That supervision is concerned with the appropriateness of instruction expectations
- That supervision is that phase of administration which has pertinence for the expectations (products) of educational system.

Supporting the above, Usoro and Edu (2006) saw supervision as one of the basic requirement in administration that focuses on the tactics of efficient and proper management. Thus, it can be said that supervision is the “nerves system” of an organization. Also, Akpan, Usoro. and Usoro (2010) supporting the above view perceived supervision as very important to management practices in the daily operations of industrial organizations through routine direction and control of employees activities. The measure of effectiveness and efficiency of an organization is determined by how effectively and efficiently the supervisors perform the basic role of motivating the employees to increase their productivity.

In Vocational Technical Education (VTE), creating an environment for optimal productivity requires that the right skills, equipment, materials, appropriate and adequate instruction and effective teaching methods for delivery to students. The task of achieving these lies with the supervisors.

To achieve the above tasks, the need for better supervisory style(s) comes into play.

Akpan, Usoro and Usoro (2010) enumerate many supervisory leadership style theories most conducive to promoting effective work group; as

- Initiative structure theory
- Life-cycle theory
- Contingency theory of leadership
- Paths-goal theory
- Situational leadership theory
- The development approach theory
- Positive management theory,; and
- Quality approach theory

Due to space, these theories could not be discussed or explain individually, but suffice to state here that generally, they are conceptual propositions which could predict, explain, and guide effective supervisory behaviour and hence effective supervision in VTE.

Functionality Concepts

Hornby (2000) noted that in architecture, functional architecture is said to be designed to serve practical purpose, beauty of appearance beings secondary. According to him, if a building is aesthetically designed but uninhabitable, it is not a functional building. In line with this, Uzuagulu (2004) explained that functionality

has to do with effectiveness, efficiency and workability of something or organization. According to him, a functional education system must be effective in achieving its set goals. It follows from the above explanations, that if a system to achieve its set goals or purpose, then it is not effective and cannot be referred to also a functional system, Onyeukwu, Abassah, Hart (2010). Again, as observed by Asogwa (2004), functionality of a system is the practicability and usefulness of that system being very suitable for the purpose it was set to achieve from the foregoing and looking at the goals and objectives of VTE as stated in section 15 by FRN (2004), can we say that VTE is functional in Nigeria?

Dividends of e-activity

With adequate and effective administration and supervision which can come through e-activities when properly applied, Vocational Technical Education (VTE) will be functional and hence its visible results and goals shall be felt and its impact on the economy shall be seen and measured.

Dividends of e-activities as outlined by Prasad (1997) has the potentials of reposition administrative and supervisory functions/tasks for functional VTE. These dividends includes:

- More educational, information and technology access;
- Learning from other;
- Partnership from enrichment
- Competitive environment
- Globalization of materials and resources

Impact of e-activity on Education

The phenomenon of globalization is considered as the most widespread trends in many countries. It has brought about the worldwide integrations of economic and financial sectors. In the context of changing world, the central role played by education to favour social and professional integration appears to be largely reinforced. Thus the aspirations objective of UNESCO and the world body of United Nations Organization are being propelled by the globalization on education.

Challenges of e-activity in Nigeria

Web-technology based programmes like e-learning was developed by the developed economy whose infrastructures and facilities are adequate for effective and efficient accessing these programmes from the web. A developing economy like Nigeria whose infrastructure and facilities are in a dilapidated state due to bad government have challenges in accessing the web-technological –based programmes for e-activities. The following serve as challenges for e-learning in Nigeria:

- **Infrastructural Deficiencies:** Many developing countries like Nigeria do not have adequate infrastructures and facilities for e-learning etc. They do not manufacture hardware and software needed for information technology services. In some countries there is still problem of steady power supply.
- **Global Educational Vision versus Market Vision:** For globalization to promote even development, there must be a balance view of educational vision and market forecast. This is concern with the exploiting the market demand of developing countries by developed economies for profit making. This profit making drive of collaborative arrangements may distort the priorities of education and would not promote effective partnership arrangement.

- **e-activity versus Localization of learning:** Developing relevant curriculum for international context is a difficult task. More difficult getting the educational materials develop in a particular context to suit different cultural millien.

Limitations of e-activity

Despite the laudable potentials and advantages, e-activities have some limitations.

Bandwidth Limitations

Limited bandwidth means slower performance for sound, video and intensive graphics, causing long waits for downloads that can affect the ease of learning process.

- Static e-activities must be replaced by dynamic programmes, which takes more time and money to develop.
- Not all courses are delivered well by e-activity based instructional programmes.
- Most of our teachers are ICT's illiterate.

Not withstanding the above limitations, e-activity has come to stay. What Nigeria needs to do as developing country is to key into mass infrastructural and facility development. Our educational system from primary to tertiary should ICT's compliance. Development of both teaching and non-teaching should be a continuous e-activity so as to benefit fully in e-activity based programmes. Vocational technical education should be on first live because of its potentials to national development.

Conclusion

e-activity has come to stay and it would continue to affect structure and content of the education system. As the world march towards globalization so will the application of ICT's and hence e-activity continue to affect education delivery at all levels. Administrative and supervisory functions in VTE shall witness a boost when properly packaged CAI materials are effectively and efficiently delivered. This will in turn rob on the functionality of VTE system and hence position Nigeria as an emerging economic power house in sub-Saharan Africa.

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**“UTTERANCE TECHNOLOGY” FOR “SHORTHAND” A REPERCEPTION OF THE
CONSONANT STROKES: FOR COPPING WITH E-ACTIVITY AND ICT CHANGING
ENVIRONMENT IN BUSINESS EDUCATION**

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ABSTRACT

Society generally is witnessing a lot of phenomenal development changes in almost every sphere of human endeavor's, Information Communication Technology (ICT) taking the lead. In all fact of life concepts, attention on ICT becomes most high. The fact that these new evolutionary developmental patterns flow along with verbal communication (talk) calls for more concentrations on the area. A specific focus on utterance and its intricacies will enhance or even elevate the technological perspective of ICT and enhances entrepreneurial living. The proposal here is highly in concordance to ICT compliances. The essential elements in utterances mastery will be fully understood in this presentation and if so passed on to the learners, will definitely result to perfect making of individuals who will be effective and efficient in the field.

INTRODUCTION

The major course “shorthand” among education courses in the field of business is now the most unwelcome, unappreciated, dreaded and subsequently most dejected and failed by students among all. Students and most lecturers do not seem to understand why such terrorizing course should be integrated among educational courses more especially even at this present “touch button information and communication gadgets are almost every where and can be used by many people too. Actually, the feeling of many people too. Actually, the feeling of many people is that the course shorthand be scrapped out of educational system. This feeling seemed to be the reason why the writer among other few are of the view that, and stressing that the course should stay but be well thought. It is hoped that when the advantages and its benefits are fully understood one will really see reasons why even the developed nations of the world are still very much using and still emphasize its acquisition or learning. Limited opportunity here will not permit elaborate expatiations of benefits and opportunities derivable through the processes in undertaking this course. However, some few ones are as follows: The sign formation development habit based on the attentiveness to sound that is built through drill practices develops human capacities on the following:

- enhance hearing capacity
- retention of words
- sequential flow of ideas
- internalization of facts
- endurance and perseverance
- fast reasoning and movement of hands
- enhance concentration abilities
- ability to recognize, differentiate and adjust with dexterity and mastery skills

Proposal to revisit shorthand consonant sources or rename shorthand “Utterance Technology” some related literatures shall be reviewed to enhance our reasoning. This should be done with the following in minds:- to understand why the name Utterance Technology is agitated in place of the former; to examine the organ or parts of the body used for the making of sound and get a hint on their formation when producing sounds; to examine the types of utterances we have for real identification; to examine the sources of the signs use to represent corresponding sounds. A brief general description of how the organs are used to utter sound will also be made. What people say about the benefits or otherwise of the time use in the art will also be examined. Associated benefits in addition to acquiring the skill techniques will also be reviewed. What the society or nation stands to gain through this technique acquisitions will as well be highlighted.

A none or lesser user of the skill of utterance techniques may wonder and even argue that these benefits mentioned here cannot all be associated with the course but there are even much more than these. One cannot see them with the kind of the over all negative nations formed about the course hitherto. This is due to the psychological defects set in by some previous ‘mechanical’ learners through the hardship of cramming and memorizing of passages and their associated outlines or signs used without proper grooming on real background foundation of learning it, and ignoring to know the foundation for uttering sounds or reasons why certain signs should represent certain sound. This lack of foundation always disrupted the natural inclination and joy that is associated with the art in our tertiary institutions.

It is the return of this natural inclination and joy that is associated with this course that this work addresses here so as to raise the value classification that were hitherto erupted by conceptual flows exhibited by ignorance of actual facts. A natural perception and appreciation mood should be developed so as to see in essence the reality of what nature offers through the knowledge of this course.

This write up starts by offering the course, the name Utterance Technology, instead of the usual shorthand. It will discuss then the utterances organs of human body as provided by nature; the types of sounds by human. It will also discuss and present how through nature, the signs used for representing the sounds (utterances) are derived. It is hoped that with careful understanding of these, effort can be intensified by the learners to practice what they would be made to understand, what they would be taught to do from what they may hear or think to have heard for the development of this special multipurpose skill in our tertiary institutions especially those institutions that are equipped with modern ICT gadgets.

The Facts in this Issue

It is an acceptable notion that shorthand as a core business subject has no specific support in some nations philosophy of education as in Nigeria. Further the production of specialized trained teacher equipped with the real knowledge and skill in the area of shorthand are still dreadful yet to be ventured. Such nations are founded and managed by those who are negatively biased and had no interest on the subject.

Today, the art of making and transcribing shorthand notes is largely based on reflection of activities of development within foreign (English or French Speaking Nations) and not reflecting other culture (Language inclusive). This generated displeasure and dislike which further subjects the art into hatred and unhealthy debating and arguments against, such statements as of what use will it be in the presence of tape recorders and computers? Such people who ask such question fail to realize that most education programmes and process are implied upon other developmental pattern.

The need for high motivated, dedicated and qualified teacher in any educational organization cannot be over emphasized. Farrant (1964) in Amaewhule (1990) assert that a lesson is not taught until it has been learned, and it cannot be learned until it is understood. Let it be added that it cannot be understood if it is not well delivered or passed on. It cannot be well passed on if it is not well acquired. Real acquisition therefore depends on the disposition, experience, qualification, and the dexterity of the teacher in the method used.

Nolan (1986) stated that business teacher has the responsibilities to help the students develop basic skills and knowledge which is required in a well articulated curriculum. But most teachers in this field instead of devising means and ways of making shorthand appreciable, loving and desiring, go ahead criticizing the subject and displaying open disregard and uninterested even when they are paid to teach it. This paper has it here that, it is high time teachers' disposition about a given subject be investigated and proper adjustment implemented to achieving the desired objectives.

Purpose of this Paper

This paper is aimed at redesigning shorthand in thoughts, perception, teaching approach and to unfold its numerous benefits. Also recreate the process involved to enhance the understanding of the real techniques involved through redesigning it. It is believe that those much talked about benefits being direct and implied knowledge will be fully acquired and used for the development of information communication technology self reliance and productivity.

Recreating Questions

This recreating proposal if well executed will provide adequate solutions to the following questions:

1. Is the art involved in learning shorthand a really time wasting useless effort?
2. Are there essential skills other than drawing signs to the acquired in the learning techniques involved?
3. Has the society or nation anything to gain from someone who acquire the techniques other than the teaching of the subjects.

Significance of this Paper

In the first place teaching is a profession for making useful manpower generally. Economic strength of any nation lie in the world of business, the core of information communication techniques. This goes with talk (utterances) in diverse specifications. Anything contrary or negative in this all important sphere of life – “teaching” and “utterance” does not profess doom alone but “real doom” for such a society. In this regard this proposal for the well being of core society life fluids becomes the proposal of all proposals and if carried out becomes the wisest thing every done by any society in the field of utterances. It therefore becomes very significant for the entire human nation and the development of human abilities.

Scope of Recreating

This recreating proposal implementation should be carried out in every tertiary institutions of the globe. In Nigeria, let it be done in every state of the federation. Especially among these institutions that offers shorthand in the area of business and education.

Why Utterance Technology

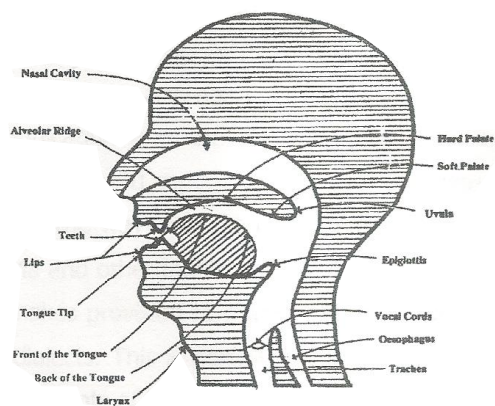
Sounds through the mouth are just part of the totality of sounds in the universe. Sounds occurs when birds sing, or cry, dogs bark, cars or vehicles move, when engines get started, when people sing, claps, cry, shout, etc. When human beings communicate with another they usually do that through speech or talk or writing. Speech or talk involves sounds from the mouth – “Utterance” – which are associated with hearing and meaning for understanding to take place. These mouth sounds combine with one another as may be heard to form meaningful utterances.

When one speaks, one produces a chain of sounds which are mentally arrange in sequence as heard. In mental recognition from stress and intonation resulting from certain movements from the organ part to give syllable or words. The feature of stress, intonation and sequence of these sounds in speech processes become very necessary in life and constitute producing organ sound system – UTTERANCE. The art of

having heard it and trying to represent it as actually heard in the briefest (the most brief) form possible (i.e. sign) involves a developed technique hence “**UTTERANCE TECHNOLOGY**”.

The Utterance Organs

The process of utterance according to Onuigbo (2006), starts from the lungs which acts as power house. As the airstream flows out from lungs through the narrow space of the wind pipe, some sounds are produced. He further said that other organs along the throat in the mouth modify the sounds according to the message which the speaker wants to convey. He added other parts as the vocal cords, the velum, hard palate, alveolar ridge, teeth, lips and the tongue. Among all he described the tongue as the most active articulator because it moves and can, in contact with others create a total or partial obstruction during the production of certain groups of sound (utterance) – consonants. Onuigbo (2006) also added that the tongues distance from the top of the oral cavity influences the quality of the other group of sounds call vowel. Even at all these, it should be noted that utterance are produced only when the airstream flows out of the lungs. Larynx is another organ that also modifies the sound depending on the state of yet another known as glottis through the vocal cords vibratin to produce “Voiced Sounds” or drawn apart not to vibrate to produce “Voiceless Sounds”. All these organs contribute one way and the other to make sounds, see diagram in fig 1 below. According to Onuigbo (2006) still, the movement of the jaws also influences the shape of the lips in the production of the vowels. The expansion or contraction of these utterances organs produces different types of sounds.



**Fig. 1: Diagram showing organs of utterance
(Oral English for Schools; Pg.2)**

Types of Utterances

Ozuruoke (2003) offered an explanation of sounds utterances to be sound made with mouth that is heard or idea or impression conveyed through mouth being heard. Shortly put, - “utterance” from the mouth where the human mouth is the conveying organ. He further categorized mouth sounds (utterance) into 2 groups: for easy follow up of this art.

1. Sounds made with hearable break (CONSONANT)
2. Sounds made without hearable break (VOWELS)

Onuigbo (2006) though based his idea of sound system through English Language also said that it is made up of two main features. Further he said the segmental feature are simply the vowels and consonants while the supra-segmental features are – stress rhythm, and intonation. He further classified the vowels and consonants as individual sound segments and added that the features of stress, rhythm and intonation affects the quality of the sounds, and acted over longer sequences. This is similar to the group, Ozuruoke (2006) in agreement with pitman (1978) referred to as “double consonants”, and “compound consonants”

in addition to diaphones and triphones. This presenter agrees also with Onuigbo (2006), to say that although the relative importance of stress, intonation, etc is generally recognized, efforts made for the teaching and learning of these features are not commensurate with their importance in intelligible communication and the prescribing of art. The reasons for the apparent lack of interest and serious effort by both learners and some teachers especially in Nigeria and other multilingual countries or societies. This proposal if closely followed makes provision to represent exactly what is uttered no matter the language or dialects. This is achieved by careful understanding the nature derivation of the elements of the signs used, as hereafter explained.

Natural Insinuation for Derivations of Sound Signs

Utterances at this stage should be viewed with this technique of getting subsequent sign representation for actual sound in relation to nature. Nature provides that one should always and only be thinking of 2 things in every consideration: - Thus – male and female, day or night, up or down, front or back, bends or straight, etc. Utterance techniques should also keep one within this frame of mind. Sound utterances should be grouped into 2 only too. We had heard earlier of sounds with hearable break or without hearable break let us also add – long short; heavy or light; straight or curve, etc. According to Ozuruoke 2006 as agreed with Pitman (1978) sounds made with hearable break are called consonants while those made without hearable breaks are called vowels. Either consonant or vowel can be made long or short and also be represented with heavy or light sign. The signs used to represent consonant are in form of straight strokes and shallow curves. While those use for representing vowels are in the forms of dots and dashes. Invariably, there can be a light stroke or a heavy stroke for consonant and light or heavy dots and dashes for the vowel sounds. These signs can be derived from Areole et al (2006) put forward as natural look of the earth in globe.

The Consonant Signs Associate

The sounds made with hearable breaks otherwise known as consonants are identified by Pitman to be 24 in number but represented with 26 signs. The signs for these sounds for this mastery aim can be associated with the imaginary natural line on the Globe base on geographical perspectives as seen in these diagrams.

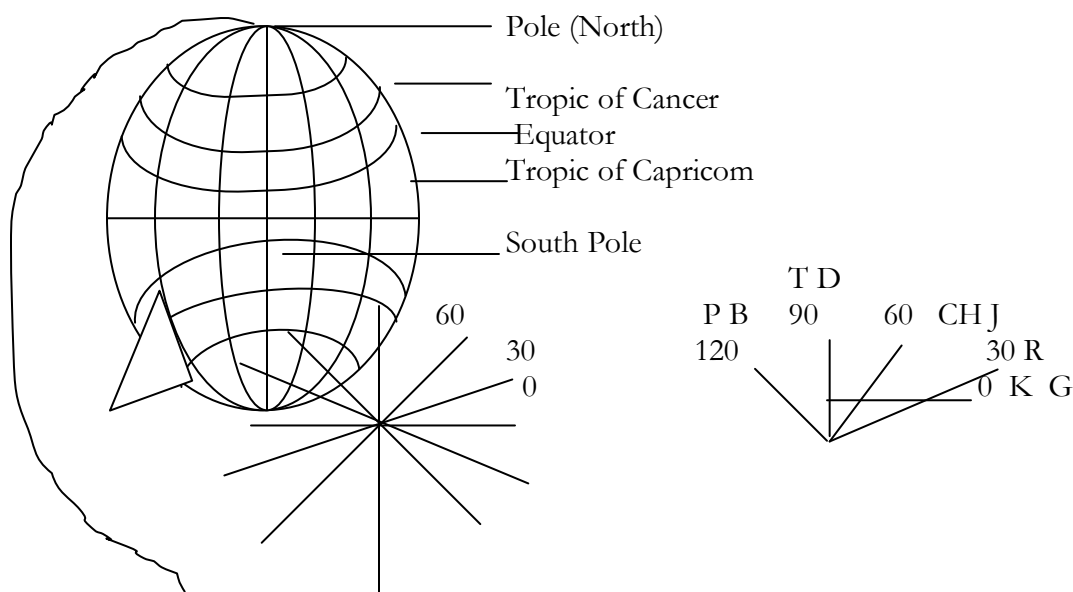
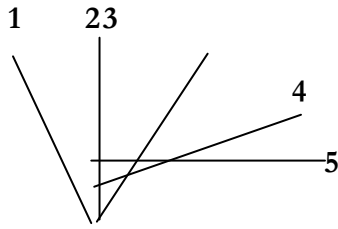


Fig. 2: Pole End Derivation of Straight Strokes
 (Source – Certificate Physical & Human Geography Pg. 7 -13)

From the pole point with a distinct consideration from 0 to 120 at angle 30° intervals every other strokes seems to repeat itself. So five strokes at these intervals can be singled out and used as signs representations of some sound in human speeches (utterances) following pitman’s discovery or shorthand.



0 – 120, 5 selected strokes from 30° interval of the Earth Pole. From this diagram it becomes natural to see that some major consonants derived their signs formations from these strokes, as number 1 stroke is sign representation for

- 1. P and its corresponding heavy B
 - 2. T and its corresponding heavy D
 - 3. Ch and its corresponding heavy J
-

Same can be said of others for K and G as well as derivatives for R and H. Similarly, the Globe too can be used to deduce the signs for the curved strokes by dividing or bisecting the globe in two different perspectives thus vertical/horizontal cutting, diagonal left-down and right-down cutting.

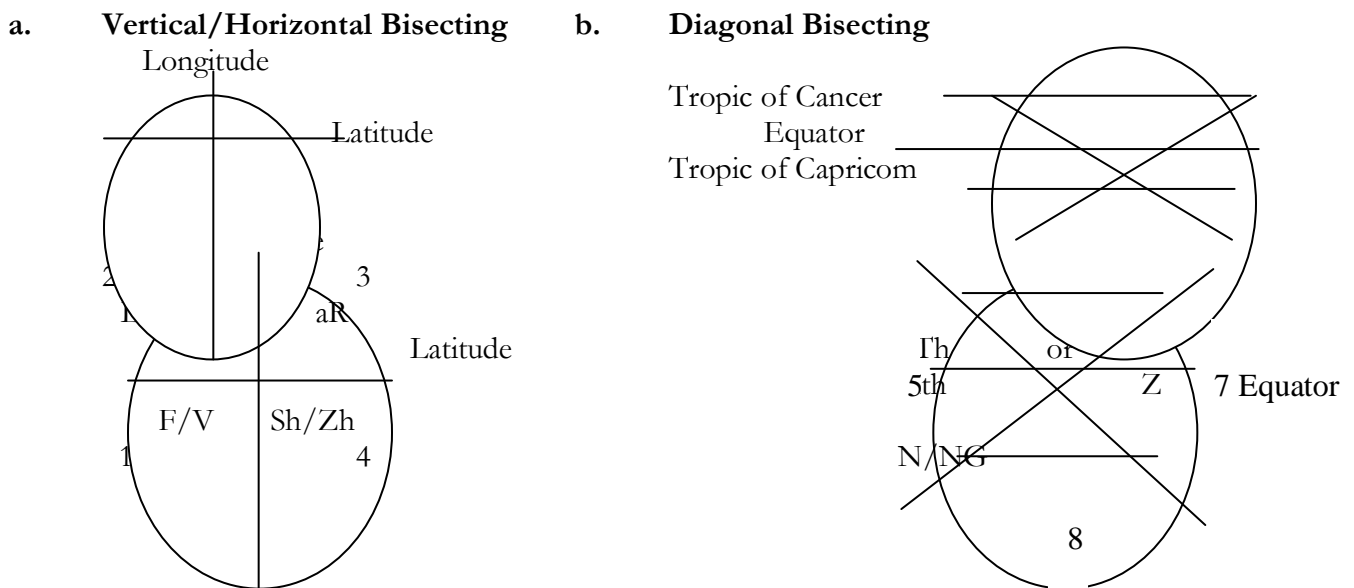


Fig. 3: The Global Derivation of Curved Strokes
 (Source: Certificate Physical and Human Geography for SSS Pg. 8 -13)

From these diagrams it can also be deduced that some other consonants gets their sign representations from these curves. If being bisected in two forms as 1 – Vertical/Horizontal and 2 – Diagonal Bisecting resulting to curve as:-

- Number 1. can be used for F – light and V – heavy

2. can be use for L – light
3. can be use for AR – light
4. can be use for Sh – light and Zh – heavy

On these geographical perspectives it could be seen that consonants are represented with straight strokes and shallow curves. Representing consonants are not only ordinary imaginative drawing but derived from natural, relation to geographical natural curve shapes of the glob. The sounds made without hearable breaks also have similar inclination in agreement with nature for dot as small globe and dash strokes as the latitude line.

Conceptual Negative View As Affecting Recreating Efforts

A Time Consuming Task

The diligence required to master the art of shorthand is time consuming and that is what the uninterested students and teachers complained about. It should be forgotten that “Any thing worth doing is worth doing well and that nothing good comes easy. Pitman (1978) ascertained this in one of his passages by saying that Gold is not gotten on the surface. The believe of “practice makes perfect” should not be forgotten. Onwusu – Ansah (2004) argued that the course sees obstacles or difficulties as challenges which must be faced squarely and conquered. Igbo (2000) in Ozuruoke (2003) says it makes one abides by one’s decisions and accepts responsibilities for them. He further stated that the skill gives one enduring training that is capable to enable one to bear risks and that dexterity and mastery in speed and accuracy are well developed after long term consented efforts.

The Benefits of Acquiring Utterance Technology Skill

Onwusu-Ausah (2004), Orifa (2005), Davis and Gubb (1991) in their various views affirmed that entrepreneurship which has almost the same zeal and involvement as shorthand in skill acquisition, offers – self confidence, self reliance, risk taking and bearing, is result oriented, creativities, initiatives, and leadership quality that ensures success in almost all endeavors.

Igbo (2004), specifically designed what he call SWOT analysis membership – strength, weakness, opportunities and threat analysis of any on going business assessment as to advantageously maximize the use of available assets. Creativities and innovations resulting from the concentration habit also help the one who acquire such techniques to synthesis extensions of other mind dissatisfaction, bulk of job challenges, delay in payment, unemployment will never be associated with anyone that has acquired a wonderful skill technique as this much more could be reviewed.

THE FOCUS OF RECREATING PROPOSAL

Since some of our halls are equipped with computer gadgets for course involving computer such as Computer Appreciation, Computer Application, Word Processing and others. It is hereby proposed that:

1. A good textbook or lecture notes as life packages that is well developed to fully cover all the intricacies of utterances techniques be installed in those computers as “Teach Yourself Utterance Technology” in a lovely sequential order.
2. Head phones provided for each of them so as to encourage individual practices as a form of personal learning not to disturb others.
3. Lecturers of this course can be specifically trained to handle this project accordingly.
4. More computers should be provided to make provision for at least 200 students to be accommodated in a given period in separate halls.
5. This self educative programme will be installed into floppy diskettes and offer to students who may wish to go home with it.

6. This programme which will display both visual formations of sounds heard and signs formed out of what is heard, will no doubt be of immense assistance in eliminating terrors pose by this course to students.

CONCLUSION

Recreating shorthand skill for utterance technology is indeed a welcomed idea in the field of school of business education at least to place and have more recognition, love and appreciations of the subject and to harness the numerous benefits associated with the skill and its acquisition method in a global digital society as in this era.

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**ADEQUACY OF TECHNICAL EDUCATION TEACHERS AND MACHINERY FOR THE
TEACHING AND LEARNING OF WOODWORK: A CASE STUDY OF A SOUTH-
SOUTHERN NIGERIAN TECHNICAL COLLEGE**

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Abstract

This paper examines the adequacy of Technical Education Teachers and machinery for the teaching and learning of woodworking trades in technical colleges with a focus on Sapele Technical College, Sapele, Nigeria. To guide the study, two research questions were raised and answered. A 21-item structured questionnaire was used for data collection. The instrument was validated by three lecturers in the department of technical and Business Education, Delta State University, Abraka, Nigeria. The reliability of the questionnaire was ascertained by the test-retest method with a coefficient of 0.78. Data collected were analysed using mean and standard Deviation. The results revealed that qualified teachers to teach safety and technical drawing are adequate. NCE and B.Sc. (ed) teachers are adequate. Teachers to teach woodworking trades are inadequate, while teachers who are ICT literate are inadequate. Holders of B. Tech (ed) certificates are inadequate. Based on the findings, it was recommended that (a) teachers in technical colleges should be computer (ICT) literate (b) ICT facilities should be made available in all technical colleges in Nigeria (c) Government and the private sector should provide equipment in existing technical colleges in Nigeria to improve instruction.

Introduction

Technical colleges are established by the Federal Government of Nigeria to prepare individuals to acquire practical skills, basic and scientific knowledge and attitude required by craft men and technicians at sub-professional level in order to achieve the goals of technical education, which shall be to:

- 1) Provide trained manpower in the applied sciences, technology and business particularly at craft, advance craft and technical levels.
- 2) Provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development.
- 3) Give training and impart the necessary skills to individual who shall be self-reliant economically.

In pursuance of the above goals:

- (a) The main features of the curriculum activities for technical college shall be structured in foundation and trade modules.
- (b) The components are general education, theory and related courses; workshop practice and Industrial training/production work (Federal Republic of Nigeria, 1998).

According to Digbori-Besmart (1994) the venue for acquiring practical skills by technical college students is the workshop. Technical college provide technical training in a number of courses including Automobile mechanics, Welding and Fabrication, Plumbing, Electrical/Electronics, Painting Furniture making, machine wood-working, carpentry and Joinery, etc. it appears that these courses are taught in technical colleges with inadequate equipment and facilities for effective teaching and learning process. In this study, adequacy of

qualified technical teachers and machinery used in the teaching and learning process, to make lessons meaningful and understandable would be examined. This study aims to find out whether qualified technical education teachers and woodwork machinery for teaching and learning woodwork trades are adequate. Adequacy of technical education teachers and woodwork machinery will enable the learner to receive, understand, retain and apply the knowledge gained to achieve the goals of technical education.

Purpose of the Study

The study seeks to determine the:

1. Adequacy of qualified technical education teachers which include NCE (technical) education teachers holders of B.Sc. (ed) technical or B. Technology (ed) teachers.
2. Adequacy of woodwork machinery which include: portable circular saws, saber saws, portable electric drills, power planes, portable routers, portable sanders, radial saws, table saws and jointers, band saws, surfaces and lathe. These teachers and machinery are for improving teaching and learning woodwork in technical colleges with a focus on Sapele Technical College, Sapele, Nigeria.

Research Questions

1. How adequate are qualified teachers for the teaching and learning woodworking trades in technical colleges?
2. How adequate are woodworking machinery for the teaching and learning woodworking trades in Technical Colleges?

Methods and Materials

The study adopted descriptive survey method. The population was made up of all the 168 students in the woodwork programmes in Sapele Technical College, Sapele, Nigeria. No sampling took place because of the small nature of the population, so all the students in the woodworking trades were used for the study.

Instrument

A 21-item questionnaire designed by the researcher was used to elicit information from the respondents. Their opinions on adequacy of qualified teachers and woodworking machinery for the teaching and learning woodworking trades were sought. Copies of the questionnaire were personally administered on the respondents by the researcher, and collected on the spot.

Face validity of the instrument was determined by three lecturers in the department of Technical and Business Education, Delta State University, Abraka, Nigeria. The reliability was ascertained by test-retest method designed by Tuckman (1988). The instrument was found to have a reliability coefficient of 0.78. The data collected were analysed using weighted mean and standard deviation (SD).

The instrument was constructed using the four-point Likert-type response rating scale namely; Strongly Agree (SA); Agree (A); Disagree (D); and Strongly Disagree (SD) with a corresponding weights of 4, 3, 2, and 1 respectively. The cut-off point was fixed at 3.0. Therefore any item that will receive a mean score rating of 3.0 and above was regarded as agreed; while any mean below 3.0 was regarded as disagreed for improving the teaching and learning woodworking trades.

Results

The results of the study are summarized in the tables and sub-headings below.

Research Question 1

1. How adequate are qualified teachers for the teaching and learning of woodworking trades in Sapele Technical College?

Table 1: Mean ratings and standard Deviation of Qualified teachers for the teaching and learning woodworking trades.

S/N	Statement	Score	Mean	SD	Decision
1.	There are enough qualified teachers to teach carpentry and Joinery	338	2.01	9.16	Disagree
2.	There are rough qualified teachers to teach furniture making	394	2.34	9.69	Disagree
3.	There are qualified teachers to teach machine woodworking	329	1.95	10.21	Disagree
4.	There are enough qualified teachers to teach technical drawing	569	3.38	11.51	Agree
5.	There are enough qualified teachers to teach wood work safety	566	3.36	10.47	Agree
6.	There are enough teachers with NCE	591	3.5	11.64	Agree

7.	There are enough teachers with B.Sc. (ed) technical education	522	3.10	10.15	Agree
8.	There are enough teachers with B.tech (ed) degrees	405	2.4	8.93	Disagree
9.	Most of our teachers are ICT literate	412	2.45	8.91	Disagree

Cut-off point = 3.0

N = 168

Table 1 shows the responses of the respondents on the adequacy of qualified teacher for the teaching and learning of woodworking trades at Sapele Technical College. The respondents agreed on four items as adequate out of the nine items, while five items are adjudged inadequate for improving teaching and learning.

Research Questions 2

How adequate are woodworking machinery for the teaching and learning woodworking trades in technical colleges?

Table 2: Mean ratings and standard deviation of respondents on adequacy of woodworking machinery for the teaching and learning woodworking trades.

S/N	Statement	Score	Mean	SD	Decision
10.	Portable circular saw is adequate	412	2.45	8.92	Disagree
11.	Sawber saw is adequate	400	2.38	9.02	Disagree
12.	Portable electric drill is adequate	436	2.59	9.03	Disagree
13.	Power plane is adequate	411	2.44	8.92	Disagree
14.	Portable router is adequate	392	2.33	9.13	Disagree

Conclusion

School workshop, laboratories and the environment where vocational and technical education is given must be adequately equipped to reflect the actual working environment. It is recognized globally that technical college workshop, etc should be well equipped with instructional facilities. In short the school workshops should look like the workshop where the students will work after the training. It is only through this way that the students' effectiveness and efficiency in the world of work can be ensured after training.

Recommendations

1. ICT facilities should be made available in all technical colleges in Nigeria for improving teaching and learning of woodworking trade.
2. Teachers in technical colleges should be computer (ICT) literate.
3. Companies, government and other organizations should take the responsibility of the provision, production and contribution of simple machinery to improve the poor state of instruction in technical colleges in Nigeria.

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ASSESSMENT OF SECONDARY SCHOOL TEACHERS' USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN OYO METROPOLIS OF OYO STATE

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Abstract

This study examines the availability and usability of Information and communication technology among secondary school teachers in Oyo Metropolis. The Research Design employed is the descriptive survey design. Three research questions were formulated for the study. The population for the study consisted of 120 secondary school teachers. Questionnaire was used as the instrument for gathering data for the study. Data collected were analyzed using frequency tables and simple percentage. Results of the study showed that ICT facilities are not available in most of the schools covered. It was also observed most teachers used as the sample for the study, are not competent in the use of ICT. Recommendations were then made to the government.

Introduction

Information and Communication Technology (ICT) may be viewed in different ways. Rodriguez and Wilson (2000) defined ICT as a set of activities which facilitate by electronic means the processing, transmission and display of information. ESCAP (2000) in its own definition defined ICT as techniques people use to share, distribute, gather information and to communicate through computers and computer networks. Marcelle (2000) described ICT as a complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media. Ogunsola and Aboyade (2005) viewed ICT as a cluster of associated technologies defined by their functional usage in information access and communication of which one embodiment is the internet. Information and Communication Technology are computer based tools used by people to work with information and communication processing needs of an organization. It purview covers computer hardware, software, the network and other digital devices like video, audio, camera and so on which convert information (text, sound, motion etc) into digital form (Moursund and Bielefeldt, 1999). Information and Communication Technology as tools within the school environment include use for school administration and management, teaching and learning of ICT related skills for enhancing the presentation of classroom work, teaching/learning repetitive tasks, teaching/learning intellectual, thinking and problem solving skills, stimulating creativity and imagination, for research by teachers and students and as communication tool by teachers and students (Collis and Moonen, 2001, Derbyshire, 2003; Moursund and Bielefeldt, 1999).

The field of education has been affected by ICTs, which have undoubtedly affected teaching and research (Yusuf, 2005). A great deal of research has proven the benefits of ICT in improving quality of education (AL-Ansari, 2006). As a result of this, developed nations have integrated ICT into their educational system. Adomi and Kpangban (2010) observed that there are developments in the Nigerian education sector which indicate some level of ICT application in secondary schools in Nigeria. They traced the introduction of computer education in secondary schools to 1988, when Nigeria government enacted a policy on computer education. The Federal Government of Nigeria in the National Policy on education 2004 recognizes the prominent role of ICTs in the modern world and has integrated ICTs into education in Nigeria (Adomi and Kpangban, 2010). To actualize this goal, the document states that government will provide basic infrastructure and training at the primary school. At the junior secondary school, computer education is made a pre-vocational elective and is a vocational elective at the senior secondary school.

The Federal Ministry of Education launched an ICT-driven project known as SchoolNet, which was intended to equip all schools in Nigeria with computers and communication techniques. Under the SchoolNet programme, MTN provided fully operational computer laboratories with 21 personal computers, VSAT interconnectivity, hand-on training in 24 secondary schools in Kaduna, Lagos, Enugu, Kwara, Rivers

and the Federal Capital Territory Abuja. In all, over 49,524 pupils and 2,412 teachers were trained on how to use ICT facilities (Abdul-Salaam, 2007).

To adequately provide ICT facilities to secondary schools, the Nigerian Federal Government commissioned a Mobile Internet Unit (MIU) which is operated by the Nigerian National Information Technology Development Agency (NITDA). The MIU is a locally-made bus that has been converted into a mobile training and cyber centre. Its interior has ten workstations, all networked and connected to the internet. The MIU is also equipped with printers, photocopiers and a number of multimedia facilities. Internet connectivity is provided via VSAT with a 1.2m dish mounted on the roof of the bus. It is also equipped with a small electric generator to ensure regular power supply. The MIU takes the internet to places, areas and various secondary schools (Adomi and Kpangban, 2010). They added that the number of these buses is so small and as a result most rural schools are yet to benefit from this project.

Successful integration of ICT in the school system depends largely on the availability and competence and the attitude of teachers towards the role of modern technologies in teaching and learning. Research works have shown that most secondary schools have either insufficient or no ICT tools to cater for the ever increasing population of students in the schools and where they are available, they are by implication a matter of out-of-bounds to the students (Chattel, 2002; Cheng, 2003; Chiemekwe, 2004). Fakeye (2010) also found out in a study carried in Ibadan that in most of schools covered in the study do not have computers, hence are not connected to the internet. He added those who have computers do not use them for teaching but solely for administrative purposes. In another study by Okwudishu (2005), he found out that the unavailability of some ICT components in schools hampers teachers' use of ICTs. Lack of adequate search skills and of access points in the schools were reported as forces inhibiting the use of internet by secondary school teachers (Adomi and Kpangban, 2010).

A survey carried out by Cirfat and Longshak (2003) revealed that only one school, out of ten has computer sets. It is worth noting that none of the ten schools has internet facility. Ozoji (2003) reported in a study that most of our secondary schools do not have software for the computer to function. One of the unity schools has five computers against a population of 900 and no internet software was installed. The facilities are grossly inadequate for any meaningful teaching or learning to take place. On teachers' competence, teachers in Nigerian secondary schools are not competent in basic computer operation and in the use of generic software (Yusuf, 2005), although they have positive attitude towards the use of computer in Nigerian secondary schools. This finding revealed the low level of ICT penetration in the Nigerian school system. This reveals the state of ICT in most of the Nigerian secondary schools. The main purpose of this study was to investigate the availability of ICT facilities, level of knowledge possessed by teachers in some selected secondary schools in Oyo Metropolis.

Research Design

The descriptive survey method was considered as the appropriate design because the study is directed towards people, their opinions, attitude and behaviors. The area covered by the study is Oyo Metropolis, covering the four local governments that make up Oyo Metropolis. They are Oyo East, Oyo West, Atiba and Afijio Local Government Area.

Research Question

The following research questions were formulated for the study:

- How readily available are ICT's facilities in schools for the purpose of teaching and learning?
- Do teachers use ICT in Teaching?
- Do teachers in secondary schools have the needed experience and competence in the use of computers either for educational or industrial purpose?

Population of the Study

The population of this study was made up of 120 teachers from twelve secondary schools that were randomly selected from the secondary schools in the four local governments using the random sampling

technique. Ten teachers were randomly selected from each of the twelve schools making a total of one hundred and twenty (120) teachers for the study.

Research Instrument

The instrument for the study was developed by the researcher based on established procedures in literature. The instrument contained of three sections. Section A focused on the demographic information of the teachers. Section B focused on the availability of ICT facilities in the schools while section C contained questions on the usability of these facilities by secondary school teachers.

Validity and Reliability of Instrument

The face validity and content validity of the instrument were verified by experts in the Computer Science Department and School of Education, Federal College of Education (Sp) Oyo. The various suggestions made were used to modify the instrument. In order to ascertain the consistency of the instrument, test-retest method was used to ascertain the reliability. The questionnaire was administered twice on the sample. The interval between the first and second administration was three months. A correlation of 0.84 was achieved which was considered high enough to justify the reliability of the questionnaire.

Procedure for Data Collection

The researcher visited the selected schools to administer questionnaire developed for the study. The 120 copies of the questionnaire were administered on the respondents and collected back on the spot.

Methods of Data Analysis

Data Collected from the study were analyzed using descriptive statistics of frequency counts and Simple Percentage.

Results

The demographic information of the participants is given in table 1.

Figures from Table 1 below shows that 8.33% of the respondents are between the ages of 21 and 30, while 50% falls between 31 and 40, 33.33% are between 41 and 50 while 8.33% are 50 years and above. It also showed that 58.33 of the respondents are female while 41.67% are male. 25% of the respondents are NCE holders, while 66.67% hold a first degree and 8.33% of the respondents are masters degree holder. 8.33% of the respondents have spent 1 to 10 and 31 years above respectively in the teaching service. 58.33% of them have spent 11 to 20 years while 25% of them have spent 21 to 30 years in secondary schools as teachers.

Table 1: Demographic Information of Respondents

ITEM	FACTOR	PERCENTAGE
AGE	Age (Year)	Percentage
	21 – 30	8.33
	31- 40	50
	41 -50	33.33
	51 and above	8.33
Sex Distribution	Sex	Percentage
	Female	58.33
	Male	41.67
Educational Qualification	NCE	25
	B.A/B.Sc/B.Ed/B.Sc Ed/B.A Ed./HND	66.67
	M.Sc/M.A/M.Ed	8.33
Years of Experience	1 – 10	8.33
	11- 20	58.33
	21 – 30	25
	31 and above	8.33

Research Question 1: How readily available are ICTs facilities in schools for the purpose of teaching and learning?

The analysis as it applies to the above research question is as shown on Table 2 below

Table 2: Availability of ICT Facilities in Schools

SN	STATEMENTS	YES	%	NO	%
1.	There are enough computers in my school	30	25	90	75
2.	My school has Educational Software for teaching	10	8.33	110	91.67
3.	Our computers are connected to the internet	5	4.17	115	95.83
4.	We have interactive Boards in our schools	0	0	120	100
5.	There are Television set that we use for teaching	10	8.33	110	91.67
6.	We have enough printers	10	8.33	110	91.67
7.	There are Photocopiers in my schools.	15	12.5	105	87.5
8.	Multimedia Facilities are available for teaching	0	0	120	100
9.	We have Projectors in our schools	2	1.67	118	98.33
10.	Presence of a virtual library	0	0	120	100

The results in table 2 are on the availability of ICT facilities in secondary schools. Results showed that ICT facilities are not readily available, with items 1 to 10. 75% of the teachers stated that they do not have enough computers. The study showed that none of the school covered in this study have interactive boards, multimedia facilities and virtual library. 8.33% of respondents said that they have educational software, television set and printers, while 4.17% of the respondents said their computer systems are connected to the internet. 12.5% of the respondents said they have photocopiers in their schools.

Research Questions 2 & 3: Do teachers use ICT in Teaching? and Do teachers in secondary schools have the needed experience and competence in the use of computers either for educational or industrial purpose?

The Table 3 below shows results for the analysis of the research questions stated above.

Table 3: Teachers use of ICT Facilities

SN	STATEMENTS	YES	%	NO	%
1.	I can boot the computer	40	33.33	80	66.67
2.	I use the computer to teach my students	12	10	108	90
3.	I use the computer to keep records	02	1.67	118	98.33
4.	I use Microsoft Word to type Questions and other documents	18	15	102	85
5.	I use Microsoft Excel to teach basic mathematics	02	1.67	118	98.33
6.	I use Power Point In Presenting my Lesson	00	00	120	100
7.	I browse the Internet to get materials for teaching	09	7.5	111	92.5
8.	I have an e-mail address	35	29	85	71
9.	I can use a search engine such as google	12	10	108	90
10.	I use education software such as CAI for teaching	08	6.67	112	93.33
11.	I can set up a database using MS Access	00	00	120	100
12.	I can use a scanner to copy images	02	1.67	118	98.33
13.	I can operate a printer that is connected to the computer	40	33.33	80	66.67
14.	I can set up a multimedia projector	02	1.67	118	98.33

The Table 3 above provides answers to the research question 2 and 3. 66.67% of the respondents cannot boot the computer. 10% of them use the computer to teach their students. 1.67% use the computer to keep records and use Microsoft Excel to teach basic mathematics, while 15% use Microsoft word to type their questions and other document. 7.5% of the respondents get their teaching material from the internet, 29% have e-mail address, so it means 29% of the respondent use the computer to send and receive mail. 10% of the respondents can use a search engine, while 6.67% of them use educational software such as CAI for teaching. 1.67% of the sample can use a scanner and can also set a multimedia. 33.33% of the respondents can print using a printer. The study showed that none of the respondent use power point and Microsoft Access.

Discussion

The result of this study shows that ICT facilities are not readily available in the schools covered by this study. It also shows that most of the schools are not connected to the internet. Schools with computers do not have the relevant educational software required by their students. In addition, the computer available in these schools cannot meet the need of the large population of students in these schools. Some schools with internet connectivity have been cut off because they have not been able to pay their access fee. The findings of this study are in line with that of Fakeye (2010) and Oyejola (2007) that most schools in Nigeria are ill equipped for the application of ICT.

The study also showed that most teachers in secondary do not use ICT teaching students, for administrative purpose and for their personal purpose. It observed that most of these teachers lack the knowledge, competence to use ICT to facilitate teaching-learning process. This Fakeye (2010) attributed to non availability of ICT facilities. He believed that the non availability of these facilities greatly hinders access and inadequate training of teachers on the use and application of the computer.

Conclusion

From the study it was concluded that ICT facilities are not readily available in our secondary school and that there is low level of ICT utilization in our secondary schools. The study revealed that most teachers lack the basic skill to use the computer and other ICT devices. Based on the findings, it is however, recommended that:

1. Government should ensure that ICT facilities be provided in schools. Education Tax Fund should be involved in procuring computer for secondary schools.
2. Government should revisit the curriculum at secondary schools level with a view to incorporating the use of computer and ICT assisted instruction in the teaching and learning process.
3. Teachers at secondary school levels should be trained on the use of ICT facilities through regular seminars and computer literacy workshops to keep them abreast of computer and ICT based instruction.

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STENO-ENTREPRENEURSHIP SKILL RETRAININGS: A VERITABLE TOOL AS EMERGING REALITY FOR QUALITY BUSINESS EDUCATION FOR DEVELOPING NATION

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Abstract

*This paper opines that **entrepreneurship Skill** be combined with **Stenographic Skill** to have a common name STENO- ENTREPRENEUR for quality education that inculcate two viable skills into one for Business Educators and be offered at regular workshops at given intervals. This can keep the undertaker at a more advantageous position for effective role performance in a developing nation where unemployment is a societal problem as in Nigeria today. It agitates here as presented in a **twelve slides power point**. It explains what is meant by steno- entrepreneurship and spelt out the qualities and functions expected of such personnel. Motivating factors and strategies for inculcating such desired skill were fully presented. This paper further agitates that multinational companies, banks and financial houses which records have shown their high profit margin over others be made to aid a developing nation like Nigeria to finance such steno- entrepreneurship skill acquisition programme. The paper also affirmed that such resources can be tapped to enhance the teaching and learning quality education programmes in steno- entrepreneurship skill as solution to challenges for effective and efficient education and for developing nations.*

Introduction

The worldwide economic depression of the early 80's that is about repeating itself these days and the improper management of Nigeria's oil resources and wealth that brought about rapid deterioration in our economy are pointers to the modern genesis of survival efforts of human beings. Industrial output that surged up world economy since after 18th century shrunk to all-time low commercial activities including negative stock market results. This consequently reduced substantially cash flow and developmental strides in the society leading to less of employment opportunities for millions of job seekers world-wide (Igbo C.A, 2003) affirms to this. He further in addition said that unemployment preens poverty which in turn is one of the greatest problems plaguing developing nations today, and put the figure of Nigerian living below poverty level at 60 million (World Bank 1998). The Nigerian Federal Office of Spastics (FUS) in 1999 stated that as at 1996, unemployment figure rose to 62 million (Ajayi 2000). No doubt the youths and tertiary schools graduates are at the top or this figure reason Larum stated that only 110% (percent) or about 100,000 have prospect or securing employment on graduation from Nigerian secondary and tertiary institution yearly. He further called for high need for reformation at this angle in Nigerian tertiary institutions, implication of steno-entrepreneurship skill in this case is eminent.

This situation can improve if our undergraduates this lecturers renewal programme in steno-entrepreneurship especially with the agitated integration of stenography skill. The reform of individuals in this direction of entrepreneurship enhance country business education and national reform. Reform in this

regard mererore becomes an emerging issue that can now be acquisition well enough in the nation education system for good quality and poverty alleviation in this modern era.

The union no accur is ungeneration revolution like the industrial revolution of the seventeenth century in history that spread some among many time men. The present

Palmtops etc that can be used in our rooms of offices an get connected to any part of the globe.

Entrepreneurship is a special skill that is mistakenly thought to be a free-for-all talent. It is only when business endeavor fails that people realizes the benefits and special talent endowed in a trained entrepreneur. These days it is evidently realized that such a wonderful skill as entrepreneurship could be given a special place in the curriculum of education. Others saw it as an instrument that should be developed through business. With that of stenography as a regular renewal programme is a very welcoming development. The digital revolution that has come to stay makes it even more imperative for the functions of an entrepreneur to be simplified ably expanded. Unlike the industrial revolution where large and heavy engines and irons were invoked, the digital revolution makes things coin sized, portable and rapidly too. The laptop and palmtop computers as well as the mobile phones sets are cases of records as examples.

A more pragmatic entrepreneur is in no way exempted from the uses of these gagers. A proper and effective uses of these gagers call for knowledge and skill of word processing (typing) with regular workshop for retraining as in been proposed here. But as a professional this work is not only agitating processing idea only but calling for the full knowledge and skill or stenography to be acquired in line with entrepreneur skill. For any group on the currencies in these set of professional personals, let the explanation here below assist.

- An entrepreneur is one who has the act of managing business firms
- A word processor is one who can just operate the keyboard of the machines and produce documents in mail able printed form
- A stenographer requires the knowledge or sounds, able to represent them and as well produce them in ail able printed form.

It is this kind of joint-skilled personnel that this paper is agitating for and as part skill to b e on regular renewal to make a more quality business education.

Stenography is one of the most important ingredients that can be used for self reliance. The current digital revolution otherwise known as “*touch button life*” highly requires this skill. Therefore, an entrepreneur with it remains unbeatable human resources in the field of business and in societal commerce generally.

The skill however cannot be properly impacted without going through the curriculum where the frame works for entrepreneurship education are spent out to integrate stenography skill. The curriculum is also the emerging source from which the teacher or instructor and the school administrators derive desirable learning experiences to be impacted on the learners.

Despite the rich and well articulated ideas embedded into the art of stenography the subject is yet to be given any consideration in the curriculum of entrepreneurship. This paper is to address the issue of stenography hitherto perceived as shorthand and typewriting major and how it can be integrated into entrepreneurship education through seminars and workshops to meet the digital evolutionary benefits of an entrepreneur for better quality education. This can be possible with a well articulated curriculum that will

integrate *both stenographic and entrepreneurship items* as emerging educational issue for effective and efficient quality business education.

One of the aims of this paper is to see the entrepreneurship with stenographic elements could be kindled at all level of our tertiary education as products of this level of any education are regarded as the trainers of all others. The role of the teachers as the builder and molder of destiny cannot be overemphasized. Business management generally that once the teacher trainers at this level are able to acquire problems of any growing nation in terms of employment would have been solved as the quality of education must have been enhanced. This paper is therefore going to handle this emerging issue of quality steno- entrepreneurship education under the following subheadings:

1. Stenographic Entrepreneurship Qualities
2. Functions of a Stenographic Entrepreneur
3. Motivating Factors in Entrepreneurship/Stenographic Resources
4. Strategies for Inculcating Stenographic Entrepreneurship Skill on Learners

The Qualities Expected of Stenographic Entrepreneur

Every business is an adventure (Orunloye 1992), which largely depend on the ability of the entrepreneur to effectively use his positive qualities. It also depends on the entrepreneur's ability to acquire and utilize effectively the experience of those who have succeeded or failed in the type of venture he or she failed compare to the type of venture so intended to undertake. Some of the positive tools associated with skill are:-

- (1) **Self-Confidence and Self Reliance:-** This is about the greatest tool to be acquired through stenographic entrepreneur. The skill must make one believe in oneself ability to achieve goals in either working for others or reliance on one's own skill. He or she sees obstacles or difficulties achieving goals as challenges which must be faced squarely and conquered. He or she is trained to maintain a high level of emotional stability in the face of difficulties (Readom 1950), in Igbo A. C. (2000). It makes one abides by one's decisions and accepts responsibilities for them.
- (2) **Risk Confident:** An entrepreneur must calculate the risk involved in any project and is confident of overcoming it, this must begins from the learning process. The skill of stenography gives one, ample enduring training that is capable to enable one to bear technical and digital know how experiences, attributes and values that can take care risks (Ghana 2001). The risks are such that can provide reasonable and challenging chances of success.
- (3) **Task (Result) Orientation:-** An entrepreneur is result oriented . The idea of considering stenographic skill is an enhancement to further affirms the actualization of the task oriented skill which should spell out measurable goals. He should be able to put in lots of physical and mental energy in the venture stenographic skill acquisition methods has a lot to offer in this regard. Speed and accuracy tasks are major skills developed in the learning of the stenographic arts, which makes it more relevant for an entrepreneur.
- (4) **Creativity:** An entrepreneur should be creative and think positively different from others. Stenographic skill offers this as the art of representing sounds with signs and the ability to know it and recognize it any other time no matter how long the write-up last.
- (5) **Initiative:-** Another quality an entrepreneur must possess is that of initiative. This again abounds in stenographic act acquisition. The signs associated with sounds are automatically initiated according to the rule of the art. An entrepreneur with this character and skill can easily transfer same to others in the horizon of business.
- (6) **Leadership:-** The leadership quality expected of an entrepreneur can only manifest through good command of the subject matter. An entrepreneur can only boost of what he or she know if there is an evidence. And evidence can only be gotten if it is provided. And provision can only be made if available. And available can only be ascertained of a proper record. Record can only

be kept by whoever knows how to keep it and has kept such accurately too. A good stenographer does not quarrel her records interpretations.

Stenographic Functions for Effective Entrepreneurship

A quality educated stenographic-entrepreneur that is well groomed can function effectively on the following categories:-

- 1) **Involvement In Marketing And Recording:** Opportunities arise and disappear at surprising speech. This might be because of the changing environment and there is a limited period of time when market offers opportunities and keeps proper records of the exploration and manifestations of such when one avails. Marketing may include organizations goods and the skilled stenographic entrepreneur, personnel, sees to the manipulation of the digital key machines for communication round the globe for the business depending on the socio-economic requirements of their operations which can instigate the personality involved.

Here in Nigeria, some organizations can help an entrepreneur to identify investment opportunities through what Igbo (2005) describe as GAP ANALYSIS. Gap analysis she said, is involves identifying a gap between customers desire and what other entrepreneur offer. The entrepreneur can do this through market research and survey. Some organizations can also help an entrepreneur to identify investment opportunities through (IDCS) just as some do same for job opportunities. A steno-entrepreneur fits well and stands a better chance above others. Bodies associated with these services include I.D.C – Industrial Development Centres. Operation of the most comfortable machine for communication – Computer, Internet becomes inevitable. It behooves a steno-entrepreneur to familiarize himself or herself in to the system.

- 2) **Improve Duplications:** This includes looking into other peoples' and organizations' ideas, coping with them and improving on them, adopting such good ideas for oneself or his organization. He sniffs around and got alerted to happenings about other firms, see their weakness and shortcomings and uses them to modify his own goods and services and remain favourable in competition. The idea here can only go perfectly well with an entrepreneur that has stenographic skill. A stenographic entrepreneur may use ideas that worked elsewhere believing it will work out in the present situation considering the socio-cultural environment of the new area and engagements. This is highly common now through the computer net working.
- 3) **Identification And Analysis of Investment Opportunities:-** This can be understood better through what Hasty and Reade (1995), call "SWOT" analysis – Strength, Weakness Opportunities and Threats Analysis in Igbo (2004). In this respect an entrepreneur must know the strength and weaknesses of an on going business by assessing the factors and advantageously maximize the uses of all available assets and can minimize or even eliminate obstacles posed by inherent weaknesses. Analyzing weakness and such negativities as that can be overcome by hiring an outside expert in the areas in which the ordinary entrepreneur knowledge and experiences are limited especially in the case of stenographic skill. But with the stenographic entrepreneur as agitated in this paper, such wastage of hiring will not be there. Additional training will only take the form of retaining to bring such stenographic entrepreneur up-to date. Instead of looking for such other close skilled person to work with as suggested by Igbo (2004). Steno- entrepreneur with magic fingers on computer networking solves it all.
- 4) **Creativity:-** This involves exhibition of new ideas and the capability of an entrepreneur to do something in a way that no body has thought of and put forward before. We can consider briefly here the four forms of creativity as put forward in Igbo (2004).

- i) **Innovation:-** This refers to originality, couple with ability to develop new products, new technology, new distribution outlet, new supply, etc. For an entrepreneur to be successful he must always come up with new ideas.
- ii) **Synthesis:-** This is another form of creativity which involved combing information from many sources, analyzing and sieving them and then integration them into something new. Such information could come from salesmen or newspaper; graduates or telecasts or even from complains of middlemen or customers.
- iii) **Extension:** This involves expansion and enlargement of current boundaries of relationship with banks and financial houses, government agencies, and suppliers of new materials. Records concerning all these must be in order and this will not pose any hindrance for a stenographic entrepreneur.
- iv) **Establishing An Enterprise:** This involves the determination of the tasks necessary to achieve goals planning, organizing, writing mission statement, selecting and allocating necessary resources coordination of activities and motivation of personnel, redesigning records and information to suit establishment and enterprise purpose and goal achievement.

Perfect manipulative fingers on the computer networking and the dexterity to be postulated by a steno-entrepreneur can make out these four forms of creativity effectiveness and oriented goals achievable.

Motivation Enhancing Factors for Steno- Entrepreneurship Skill

Many factors can enhance individuals decide to embark on entrepreneurship skill. There are negative and positive factors (Igbo 2004), that can be remedied and enhanced respectively by quality education stenographic skill renewal workshops.

The Negative Factors are:-

- a) **Job Dissatisfaction:-** This arises when an individual feel his skills, experience and other attributes are not been properly utilized. He/she may become dissatisfied with his job. The inability to carry out perfectly any part of a given tasks. For example typing delays and displeases one.
- b) **Lack of Job Challenges:-** When a job is becomes routine and no longer offers challenges or diversions, it might lead to establishment of another industry where satisfaction can be got. But a stenographic entrepreneur will always get enough work to occupy him/her opportunity of changing from one job type to another is always there to avoid fatigue or monotony.
- c) **Delay in Payment:** When a worker is poorly remunerated in relation to amount and time of payment unnecessarily delayed for months as with teacher previously, in some states. An entrepreneur (sole) may function negatively. But with stenographic experience, other types of jobs as type setting, photocopying, etc. can fetch instant cash for him to go with cheerfully.
- d) **Unemployment:-** The ordinary entrepreneur may lack jobs but the additional skill of stenography will provide more opportunity to him/her. Retrenchment and lack of job which has become the order of the day in most forms can lead an individual into stenographic entrepreneurship skill, where unemployment itches might not be felt.

Functions Expected To Enhance The Steno-Entrepreneur Renewal Includes:

- (a) **Encouragement:** A stenographic entrepreneur can be encouraged by friends and relation based on the skill acquired on how to always be on job as a result of the skilled quality education attained from such dual skill.
- (b) **Favourable Government Policies:** According to Igbo (2004) includes:
 - i. National Directorate of Employment (NDE)

- ii. Nigerian Bank of Commerce and Industries (NBCI)
- iii. Industrial Development Centre (IDCS)
- iv. Nigerian Economic Reconstruction Funds (NERFUND)
- v. Nigeria Agricultural and Co-operative Bank (NACB)
- vi. Small Scale Industries Credit Scheme (SSICS)
- vii. State and Regional Investment Companies (SRIC)
- viii. Small and Medium Enterprises Scheme (SMES)

Every one of these advocates for quality education skill that can well be met and occupied by a stenographic-entrepreneur.

- (c) **Provision of Venture Opportunities:-** A person may be running a business part-time but realizing the venture is a success might decide to get into the business full-time. The extra skill of being able to process his documents and communication data himself generally keeps him better ahead of others.
- (d) **Job Security And Independence:** Fear of losing a job or being retrenched or literally can motivate one to in addition to acquiring stenographic skill establish an enterprise of his /her own boss can also motivate one to become as entrepreneur. But enhancing this with stenographic skill assures one more than ones counterparts that are not so equip skillfully.

Strategies for Inculcating Stenography Into Entrepreneur

The much talked about quality education steno- entrepreneur skill can be impacted through the following:

- (a) **Selecting Resources That Enhances Skill Acquisition:-** For a stenographic entrepreneur skill to be impacted on the students and the students succeed in life, the sources for acquiring the resources must be identified and selection made of the ones that are of comparative advantages. In management generally the five Ms are always attested to as such major sources. They are: - Money, Man (Manpower), Materials, Management and Machinery. An entrepreneur of the caliber agitated of here need to use either some of or all of these Ms to get him/herself inculcated to the skill required of these personnel. The issue of adequate management of such each of the Ms stipulated above is a direct strategy for producing an entrepreneur that can stand the test of time.
- (b) **Planning:** This is an indispensable tool for anyone that wished to succeeds in business. Even in an on-going job one can plan and had additional skill to the one he/she is working with. In fact, on the job training has been proved beyond reasonable doubt as a strategy for improvement, both in business and in life generally. In fact Igbo (2004) says that an entrepreneur who is weak in planning needs extra hands. So it is better acquired than sort for elsewhere. Objectives need be stated and mission statements written to answer some basic questions about business ventures. It is also imperative to plan about services one can start with few number of people and how to appeal to target consumers. This also include how ell and shows some innovative ways to deal with customers pleasantly and take the product of your skill to where it is wanted.
- (c) **Suitable Environment For Inculcating This Integrated Skill Into The Learners:-** The lecturers involve in stenographic entrepreneurship education should always be at their best emotionally and ensure to make explanation of facts in the most appreciable ways. Introduce more in-depth information as the learners go higher in the lesson discussion. The lecturer should be able to skillfully shape students attitudes towards understanding the relationship between what they are studying and that of natural relational examples. In doing this, it may go along well if extra curricular activity in form of orientation as a regular programme is adopted. The classrooms for these courses must be made to have adequate facilities necessary. This goes in line with Schammbberger (1987) and Butler (1987) who said of small business owners and junior executive trainings as an example of

inculcating skill that works for training up an entrepreneur. This should be done in adequate environment.

The use of games like monopoly and Gbasibo, S. (2004) shorthand games is a good way of training up a stenographic- entrepreneur in addition to assignments. Assignment related methods as put forward by Igbo (2004), for the right impartation process to developing steno-entrepreneur includes:-

- Development of business idea and how to identify business opportunities for professional steno-entrepreneur
- Writing business plans and presenting it to others, in supporting the skill.
- Writing reports – to include additional functions and benefits of a steno-entrepreneur.

Conclusion

Entrepreneurship is synonymous with self employment just as stenographic skill. Quality education that integrate these skills in one naturally might be a huge solution to any nation's problem of unemployment and underdevelopment. Youth can be taught stenographic entrepreneurship skills specifically. With quality education and the right environment in terms of the 5 Ms earlier in here presented. Nigerian youths can get into stenographic entrepreneurship. This idea of providing a renewal programme will definitely stem the tide of effectiveness of education for employment against unemployment, poverty and other social malaise of which rise had much affected the developing nations. A combination skill as this is possible with relevant quality education. This is hereby highly recommended for a developing nation as Nigeria and others. We dearly need to take a bold step in this direction to make the required positive change.

Recommendation

At this point the following recommendations are hereby postulated:

1. It will be very helpful to identify business and steno-entrepreneurships ventures in every area of studies and organizational setups, write mission statements of some of the business and job opportunities, for prospective quality educational steno-entrepreneurship skill.
2. set up objectives or goals the missions hope to achieve through quality educational steno-entrepreneurship skill development.
3. Identify source of funds for take-off and managerial strategies to be adopted in training up adequately this caliber of human resources for a developing nation's need using multinational companies, financial organizations, even wealthy philanthropic individuals and government at various levels.
4. Quality steno-entrepreneurships education should be a quality education method of solving the problems of poor education, poverty, unemployment and other societal imbalances in any developing nation, under utility of human resources and none availability of required manpower.

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CHALLENGES OF ENERGY SAVING CRISIS AS A PANACEA TO HYBRID ELECTRIC VEHICLE (HEV)

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Abstract

Modern HEVs make use of efficiency-improving technologies energy such as regenerative braking, which converts the vehicle's kinetic energy into battery-replenishing electric energy, rather than wasting it as heat energy as conventional brakes do. Some varieties of HEVs use their internal combustion engine to generate electricity by spinning an electrical generator (this combination is known as a motor-generator), to either recharge their batteries or to directly power the electric drive motors. Many HEVs reduce idle emissions by shutting down the ICE at idle and restarting it when needed; this is known as a start-stop system. A hybrid-electric produces less emissions from its ICE than a comparably-sized gasoline car, since an HEV's gasoline engine is usually smaller than a comparably-sized pure gasoline-burning vehicle (natural gas and propane fuels produce lower emissions) and if not used to directly drive the car, can be geared to run at maximum efficiency, further improving fuel economy.

Introduction

A hybrid electric vehicle (HEV) is a type of hybrid vehicle and electric vehicle which combines a conventional internal combustion engine (ICE) propulsion system with an electric propulsion system. The presence of the electric power train is intended to achieve either better fuel economy than a conventional vehicle, or better performance. A variety of types of HEV exist, and the degree to which they function as EVs varies as well. The most common form of HEV is the hybrid electric car, although hybrid electric trucks (pickups and tractors) and buses also exist. A gasoline car meets these requirements but produces a relatively large amount of pollution and generally gets poor gas mileage. An electric car, however, produces almost no pollution, but it can only go 50 to 100 miles (80 to 161 km) between charges. And the problem has been that the electric car is very slow and inconvenient to recharge. A gasoline-electric car combines these two setups into one system that leverages both gas power and electric power.

Classification of hybrid vehicle: Hybrid electric vehicles can be classified according to the way in which power is supplied to the drive train:

In parallel hybrids: the ICE and the electric motor are both connected to the mechanical transmission and can simultaneously transmit power to drive the wheels, usually through a conventional transmission. Honda's Integrated Motor Assist (IMA) system as found in the Insight, Civic, Accord, as well as the GM Belted Alternator/Starter (BAS Hybrid) system found in the Chevrolet Malibu hybrids are examples of production parallel hybrids. Current, commercialized parallel hybrids use a single, small (<20 kW) electric motor and small battery pack as the electric motor is not designed to be the sole source of motive power from launch. Parallel hybrids are also capable of regenerative braking and the internal combustion engine can also act a generator for supplemental recharging. Parallel hybrids are more efficient than comparable non-hybrid vehicles especially during urban stop-and-go conditions and at times during highway operation where the electric motor is permitted to contribute.

In series hybrids, only the electric motor drives the drive train, and the ICE works as a generator to power the electric motor or to recharge the batteries. The battery pack can be recharged through regenerative braking or by the ICE. Series hybrids usually have a smaller combustion engine but a larger battery pack as compared to parallel hybrids, which makes them more expensive than parallels. This configuration makes series hybrids more efficient in city driving. The Chevrolet Volt is a series plug-in hybrid, although GM prefers to describe the Volt as an electric vehicle equipped with a "range extending" gasoline powered ICE as a generator and therefore dubbed an "Extended Range Electric Vehicle" or E-REV.

Power-split hybrid:s have the benefits of a combination of series and parallel characteristics. As a result, they are more efficient overall, because series hybrids tend to be more efficient at lower speeds and parallel tend to be more efficient at high speeds; however, the power-split hybrid is higher than a pure parallel. Examples of power-split (referred to by some as "series-parallel") hybrid power trains include current models of Ford, General Motors, Lexus, Nissan, and Toyota.

Full hybrid: sometimes also called a strong hybrid, is a vehicle that can run on just the engine, just the batteries, or a combination of both.[17] Ford's hybrid system, Toyota's Hybrid Synergy Drive and General Motors/Chrysler's Two-Mode Hybrid technologies are full hybrid systems.[18] The Toyota Prius, Ford Escape Hybrid, and Ford Fusion Hybrid are examples of full hybrids, as these cars can be moved forward on battery power alone. A large, high-capacity battery pack is needed for battery-only operation. These vehicles have a split power path allowing greater flexibility in the drive train by interconnecting mechanical and electrical power, at some cost in complexity.

Mild hybrid: is a vehicle that can not be driven solely on its electric motor, because the electric motor does not have enough power to propel the vehicle on its own. Mild hybrids only include some of the features found in hybrid technology, and usually achieve limited fuel consumption savings, up to 15 percent in urban driving and 8 to 10 percent overall cycle. A mild hybrid is essentially a conventional vehicle with oversize starter motor, allowing the engine to be turned off whenever the car is coasting, braking, or stopped, yet restart quickly and cleanly. The motor is often mounted between the engine and transmission, taking the place of the torque converter, and is used to supply additional propulsion energy when accelerating. Accessories can continue to run on electrical power while the gasoline engine is off, and as in other hybrid designs, the motor is used for regenerative braking to recapture energy. As compared to full hybrids, mild hybrids have smaller batteries and a smaller, weaker motor/generator, which allows manufacturers to reduce cost and weight.

Honda's early hybrids including the first generation Insight used this design, leveraging their reputation for design of small, efficient gasoline engines; their system is dubbed Integrated Motor Assist (IMA). Starting with the 2006 Civic Hybrid, the IMA system now can propel the vehicle solely on electric power during medium speed cruising. Another example is the 2005-2007 Chevrolet Silverado Hybrid, a full-size pickup truck.[18] Chevrolet was able to get a 10% improvement on the Silverado's fuel efficiency by shutting down and restarting the engine on demand and using regenerative braking. General Motors has also used its mild BAS Hybrid technology in other models such as the Saturn Vue Green Line, the Saturn Aura Greenline and the Mailbu Hybrid.

A plug-in hybrid electric vehicle (PHEV): also known as a plug-in hybrid, is a hybrid electric vehicle with rechargeable batteries that can be restored to full charge by connecting a plug to an external electric powersource. A PHEV shares the characteristics of both a conventional hybrid electric vehicle, having an electric motor and an internal combustion engine; and of an all-electric vehicle, also having a plug to connect to the electrical grid. PHEVs have a much larger all-electric range as compared to conventional

gasoline-electric hybrids, and also eliminate the "range anxiety" associated to all-electric vehicles, because the combustion engine works as a backup when the batteries are depleted.

Chinese battery manufacturer and automaker BYD Auto released the F3DM PHEV-62 (PHEV-100 km) hatchback to the Chinese fleet market on December 15, 2008, for 149,800 yuan (US \$22,000). General Motors launched the 2011 Chevrolet Volt series plug-in in December 2010. The Volt displaced the Toyota Prius as the most fuel-efficient car sold in the United States.

The regenerative braking system: the core design concept of most production HEVs, was developed by electrical engineer David Arthurs around 1978, using off-the shelf components and an Opel GT. However the voltage controller to link the batteries, motor (a jet-engine starter motor), and DC generator was Arthurs'. The vehicle exhibited 75 miles per US gallon (3.1 L/100 km; 90 mpg-imp) fuel efficiency, and plans for it (as well as somewhat updated versions) are still available through the Mother Earth News web site. The Mother Earth News' own 1980 version claimed nearly 84 miles per US gallon (2.8 L/100 km; 101 mpg-imp).

In 1989, Audi produced its first iteration of the Audi Duo (the Audi C3 100 Avant Duo) experimental vehicle, a plug-in parallel hybrid based on the Audi 100 Avant quattro. This car had a 9.4 kilowatts (12.8 PS; 12.6 bhp) Siemens electric motor which drove the rear roadwheels. A trunk-mounted nickel-cadmium battery supplied energy to the motor that drove the rear wheels. The vehicle's front roadwheels were powered by a 2.3 litre five-cylinder petrol engine with an output of 100 kilowatts (136 PS; 134 bhp). The intent was to produce a vehicle which could operate on the engine in the country, and electric mode in the city. Mode of operation could be selected by the driver. Just ten vehicles are believed to have been made; one drawback was that due to the extra weight of the electric drive, the vehicles were less efficient when running on their engines alone than standard Audi 100s with the same engine.

In 1992, Volvo ECC was developed by Volvo. The Volvo ECC was built on the Volvo 850 platform. In contrast to most production hybrids, which use a gasoline piston engine to provide additional acceleration and to recharge the battery storage, the Volvo ECC used a gas turbine engine to drive the generator for recharging.

Automotive hybrid technology: became widespread beginning in the late 1990s. The first mass-produced hybrid vehicle was the Toyota Prius, launched in Japan in 1997, and followed by the Honda Insight, launched in 1999 in the United States and Japan. The Prius was launched in Europe, North America and the rest of the world in 2000. The first generation Prius sedan has an estimated fuel economy of 52 miles per US gallon (4.5 L/100 km; 62 mpg-imp) in the city and 45 miles per US gallon (5.2 L/100 km; 54 mpg-imp) in highway driving. The two-door first generation Insight was estimated at 61 miles per US gallon (3.9 L/100 km; 73 mpg-imp) miles per gallon in city driving and 68 miles per US gallon (3.5 L/100 km; 82 mpg-imp) on the highway.

The Ford Escape Hybrid: the first hybrid electric sport utility vehicle (SUV) was released in 2005. Toyota announced calendar year 2005 hybrid electric versions of the Toyota Highlander Hybrid and Lexus RX 400h with 4WD, which uses a rear electric motor to power the rear wheels negating the need for a transfer case. In 2006, General Motors Saturn Division began to market a mild parallel hybrids in the form of the 2007 Saturn Vue Green Line which utilized GM's Belted Alternator/Starter (BAS Hybrid) System combined with a 2.4 litre L4 engine and a FWD automatic transmission. The same hybrid powertrain was also used to power the 2008 Saturn Aura Greenline and Malibu Hybrid models. As of December 2009, only the BAS equipped Malibu is still in (limited) production.

In 2007, Lexus released a hybrid electric version of their GS sport sedan, the GS 450h, with a power output of 335 bhp. The 2007 Camry Hybrid became available in Summer 2006 in the United States and Canada. Nissan launched the Altima Hybrid with technology licensed by Toyota in 2007.

Volkswagen announced at the 2010 Geneva Motor Show the launch of the 2012 Touareg Hybrid, scheduled for 2011. VW also announced plans to introduce diesel-electric hybrid versions of its most popular models in 2012, beginning with the new Jetta, followed by the Golf Hybrid in 2013 together with hybrid versions of the Passat. The Peugeot 3008 HYbrid4 will be launched in the European market in early 2011 and is expected to become the world's first production diesel-electric hybrid. According to Peugeot the new hybrid delivers a fuel economy of up to 62 miles per US gallon (3.8 L/100 km; 74 mpg-imp) and CO₂ emissions of 99g/km on the European test cycle. Other gasoline-electric hybrids already scheduled for commercial sales in 2011 are the Lexus CT 200h,[55] the Infiniti M35 Hybrid, the Hyundai Sonata Hybrid and its sibling the Kia Optima Hybrid.

The varieties of hybrid electric designs can be differentiated by the structure of the hybrid vehicle drivetrain, the fuel type, and the mode of operation.

In 2007, several automobile manufacturers announced that future vehicles will use aspects of hybrid electric technology to reduce fuel consumption without the use of the hybrid drivetrain. Regenerative braking can be used to recapture energy and stored to power electrical accessories, such as air conditioning. Shutting down the engine at idle can also be used to reduce fuel consumption and reduce emissions without the addition of a hybrid drivetrain. In both cases, some of the advantages of hybrid electric technology are gained while additional cost and weight may be limited to the addition of larger batteries and starter motors. There is no standard terminology for such vehicles, although they may be termed mild hybrids. Free-piston engines could be used to generate electricity as efficiently as, and less expensively than, fuel cells. Gasoline

Gasoline engines: are used in most hybrid electric designs, and will likely remain dominant for the foreseeable future. While petroleum-derived gasoline is the primary fuel, it is possible to mix in varying levels of ethanol created from renewable energy sources. Like most modern ICE powered vehicles, HEVs can typically use up to about 15% bioethanol. Manufacturers may move to flexible fuel engines, which would increase allowable ratios, but no plans are in place at present.

Diesel

Diesel-electric HEVs: use a diesel engine for power generation. Diesels have advantages when delivering constant power for long periods of time, suffering less wear while operating at higher efficiency. The diesel engine's high torque, combined with hybrid technology, may offer substantially improved mileage. Most diesel vehicles can use 100% pure biofuels (biodiesel), so they can use but do not need petroleum at all for fuel (although mixes of biofuel and petroleum are more common, and petroleum may be needed for lubrication). If diesel-electric HEVs were in use, this benefit would likely also apply. Diesel-electric hybrid drivetrains have begun to appear in commercial vehicles (particularly buses); as of 2007, no light duty diesel-electric hybrid passenger cars are currently available, although prototypes exist. Peugeot is expected to produce a diesel-electric hybrid version of its 308 in late 2008 for the European market.

PSA Peugeot Citroën has unveiled two demonstrator vehicles featuring a diesel-electric hybrid drivetrain: the Peugeot 307, Citroën C4 Hybride HDi and Citroën C-Cactus. Volkswagen made a prototype diesel-electric hybrid car that achieved 2 L/100 km (140 mpg-imp; 120 mpg-US) fuel economy. FedEx, along with Eaton Corp. in the USA and Iveco in Europe, has begun deploying a small fleet of Hybrid diesel electric delivery trucks. As of October 2007 FedEx now operates more than 100 diesel electric hybrids in North America, Asia and Europe.

Liquefied petroleum gas

Hydrogen can be used in cars in two ways: a source of combustible heat, or a source of electrons for an electric motor. The burning of hydrogen is not being developed in practical terms; it is the hydrogen fuel-cell electric vehicle (HFEV) which is garnering all the attention. Hydrogen fuel cells create electricity fed into an electric motor to drives the wheels. Hydrogen is not burned, but it is consumed. This means molecular hydrogen, H₂, is combined with oxygen to form water. $2\text{H}_2 (4e^-) + \text{O}_2 \rightarrow 2\text{H}_2\text{O} (4e^-)$. The molecular hydrogen and oxygen's mutual affinity drives the fuel cell to separate the electrons from the hydrogen, to use them to power the electric motor, and to return them to the ionized water molecules that were formed when the electron-depleted hydrogen combined with the oxygen in the fuel cell. Recalling that a hydrogen atom is nothing more than a proton and an electron; in essence, the motor is driven by the proton's atomic attraction to the oxygen nucleus, and the electron's attraction to the ionized water molecule.

An HFEV is an all-electric car featuring an open-source battery in the form of a hydrogen tank and the atmosphere. HFEVs may also comprise closed-cell batteries for the purpose of power storage from regenerative braking, but this does not change the source of the motivation. It implies the HFEV is an electric car with two types of batteries. Since HFEVs are purely electric, and do not contain any type of heat engine, they are not hybrids.

Hybrid vehicles might use an internal combustion engine running on biofuels, such as a flexible-fuel engine running on ethanol or engines running on biodiesel. In 2007 Ford produced 20 demonstration Escape Hybrid E85s for real-world testing in fleets in the U.S. Also as a demonstration project, Ford delivered in 2008 the first flexible-fuel plug-in hybrid SUV to the U.S. Department of Energy (DOE), a Ford Escape Plug-in Hybrid, capable of running on gasoline or E85

The Chevrolet Volt plug-in hybrid electric vehicle would be the first commercially available flex-fuel plug-in hybrid capable of adapting the propulsion to the biofuels used in several world markets such as the ethanol blend E85 in the U.S., or E100 in Brazil, or biodiesel in Sweden.[The Volt will be E85 flex-fuel capable about a year after its introduction.

In split path vehicles (Toyota, Ford, GM, Chrysler) there are two electrical machines, one of which functions as a motor primarily, and the other functions as a generator primarily. One of the primary requirements of these machines is that they are very efficient, as the electrical portion of the energy must be converted from the engine to the generator, through two inverters, through the motor again and then to the wheels.

Most of the electric machines used in hybrid vehicles are brushless DC motors (BLDC). Specifically, they are of a type called an interior permanent magnet (IPM) machine (or motor). These machines are wound similarly to the induction motors found in a typical home, but (for high efficiency) use very strong rare earth magnets in the rotor. These magnets contain neodymium, iron and boron, and are therefore called Neodymium magnets. The magnet material is expensive, and its cost is one of the limiting factors in the use of these machines.

In some cases, manufacturers are producing HEVs that use the added energy provided by the hybrid systems to give vehicles a power boost, rather than significantly improved fuel efficiency compared to their traditional counterparts. The trade-off between added performance and improved fuel efficiency is partly controlled by the software within the hybrid system and partly the result of the engine, battery and motor size. In the future, manufacturers may provide HEV owners with the ability to partially control this balance

(fuel efficiency vs. added performance) as they wish, through a user-controlled setting.[117] Toyota announced in January, 2006 that it was considering a "high-efficiency" button.[citation needed] One can buy a stock hybrid or convert a stock petroleum car to a hybrid electric vehicle using an aftermarket hybrid kit.

Fuel efficiency

Current HEVs reduce petroleum consumption under certain circumstances, compared to otherwise similar conventional vehicles, primarily by using three mechanisms: Reducing wasted energy during idle/low output, generally by turning the ICE off

Recapturing waste energy (i.e. regenerative braking)

Reducing the size and power of the ICE, and hence inefficiencies from under-utilization, by using the added power from the electric motor to compensate for the loss in peak power output from the smaller ICE.

Any combination of these three primary hybrid advantages may be used in different vehicles to realize different fuel usage, power, emissions, weight and cost profiles. The ICE in an HEV can be smaller, lighter, and more efficient than the one in a conventional vehicle, because the combustion engine can be sized for slightly above average power demand rather than peak power demand. The drive system in a vehicle is required to operate over a range of speed and power, but an ICE's highest efficiency is in a narrow range of operation, making conventional vehicles inefficient. On the contrary, in most HEV designs, the ICE operates closer to its range of highest efficiency more frequently. The power curve of electric motors is better suited to variable speeds and can provide substantially greater torque at low speeds compared with internal-combustion engines. The greater fuel economy of HEVs has implication for reduced petroleum consumption and vehicle air pollution emissions worldwide

Reduced noise emissions resulting from substantial use of the electric motor at idling and low speeds, leading to roadway noise reduction, in comparison to conventional gasoline or diesel powered engine vehicles, resulting in beneficial noise health effects (although road noise from tires and wind, the loudest noises at highway speeds from the interior of most vehicles, are not affected by the hybrid design alone).

Reduced noise may not be beneficial for all road users, as blind people or the visually impaired consider the noise of combustion engines a helpful aid while crossing streets and feel quiet hybrids could pose an unexpected hazard. The U.S. Congress and the European Commission are exploring legislation to establish a minimum level of sound for plug-in electric and hybrid electric vehicles when operating in electric mode, so that blind people and other pedestrians and cyclists can hear them coming and detect from which direction they are approaching. Tests have shown that vehicles operating in electric mode can be particularly hard to hear below 20 mph (32 km/h). In January 2010 the Japanese Ministry of Land, Infrastructure, Transport and Tourism issued guidelines for hybrid and other near-silent vehicles.

A 2009 study conducted by the U.S. National Highway Traffic Safety Administration found that crashes involving pedestrian and bicyclist have higher incidence rates for hybrids than internal combustion engine vehicles in certain vehicle maneuvers. These accidents commonly occurred on in zones with low speed limits, during daytime and in clear weather.

Even though no specific national regulation has been enacted in most countries as of mid 2010, some carmakers announced they have decided to address this safety issue shared by regular hybrids and all types of plug-in electric vehicles, and as a result, the upcoming Nissan Leaf and Chevrolet Volt, both due in late 2010, and the new Nissan Fuga hybrid and the Fisker Karma plug-in hybrid, both due in 2011, will include synthesized sounds to alert pedestrians, the blind and others to their presence.

There is also after market technology available in California to make hybrids sound more like conventional combustion engine cars when the vehicle goes into the silent electric mode (EV mode). On August 2010 Toyota began sales in Japan of an onboard device designed to automatically emit a synthesized sound of an electric motor when the Prius is operating as an electric vehicle at speeds up to approximately 25 kilometres per hour (16 mph). Toyota plans to use other versions of the device for use in gasoline-electric hybrids, plug-in hybrids, electric vehicles as well as fuel-cell hybrid vehicles planned for mass production.

Battery toxicity is a concern, although today's hybrids use NiMH batteries, not the environmentally problematic rechargeable nickel cadmium. "Nickel metal hydride batteries are benign. They can be fully recycled," says Ron Cogan, editor of the Green Car Journal. Toyota and Honda say that they will recycle dead batteries and that disposal will pose no toxic hazards. Toyota puts a phone number on each battery, and they pay a \$200 "bounty" for each battery to help ensure that it will be properly recycled.

Economic and environmental performance comparison
among several popular hybrid models available in the U.S.]Vehicle Year
model EPA

Peugeot HYmotion3 compressor, a hybrid scooter is a three-wheeler that uses two separate power sources to power the front and back wheels. The back wheel is powered by a single cylinder 125 cc, 20 bhp (15 kW) single cylinder motor while the front wheels are each driven by their own electric motor. When the bike is moving up to 10 km/h only the electric motors are used on a stop-start basis reducing the amount of carbon emissions

SEMA has announced that Yamaha is going to launch one in 2010, with Honda following a year later, fueling a competition to reign in new customers and set new standards for mobility. Each company hopes to provide the capability to reach 60 miles (97 km) per charge by adopting advanced lithium-ion batteries to accomplish their claims. These proposed hybrid motorcycles could incorporate components from the upcoming Honda Insight car and its hybrid powertrain. The ability to mass-produce these items helps to overcome the investment hurdles faced by start-up brands and bring new engineering concepts into mainstream markets

Toyota Camry hybrid-electric taxi. And hybrid bus.

Hybrid technology for buses has seen increased attention since recent battery developments decreased battery weight significantly. Drivetrains consist of conventional diesel engines and gas turbines. Some designs concentrate on using car engines, recent designs have focused on using conventional diesel engines already used in bus designs, to save on engineering and training costs. Several manufacturers are currently working on new hybrid designs, or hybrid drivetrains that fit into existing chassis offerings without major re-design. A challenge to hybrid buses may still come from cheaper lightweight imports from the former Eastern block countries or China, where national operators are looking at fuel consumption issues surrounding the weight of the bus, which has increased with recent bus technology innovations such as glazing, air conditioning and electrical systems. A hybrid bus can also deliver fuel economy through the hybrid drivetrain. Hybrid technology is also being promoted by environmentally concerned transit authorities.

Hybrid electric truck technology and powertrain maker: Friedrichshafen.

The United States Army's manned ground vehicles of the Future Combat System all use a hybrid electric drive consisting of a diesel engine to generate electrical power for mobility and all other vehicle subsystems. In May 2003, JR East started test runs with the so called NE (new energy) train and validated the system's functionality (series hybrid with lithium ion battery) in cold regions. In 2004, Rail power Technologies had been running pilots in the US with the so called Green Goats,[which led to orders by the Union Pacific[149] and Canadian Pacific Railways starting in early 2005.

Rail power offers hybrid electric road switchers, as does Diesel-electric locomotives may not always be considered HEVs, not having energy storage on board, unless they are fed with electricity via a collector for short distances (for example, in tunnels with emission limits), in which case they are better classified as dual-mode vehicles.

HEVs can be initially more expensive (the so-called "hybrid premium") than pure fossil-fuel-based ICE vehicles (ICEVs), due to extra batteries, more electronics and in some cases other design considerations (although battery renting can be used to reach the cost parity). The trade-off between higher initial cost (also called showroom costs) and lower fuel costs (difference often referred to as the payback period) is dependent on usage - miles traveled, or hours of operation, fuel costs, and in some cases, government subsidies. Traditional economy vehicles may result in a lower direct cost for many users (before consideration of any externality).

Consumer Reports ran an article in April 2006 stating that HEVs would not pay for themselves over 5 years of ownership. However, this included an error with charging the "hybrid premium" twice. When corrected, the Honda Civic Hybrid and Toyota Prius did have a payback period of slightly less than 5 years. This includes conservative estimates with depreciation (seen as more depreciation than a conventional vehicle, although that is not the current norm) and with progressively-higher gas prices. In particular, the Consumer Reports article assumed \$2/U.S. gallon for 3 years, \$3/U.S. gallon for one year and \$4/U.S. gallon the last year. As recent events have shown, this is a volatile market and hard to predict. For 2006, gas prices ranged from low \$2 to low \$3, averaging about \$2.60/U.S. gallon.

A January 2007 analysis by Intellichoice.com shows that all 22 currently available HEVs will save their owners money over a five year period. The most savings is for the Toyota Prius, which has a five year cost of ownership 40.3% lower than the cost of comparable non-hybrid vehicles

A report in the Greeley Tribune says that over the five years it would typically take for a new car owner to pay off the vehicle cost differential, a hybrid Camry driver could save up to \$6,700 in gasoline at current gasoline prices, with hybrid tax incentives as an additional saving.

In countries with incentives to fight against global warming and contamination and promote vehicle fuel efficiency, the pay-back period can be immediate and all-combustion engine vehicles (ACEVs) can cost more than hybrids because they generate more pollution.

Toyota and Honda have already said they've halved the incremental cost of electric hybrids and see cost parity in the future (even without incentives)

The rare earth element dysprosium is required to fabricate many of the advanced electric motors and battery systems in hybrid propulsion systems

However, nearly all the rare earth elements in the world come from China, and one analyst believes that an overall increase in Chinese electronics manufacturing may consume this entire supply by 2012

In order to encourage the purchase of HEVs, several countries have introduced legislation for incentives and ecotaxes. In Haifa, hybrid vehicles are entitled to a free parking in city's parking lots for domestic citizens

In 2009 the Japanese government implemented a set of policies and incentives that included a scrappage program, tax breaks on hybrid vehicles and other low emission cars and trucks, and a higher levy on gasoline

that raised prices in the order of USD 4.50 per gallon. New hybrid car sales for 2009 were almost triple those for 2008

The purchase of hybrid electric cars qualifies for a federal income tax credit up to \$3,400 on the purchaser's Federal income taxes. The tax credit is to be phased out two calendar quarters after the manufacturer reaches 60,000 new cars sold in the following manner: it will be reduced to 50% if delivered in either the third or fourth quarter after the threshold is reached, to 25% in the fifth and sixth quarters, and 0% thereafter. Certain states (e.g., New York, California, Virginia, and Florida) allow singly occupied HEVs to enter the HOV lanes on the highway.

Summary

Drivers of HEVs in the United Kingdom benefit from the lowest band of vehicle excise duty (car tax), which is based on carbon dioxide emissions. In central London, these vehicles are also exempt from the £8 daily London congestion charge. Due to their low levels of regulated emissions, the greenest cars are eligible for 100% discount under the current system. To be eligible the car must be on the current Power Shift Register. At present, these include the cleanest LPG and natural gas cars and most hybrid-, battery- and fuel cell-electric vehicles.

Conclusion

The gasoline-electric hybrid car is just what it sounds like -- a cross between a gasoline-powered car and an electric car. A gas-powered car has a fuel tank, which supplies gasoline to the engine. The engine then turns a transmission, which turns the wheels. Gasoline-powered car, An electric car, on the other hand, has a set of batteries that provides electricity to an electric motor. The motor turns a transmission, and the transmission turns the wheels. The hybrid is a compromise. It attempts to significantly increase the mileage and reduce the emissions of a gas-powered car while overcoming the shortcomings of an electric car.

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LEADERSHIP STYLE AND BUSINESS EDUCATORS' JOB PERFORMANCE IN SENIOR SECONDARY SCHOOLS AS E-ACTIVITY AND TECHNOLOGY IN A CHANGING ENVIRONMENT: RIVERS STATE PERSPECTIVE

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Abstract

This paper investigated leadership styles and Business Educators' job performance in senior secondary schools in Rivers State, Nigeria. The Study population comprised all the 288 secondary schools in the State. Out of this population, a sample of 240 senior secondary schools that offers Business subjects was taken and selected through the stratified random sampling techniques. Out of 3,466 teachers of business subjects (including principals) in the schools, a sample of 2040 teachers was selected through the stratified random sampling techniques. This sample was made of 240 principals who are considered to be the leaders and 1800 teachers. Two instruments were used to collect data for the study. There were the leadership style questionnaire and the teachers' job performance questionnaire. The data collected were analyzed using frequency counts, percentages, correlation matrix and t-test. It was found that the democratic leadership style was the most commonly used leadership style among leaders of senior secondary schools in the State. Teachers' job performance was also found to be at moderate level in the schools. Teachers' job performance was found to be better in schools having leaders using autocratic style than in schools having leaders using laissez-faire styles. It is then recommended that leaders generally should imbibe a mixture of autocratic and democratic styles of leadership in their school administration in order to enhance better job performance among teachers. The use of the laissez-faire leadership style should be discouraged among school leaders as it could not bring a better job performance.

Keywords: leadership styles and job performance

INTRODUCTION

Education in Nigeria is an instrument for effecting national development. The country's educational goals have been set out in the National policy on education in terms of their relevance to the needs of the individual and the society. Towards this end, the National policy on education set up certain aims and objectives which were to facilitate educational development in the country. In fostering these aims and objectives, the school principal has important roles to play. Among this roles include providing effective leadership in secondary schools, thereby enhancing better job performance among teacher. How effective the principal is in performing these roles has been a matter of concern to many educationists. It needs to be mentioned that senior secondary education in Nigerian schools is for period of 3 years and it is for students who had successfully completed the junior secondary educational programme. It is therefore not surprising that there is pressure mounted on effective leadership among principals of secondary schools in Rivers state, Nigeria. It seems however that many principals have not considered their styles of leadership as determinants of teachers' job performance in their schools. Hence, some of them seem to find it difficult to effectively administer their schools. As such, leadership style occupies an important position in school management in Rivers State, Nigeria. The school principal is in a unique position as the manager or administrator who controls school resources for the purpose of attaining organizational goals.

LITERATURE REVIEW

Leadership is the process of influencing the activities of a group of people by a leader in efforts towards goal achievement. It involves a force that initiates actions in people and leader. It could be described as the ability to get things done with the assistance and co-operation of other people within the school system.

Certain theories of leadership have been identified by researchers. These include the Trait Theory, Situational Theory, Contingency Theory, Behavioural Theory and path Goal Theory. The traits theory trends to emphasize the personality traits of the leader such as appearance, height, initiative, aggressiveness, enthusiasm, self-confidence, drive, persistence, interpersonal skills and administrative ability. The situational theory stipulates that leaders are the product of given situations. Thus, leadership is strongly affected by the situation from which the leader to exercise influence depends upon the group task situation and the degree to which the leader's personality fit the group.

The behavioural theory could either be job-centered or employee-centered. The job-centered leader's practices close supervision while employees-centered leaders practiced general supervision. The path goal theory is based on the theory of motivation. In this theory the behaviour of the leader is acceptable to the subordinate only if they continue to see the leader as source of satisfaction.

In view of the foregoing, leadership style could be described in various ways. It refers to the underlying needs of the leader that motivate his behaviour. It is the manifestation of the dominant pattern of behavioural of a leader. It is also process through which persons or group influence others in the attainment of group goals.

As such, Ibukun (1997) argued that the main task of the principals is to create a conducive atmosphere for the teachers to be able to achieve desired changes in students' learning. Supporting this argument Ijaiya (2000) remarked that teachers in Nigeria express a desire for more participation in decision-making. The way the principal relates with his or her staff could contribute immensely to their effectiveness or otherwise. Researchers have identified certain leadership behaviour used in organization. These are the nomothetic, idiographic and transactional leader behaviour. The Nomothetic leadership behaviour is the characteristics of a leader to the latter. Everything is by bureaucratic rules and procedure to all subordinates. The leadership behaviour is commonly used by autocratic leaders.

The idiographic leadership behaviour focuses on individual needs rather than organization needs. The leader accepts subordinates to work things out for themselves. Hence, organization demands are minimized. Authority is delegated while the relationship to others is in line with individual's personal needs.

The transactional leadership behaviour is a hybrid between the nomothetic and idiographic leadership behaviours. It is situation-oriented. However, unlike the idiographic leadership behaviour which emphasizes individual's needs, the transactional leadership behaviour recognizes the importance of institutional roles and expectation. The leader assumes that pursuing institutional goals could result in the fulfillment of individual personality drives. Transactional leadership allows for the practices of good human relationship.

Three other styles of leadership have also been identified by researchers. These include the autocratic, democratic, and laissez-faire leadership styles. The autocratic leadership style is also known as the authoritarian style of leadership. Power and decision making resides in the autocratic leader.

The autocratic leader directs group members on the way things should be done. The leader does not maintain clear channel of communication between him/her and decision making resides in the autocratic leader.

The autocratic leader directs group members on the way things should be done. The leader does not maintain clear channel of communication between him/her and the subordinated. He or she does not delegate authority nor permit subordinates to participate in policy making the democratic style of leadership emphasizes group and leader participation in the making of policies. Decisions about organizational matters are arrived at after consultant and communication with various people in the organization. The leader attempts as much as possible to make each individual feel that he is an important member of the

organization. Communication is multidirectional while ideas are exchanged between employees and the leader. In this style of leadership, a high degree of staff morale is always enhanced.

Laissez-faire leadership style allows complete freedom to group decision without the leader's participation. Thus, subordinates are free to do what they like. The role of the leader is just to supply materials. The leader does not interfere with or participate in the course of events determined by the group.

Performance could be described in various ways. It could be an act of accomplishing of executive given task. It could also be described as the ability to combine skillfully the right behaviour towards the achievement of organizational goals and objectives.

Teachers' job performance could be described as the duties performed by a teacher or teachers at a particular period in the school stem in achieving organizational goals. It could also be described as the ability to teachers to combine relevant inputs for the enhancement of teaching and learning processes. However, Peretemode (1996) argued that job performance is determined by the workers' level of participation in the day to day running of the organization. It is noted that employees behave differently under different situations.

Leaders here can therefore encourage effective performance of their teachers by identifying their needs and trying to satisfy or meeting them. Supporting this argument, Owoeye (1999) asserted that variable of job performance such as effective teaching, lesson note preparation, effective use of scheme of work, effective supervision, monitoring of students work and disciplinary ability are virtues which teachers should uphold effectively in the school system. In this regard, the teachers performance could be measured through annual report of his/her activities in terms of performance in teaching, lesson preparation, mastery of subject matter, competence, teachers' commitment to job and extra-curricula activities. Other areas of assessment include effective leadership, effective supervision, effective monitoring of students' work, motivation, class control and disciplinary ability of the teachers.

It is based on this background that this study was set out to examine critically the relationship between leadership styles and teachers' job performance in senior secondary schools in Rivers State, Nigeria. The concern of the study was to determine the best style of leadership out of the autocratic, democratic and laissez-faire leadership style that would enhance better job performance among teachers in senior secondary schools in the State.

STATEMENT OF THE PROBLEM

The relationship between principal's leadership style and teachers' job performance has been a subject of controversy by researchers. The controversy was centered on whether or not the style of leadership of principals influences the level of job performance among teachers. Common observation in the school system shows that the style of leadership of principal could perhaps have serious impact on teachers' performance. The problem of this study therefore was to determine what relationship exists between school leaders' leadership styles and teachers' job performance in senior secondary schools in Rivers State, Nigeria. In addressing this problem, the following research questions were raised:

- Which leadership style is most commonly used by school principals in senior secondary schools in Rivers State?
- What is the level of job performance among teachers in senior secondary schools in the State?
- Is there any significant relationship between leadership styles and teachers' job performance in senior secondary schools in Rivers State, Nigeria?
- Is there any significant difference in teachers' job performance in schools having leader using autocratic leadership style and schools having leader using laissez-faire leadership style in the State?
- Is there any significant difference in teachers' job performance in schools having leader using democratic leadership style and schools having leader using laissez-faire leadership style in the State?
- Is there any significant difference in teachers' job performance in schools having leader using democratic leadership style and schools having leader using laissez-faire leadership style in the State?

METHOD

This work adopted the descriptive research design. The population comprised all the 288 senior secondary schools in Rivers State, Nigeria. Out of this population, a sample of 240 schools was taken and selected through the stratified random sampling techniques. Out of the 3466 teachers was taken and selected through the stratified random sampling techniques. This sample was made up of 240 principals who are the leaders of the schools and 1820 teachers. These principals and teachers were the respondents in the study.

Two instruments were used in collecting the data. These were the Leadership Style Questionnaire (LSQ) and the Teachers' job performance questionnaire. The 'LSQ' was in two parts A and B. Part A was demographic. It sorted information on personal information about each establishment, number of teachers and number of students. Part B consisted of two sections. Section 2, sorted information on how effective was a school principal in utilizing the leadership style in his or her school.

Teachers Job Performance Questionnaire (TJPQ) was also in two parts A and B elicited demographic information about each school such as the name of the school and its location, the rank of the teachers and years of teaching experience. Part B consisted of 5 section. Section 1 required information on the qualification of the teacher. Section 2 required information on the competence of the teacher in terms of mastery of subject matter. Section 3 elicited information on the teacher's job performance in terms of lessons note relationship. Preparation, effective teaching, class control, use of teacher's materials, method of teaching, class participation and evaluation of teaching. Section 4 required information on teacher's personality in terms of loyalty, integrity and human relationship. Section 5 requested on the teachers' extra curricula activities such as participation in school sports and other activities.

The content validity of the instrument was determined by experts in test and measurement who marched the items of the instruments with the research questions in order to determine whether or not the instruments measured what they were supposed to measure. The reliability was determined through the test-retest reliability technique. In doing this, the instruments were determined to 30 respondents in 5 senior secondary schools outside the study area. After a period of two weeks, the instruments were re-administered. The data collected on the two tests were analyzed using the Pearson Product Moment Correlation. A correlation coefficient of 0.81 was obtained indicating that the instruments were reliable for the study.

The instruments were administered by the research through the help of research assistants. Returns were received from 1782 respondents out of which 42 were badly completed and hence discarded. Returns from the remaining 1720 respondents were duly completed and used for the study. The data collected were analyzed using frequency counts, percentages, t-tests and Pearson Product Moment Correlation while the hypotheses were testes at 0.05 alpha levels.

RESULTS

Question 1

Which leadership style is most commonly used by school principals in senior secondary schools in Rivers State, Nigeria?

In answering this question, data on the leadership styles used by school principals in senior secondary schools in Rivers State, Nigeria were collected from teachers' responses to the principal's leadership style questionnaire. The data collected were analyzed using frequency counts and percentages. The findings are presented in table 1.

As indicated in table 1.the democratic style of leadership style among principals of senior secondary schools, in Rivers State, Nigeria. 1720 respondents (68.4%) gave this response. This was followed by the

Laissez-faire leadership style. Only 380 respondents (22.1%) claimed that the Laissez-faire leadership style is another common style of leadership used by principals of senior secondary schools in the state. Although some principals used the autocratic leadership style, the number of principals using the style was negligible.

Question 2

What is the level of job performance among teachers in senior secondary schools in the state?

In answering this question, data on teacher's job performance in senior secondary schools in the state were collected from the principal's responses to the teacher's job performance questionnaire. Responses were measured in terms of teachers' competence, lesson note preparation, lesson presentation, use of teaching materials, and method of teaching, effective supervision, monitoring pupils work, class control, class participation, evaluation of teaching loyalty, integrity, human relationship, motivation, participation in schools sports, participation in school activities and disciplinary ability. In table 2, the analysis shows that the level of teaching job performance in senior secondary schools in the state was moderate. The findings revealed some disparities on the responses of the principals to items on teacher's job performance in the schools. While a large number of the respondents that is 130 (54.2%) claimed that the teachers' competence was at a moderate level, 68 of the respondents (28.3%) reported that teachers' competence in the school was at a low level. However, a large number of the respondents that is 104 (43.3%) reported that lesson preparation by the teacher was at a low level. This shows that many of the teachers were perhaps not preparing adequately for their lesson. Although a large number of the respondents 115 (47.9%) reported that many teachers were in the habits of evaluating their teaching, 110 (45.8%) of the respondents claimed that monitoring pupils work by teachers was at a moderate level. However, a large number of the respondents that is 104 (43.3%) reported that the disciplinary ability of many teachers was at a low level. On the average, out of the 240 respondents, 92 respondents (38.3%) reported that teachers' job performance was at a moderate level. 87 respondents (36.3%) claimed that the level of teachers' job performance was low. These findings suggest that teachers' job performance in the schools was not at its best.

Question 3

Is there any significant relationship between principals' leadership styles and teachers' job performance in senior secondary schools in Rivers State, Nigeria?

In addressing this problem, the question was transformed to the following hypothesis.

Ho: *there is no significant relationship between principals' leadership styles and teachers' job performance in senior secondary schools in Rivers State, Nigeria.*

In testing this hypothesis, data on leadership styles questionnaire were collected from the responses and data on teachers' performance were collected from the responses to the teachers' job performance questionnaire. The data collected were collated and analyzed using frequency chi-square test. The hypothesis was tested with the use of correlation matrix (table 3). In the table 3, the correlation matrix shows a large correlation.

variables	No	HIGH	%-AGE	MODERATE	%-AGE	LOW	%-AGE
Teachers competent	240	42	17.5	130	54.2	68	28.3
Lesson note preparation	240	86	35.8	112	46.7	42	17.5
Lesson presentation	240	58	24.2	78	32.5	104	43.3
Use of teaching material	240	34	14.2	65	27.1	141	58.7
Method of teaching	240	52	21.7	54	22.5	134	55.8

Effective teaching	240	36	15.0	86	35.8	118	49.2
Effective supervision	240	53	22.1	106	44.2	81	33.7
Monitoring pupils work	240	45	18.8	110	45.8	85	35.4
Class control	240	42	17.5	76	31.7	122	50.8
Class participation	240	48	20	105	43.7	87	36.3
Evaluation of teaching	240	115	47.9	79	32.9	47	19.2
Loyalty	240	78	32.5	121	50.4	41	17.1
Integrity	240	67	27.9	124	51.7	49	20.4
Human relationship	240	106	44.2	83	34.6	51	22.2
Motivation	240	44	18.3	60	25.0	136	56.7
Participation	240	51	21.3	81	33.7	108	45
Participation	240	87	36.2	101	42.1	52	21.7
Disciplinary ability	240	58	24.2	78	32.5	104	43.3
Average total	240	61	25.4	92	38.3	87	36.3

Table Showing Percentage Analysis of Leaders/ Teachers Performance

DISCUSSION

The foregoing shows the analysis of data collected for this study. In the analysis, it was found that the democratic leadership style was the commonest style of leadership used by principals of senior secondary schools in the states. These findings were considered with the findings of earlier researchers (Ajibade, 1990; Obilade, (1999). The findings indicating a moderate level off teachers job performance in the senior secondary schools in the states. A situation whereby the level of teachers job performance in the schools was just 38.3% on the average does not auger well for effective teaching and learning in the schools. The reason for this could not be unconnected with the low level of motivation of teachers found in this study. The finding was in consonance with the findings made in previous studies (Adepoju, 1996; Bolarinwa, 2002).

The findings of this study indicating significant relationship between autocratic leadership style and teachers' job performance shows that in certain situations, the more authoritarian a leader is, the more effective the subordinates. This implies that many teachers need to be coerced by the principals before they could improve on their job performance. This findings was contrary to the findings was contrary to the findings made by Akerele (2007) who found no significant relationship between principals' autocratic leadership style and teachers' job performance in secondary schools in Lagos state, Nigeria. The findings also neglected the findings made in some earlier studies (Siskin, 1994; Gronn, 2000). The findings of this study indicating significant relationship between democratic and teachers' job performance implies that principals using democratic leadership style could also enhance job performance among teachers. The findings agreed with the findings made by previous researchers (Evans, 1998; Ijaiya, 2000). The findings indicating no significant relationship between laissez-faire leadership roles would normally expect a low level job performance among their teachers. This finding was consistent with the findings made by previous researchers (Meindi, 1995; Oluwatoyin, 2003).

The findings indicating better job performance among teachers in schools having principals using autocratic leadership style implies that in certain situation people need to be forced in order to enhance better productivity. The finding was related to the findings made in some previous studies (Nias, 1994; Okeniyi, 1995). The finding was however contrary to the findings made by Akinyemi (1993) and Akerele (2007) who found that teachers perform better in schools having principals using autocratic style of leaderships.

The findings indicating better job performance among teachers in schools having principals using autocratic leadership style shows that in schools using laissez-faire leadership style, is not good style that

could enhance better job performance among teachers. The findings were consistent with the findings made in previous studies (Nworgu, 1991; Obilade, 1998).

CONCLUSION

Based on the findings of this study, it was concluded that principals leadership style is a critical variable in teachers' job performance in senior secondary schools in Rivers State, Nigeria. This is evident in the findings of this study which isolated the style of leadership used by a principal as a function of teachers' job performance is valued added. In some situations, people need to be forced before they could improve productivity. The findings of this study have therefore led the researcher to conclude that the autocratic leadership style is the best style of leadership that could enhance better job performance among teachers in senior secondary school the State.

RECOMMENDATIONS

Considering the findings of this study, it was recommended that school principals should imbibe a mixture of autocratic and democratic styles of leadership in their schools administration in order to enhance better job performance among teachers. As such, principals could use the democratic style of leadership in some occasions. They should apply autocratic leadership style in certain situation in order to increase productivity among teachers. The use of laissez-faire leadership style should be discouraged by school principals as it could not bring a better job performance among teachers. The State Ministry of Education should organize regular inspection to schools to monitor the style of leadership used by principals that could enhance better job performance among teachers. Also the Ministry in collaboration with relevant institutions should organize workshop and seminar for principals at regular interval to strengthen and enhance principals utilizations of styles of leadership that would ensure effective teachers' job performance. This is very necessary in order to achieve the objectives of secondary education as entrenched in the National Policy on Education.

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AN APPROACH TO THE IMPLEMENTATION OF AN INTEGRATED COMPUTERIZED MEDICAL SYSTEM IN NIGERIA

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Abstract

Improvements in Information and Communications Technologies have driven innovations in computerized medical systems world-wide. Developed economies are quickly abandoning the paper-based medical record keeping and management systems for a more digitized approach. Nigeria and other developing countries, whose bulk populations reside in highly inaccessible rural areas, would also like to follow this trend. However, there are numerous and persisting obstacles and challenges that militate against such intentions. In this paper we discuss the issues associated with moving to a computerized medical system in the highly decentralized Nigerian medical sector and propose a workable three-tier integrated computerized medical system architecture which can re-integrate the rural health care centers to provide specialized care.

Keywords: computerized medical systems; 3-tier architecture

I. INTRODUCTION

Though there exists a higher prevalence of chronic illnesses among rural dwellers and populations when compared to city dwellers, it is predominantly the rural populations that enjoy the least access to available medical health resources in many countries [1]. In Nigeria, rural healthcare is typically provided by the local health centers and dispensaries. One major reason for this is the way in which patient data is managed.

Healthcare is driven by the capturing and storage of Patient Health Information (PHI). PHI can be captured, tracked and stored using paper and physical files or in a digital format. The oldest form of managing patient information and data is on paper. Developing countries are gradually moving away from paper and towards digital formats which allow for an integrated computerized medical system. However, since a large number of Nigerians live in rural areas, there are numerous additional challenges that need to be overcome to realize an integrated computerized medical system.

In this paper we look at the current state of the Nigerian healthcare system and the various issues associated with the management of computerized patient data to achieve an integrated computerized medical system. To overcome these issues we propose a 3-tier architecture to realize an integrated computerized medical system for the Nigerian healthcare system. Our proposal will allow rural health care centers to be integrated with urban health care providers to provide specialized care to rural populations.

The structure of this paper is organized as follows: in section 2 we discuss the background to deploying an integrated computerized medical system; in section 3 we then discuss the key issues militating against an extensive introduction of a computerized medical system in Nigeria; section 3 presents our proposed technical model and solution to overcome the issues presented in section 2; section 4 discusses future work and final conclusions are given in section 5.

II. BACKGROUND

Nigeria's Health Care Delivery System is systematically and fully decentralized. The country's health care delivery system is made up of a network of primary, secondary, and tertiary level facilities. Provision of health care at these various levels of care is the responsibility of Local Governments, State Governments and the Federal Government respectively. At the primary health level, care is given at the general hospitals and dispensaries. This level is where the bulk of rural Nigerians obtain their medical care. Facilities at this level of care are not well equipped and attention to patients is usually supported with referral treatments to the secondary level of health care.

The secondary level of health care usually provides some specialized services to patients who have been referred from the primary health care level through out-patient services of hospitals for medical, surgical, pediatric and community health services. At these secondary level facilities, patients receive supportive health services such as basic laboratory testing, some improved diagnostic services, blood bank services, rehabilitation and physiotherapy services. Serious cases are referred from the second level facilities to the tertiary levels of health care which are usually the teaching hospitals attached to medical colleges and universities.

This tertiary level of care consists of highly specialized services such as orthopedic, eye, psychiatry, maternity and pediatric cases by consultant medical specialists and personnel. The tertiary medical care facilities are not evenly distributed across Nigeria. For example the tertiary facility closest to remote rural areas may be located hundreds of miles away in a Teaching Hospital which, in turn, is located in an urban center or a state capital.

Apart from government owned primary, secondary and tertiary health facilities, there are a numerous private hospitals and health facilities distributed around Nigeria but they are still located in the vicinity of the few urban and semi urban centers. These facilities make up to more than 40% of the whole health care delivery system in the regions of study. These private care givers also depend on the more specialized tertiary level facilities at the teaching hospitals for referrals of serious cases.

For millions of Nigerians, accessing urgent or specialized medical care usually means waiting for the occasional bi-weekly visits by designated specialists from the few specialist hospitals or travelling for two to three days to reach a specialist in the urban centers which can be haphazard. The ability to quickly link urgent patient cases in remote areas to specialized care workers still remains one of the biggest challenges that Nigeria faces because it can take days (even weeks) to wait for the return of paper-based patient data that was sent out by local health staff in the rural site as a referral to the more specialized hospitals.

III. ISSUES

There are several issues that need to be overcome if an e-based solution is to be realized in Nigeria to address the problems discussed in the previous section – we shall look at each of them.

There is a non-existence of a unified and unique patients' identifier. A single unique patient identification number, called the Patient Unique Identifier (PUI), is supposed to be assigned and used to track each patient's record. This is supposed to help differentiate between these records over a period of time. However, throughout Nigeria, the use of a unified PUI is still not possible owing to the non-existence of such identifiers despite efforts made by the Federal government to centrally initiate an identification scheme in the country. This situation is hampering the integration of any e-health system that would rather track patients digitally.

There is the non-existence of encompassing healthcare policies. Encompassing health policies are supposed to provide a cohesive framework and the necessary environment for e-health innovations to thrive. However, in Nigeria, there is no policy in place or any efforts being made to put such policies in place to guide and streamline the delivery of innovative health services like the one proposed by the authors. Without such a policy framework in place, the general distrust and attitude towards the security of patient medical data used in any innovative e-health endeavor is constrained to remain just at the prototype level.

There exists predominant security and confidentiality concerns regarding medical data. Emanating from a non-existent encompassing policy is the general concern about the confidentiality of the individual (personal) health records and data that would be digitally transmitted between different sites. Privacy, security and proper handling of such records in digitalized formats is of great concern to both the rural patients and their health care providers. There are apprehensions that the security of these forms of records may be compromised unknowingly either internally or while in transit. There are still no strong safeguards around captured, communicated and transmitted patients' private health records. This situation constitutes a major challenge in the pilot rural areas investigated by the authors in Nigeria.

There is a consistent resistance towards e-health innovative solutions by medical personnel. A phobia and predominant fear exists among local medical staff and personnel towards abandoning their old paper way of capturing, transferring and storing patients' medical records. The authors observed their resistance towards adopting digitalized formats and more modern ways of tracking health records. Indeed we found that there was an abounding phobia and fear even among the computer literate university-trained medical doctors which may be emanating from fear of losing control over patient's medical records that come under their management.

There is absence of trained manpower and use of acceptable standards. Another nagging challenge unraveled by the authors emanate from the non-existence of trained staff who are abreast of established medical standards that would govern tracking, transfers, transmission and proper management of rural medical records belonging to the rural patients. There is virtually a zero security awareness and understanding of existing international medical and health care standards that exist among observed and interviewed health personnel in selected rural areas of study in Nigeria.

There is an absence of drive, low bandwidth and internet penetration. There is still a low rate of internet penetration throughout the remote rural areas of Nigeria. Bandwidths where and when available are very low. The majority of rural areas cannot support an e-based system using internet deployment because of poor infrastructure and unstable electric power generation. These challenges are attributable to the lack of drive and lack of enthusiasm that all the three tiers of healthcare in Nigeria have shown and demonstrated towards e-health innovations and endeavors. Local health centers and dispensaries also lack the funds and financial backbones needed to centrally put ICT infrastructures in place without the help of donors and their respective governments.

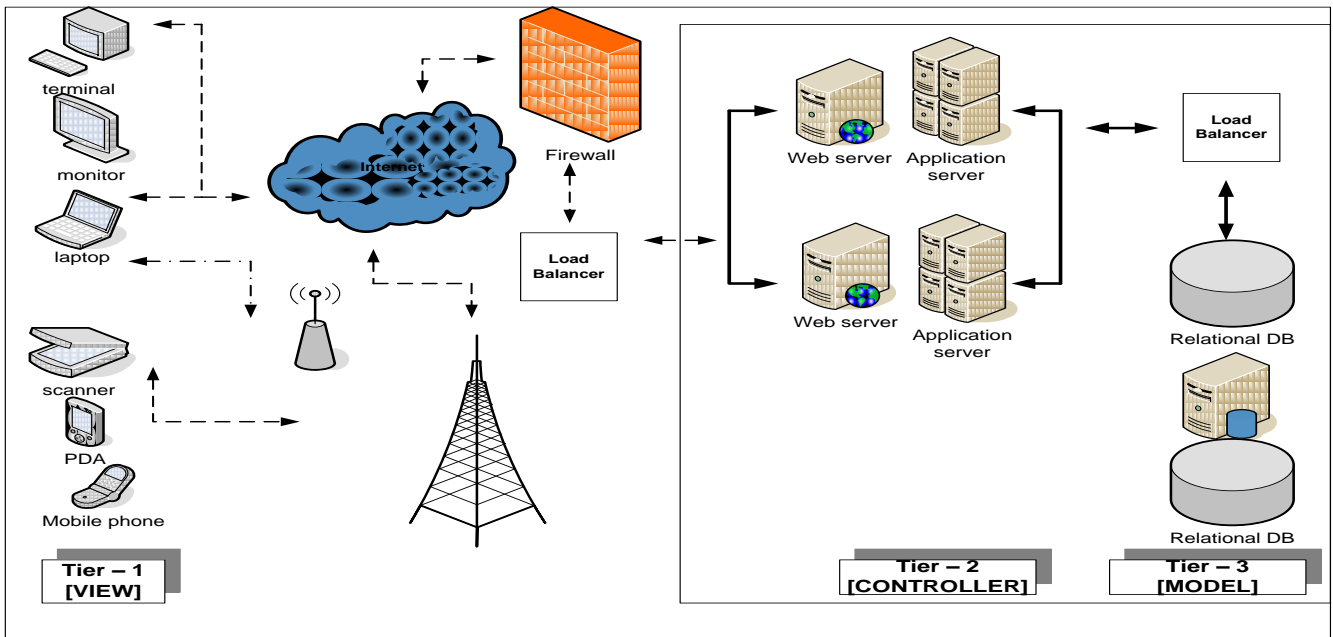


Figure 1: Proposed Architecture

Another problem of broadband in rural areas is the lack of telecommunication infrastructure which is mainly due to the capital cost for such deployment and associated operating or running costs. Consequently, bandwidth demand can easily outstrip the revenue realizable that is needed to pay for the network infrastructure investment [2, 3, 4]. As a result, rural areas generally have lower bandwidth than urban areas which, in turn, makes data transfer slow. Moreover, when operating in a rural multi-service environment such as a hospital a consequence of restricted bandwidth on access pipes is service contention at the customer site, even if core bandwidth exists to deliver the services. Contention for bandwidth within a customer site can arise if there are a number of devices at the site that can request services with aggregate bandwidth greater than can be delivered over the access connection [2, 3].

To address the challenges of deploying a medical system that uses broadband we also need to consider *Quality of Service* issues. In our case, Quality of Service refers to the collection of network technologies and techniques to guarantee a certain level of performance to the flow of medical data on a wireless network. The Quality of Service issues that concern successful medical system are delay, jitter, loss rate, throughput and network resource availability [5, 6]. Delay is the elapsed time for a packet to traverse the network from the source to the destination – we need to keep delay low. Jitter is defined as the variation in delay encountered by similar packets following the same route through the network and would affect real-time streaming applications such as transmitting continuous Intensive Care Unit monitor data - we need to keep jitter low. Loss Rate refers to the percentage of data lost among all the delivered data in a given transmission time interval - in order to reduce loss rate we need a decoder with high error resiliency. Throughput is defined as the rate at which packets are transmitted in a network – we need a system where throughput is high. Network resource availability is the infrastructure associated with the transmission of data e.g equipment, power, etc. In rural areas it is absolutely imperative in health networks to have good network resource availability because the generated traffic may be crucial for the patients' health and life.

IV. PROPOSED ARCHITECTURE

Our proposed architecture for an integrated computerized medical system in Nigeria was designed by the researchers to provide data linkage capability that will sit well among the three levels of care described in section 2 and addresses the issues described in section 3. Furthermore, a centralized medical data management system like ours will help solve the predominant problems that discourage efforts to convert paper-based medical records transmission into faster electronic data transmission processes. Our system was designed to manage medical data and information in clinical practice and diagnostics between levels of medical care giving.

Our architecture is a web-based collaboration/integration system which allows tracking of patient medical history and prognosis; it allows data sharing for remote specialist consultation. It will be used to extensively support diagnosis, prognosis and treatment decisions. The system will also make possible some checks and balances of diagnosis outcomes and treatment regimens between local hospitals and more equipped / more specialized health facilities; local health care givers and health dispensaries will have the opportunity to easily consult with specialist doctors and counterparts.

The proposed architecture of our integrated computerized medical system is shown in figure 1. Our 3-tier architecture is designed and built on wireless thin client architecture with a single very powerful central application server and web server. To connect to the

system, the client health facilities, hospitals, health dispensaries, specialist hospitals, patients will only need a web browser. They do not need to install any client application system. We shall look at each of the tiers of our proposed architecture in turn.

Tier 1 is the user interface and is designed as a separate component. The system provides a structured interface to transfer data and information from and to the client user interface. This provides for extensibility and increased portability to all remote client machines, laptops, monitors and even mobile hand-held PDAs down the line. At the onset, the system is designed to use browsers, emails and web forms for transfer and transmission of medical data, graphs, images and other patient information among system actors. It will be enhanced to accommodate scanned paper forms with optical character recognition later on.

Tier 2 is the medical logic layer and acts as the interface between tiers 1 and 3. Tier 2 interprets the commands entered by staff in tier 1 and formulates commands to execute on tier 3 to access data. Tier 3 will then return the required data to this tier and formats it for the appropriate user interface (PDA, Laptop etc) to return to tier 1 to be presented and viewed.

The persistency and data model of our architecture is designed and built on relational tables in order to accommodate the future multifunctional needs of the system. The persistency is a coded database and is designed to sit on an open source relational database. The concept of a data dictionary was employed in the design in order to make sure that validation rules are supported for all sensitive data and information transmission and transfers remotely by system actors across the regions of study and focus. Our architecture's persistency is designed to accommodate data format conversions for easy analysis, interpretation, archiving and tracking of transmitted medical records and data.

Our architecture addresses each of the issues raised in section 2 – we shall look at each in turn.

Uniquely auto-generated patient identification numbers by the Model will be used to track patients and their health records in the proposed system architecture. This will enable each patient health record to be uniquely tracked.

An easily available open source database management system such as MYSQL forms the core/central component of the Model tier in the architecture. The robust security features of this relational database are leveraged to provide adequate security and confidentiality for all tracked, stored and transmitted patient health information and records. An accessibility matrix created for all the system actors is strictly adhered to and enforced by system components in the architecture.

Our architecture suggests and incorporates low-cost innovative mobile technologies such as Android-based phones, PDAs and easy-to-use devices for its presentation layer of the View component; these devices are relatively cheap and no specialized computer training or knowledge is required for medical personnel to know how to use them. Thus, the proposed architecture will provide a very simple and reliable way for health workers to key-in, enter and transmit written medical prescriptions, diagnosis and diagnostic imagery for immediate analysis and communication.

For all electronic transmission and processing of patient health records, the devices and computer systems within the architecture will be adhering to globally established policy and standards by Healthcare Level 7 International (HL7) for transmission of e-health information and data

Since users of the system can access the system using their own devices such as PDAs and mobile phones, there will be less contention on the system's bandwidth because users can use the bandwidth provided by their own devices rather than that of the system.

To address the issues of quality of service we propose in Tier 2 that access to data is strictly controlled. For example, if priority is given to specific users then delay and throughput will increase. We need high quality of equipment to address jitter, loss rate and network resource availability.

V. DISCUSSION AND FUTURE WORK

As a result of the present explosion and penetration of Information and Communication Technologies (ICTs), many developing countries can make the transition from paper to digital medical records using emerging information and communication technologies such as PDAs, Android-based phones, and laptops with blue tooth and internet capabilities.

There are various reported benefits of the adoption of an integrated computerized medical system to individual patients, hospitals, donors and governments. Real-time medical records management systems, telemedicine and other e-health systems allow system actors to send or receive medical data almost instantly [7]. These systems can allow underprivileged rural hospitals to share/leverage the equipments and specialized human resources in real time with the well equipped bigger hospitals miles away in the urban centers [8, 9].

The specific benefits of an integrated computerized medical system therefore include the following: reduction in medical errors; speed in diagnosis; encouragement of the anywhere anytime diagnostic opportunities; improvement in physician-specialist-patient relationship and ratio; enhanced quality and speed of care; improved enablement empowerment for local health care centers; cost savings etc. Nonetheless, to reap these benefits, countries like Nigeria has to battle the militating challenges to a proper introduction of e-health and e-based systems.

VI. SUMMARY AND CONCLUSIONS

Developing countries like Nigeria are gradually moving away from paper and towards digital formats that facilitates an integrated computerized medical system which can have numerous benefits. However, since a many Nigerians live in rural areas we have seen that there are numerous additional challenges that need to be overcome to realize an integrated computerized medical system.

To overcome these issues we have proposed a 3-tier architecture to realize an integrated computerized medical system for the Nigerian healthcare system. Our proposed architecture will make a bidirectional data transfer possible for the exchange of medical data, diagnosis, prescriptions and emergency alerts between the local health facilities and the specialized hospitals

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THE NIGERIAN MANGROVE AND WILDLIFE DEVELOPMENT

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INTRODUCTION

The Nigerian mangrove ecosystem is mostly fragmented deltaic formation located in the River Niger Delta. Occasionally what should have been continuous and uniform mangrove forest in the Delta Islands are interrupted by beach Ridge Island forests sandwiched between the coastal beaches and the estuarine mangrove and island within the mangrove forests. The beach ridge forests typically contain lowland rainforest species. Some have large areas of high quality forests with high concentrations of biodiversity as in Andoni area.

All the major towns and rural mangrove dependent communities such as Abonnema, Bonny, Buguma, Brass, Nembe etc in the Niger Delta area located on such beach ridge forest Islands within the mangrove ecosystem.

Greatly influenced by both downstream freshwater flows and upstream diurnal tides, the mangrove forests have low plant species diversity and elevated productivity. Although the standing biomass is low averaging 150 ton per hectare, productivity is known to be relatively high – 15 to 20 ton per hectare per year for river mouth and creek edge stands. Productivity is lower for the inner mangrove zones which are composed mainly of stunted trees. The litterfall and accumulation of organic matter are the basis for aquatic food chain linking decomposers to marine and estuarine fish, mollusks (such as oysters and periwinkles), and crustaceans (especially shrimp and crabs). The sustainable productivity of the mangrove in these life-sustaining products is the major concern of the Nigerian mangrove communities.

Fragmentation, deforestation and degradation of the mangrove ecosystem by petroleum exploration and related industrial activities and domestic uses are major concerns to the mangrove communities, the Nigerian environmentalists and conservationists.

Community struggles in the Nigerian mangroves are directed towards operators of petroleum and allied industries for provision of alternative employment, healthcare facilities, improved rural technologies etc in place of destroyed life-supporting mangrove bases. The struggle manifests as various levels of protests, demands criticisms and occasionally violent demonstration by the aggrieved youths of the Niger Delta areas, particularly oil producing communities. This chapter presents features of the Nigerian mangrove ecosystem, some cases of communal ecosystem deforestation and degradation and measures taken to restore them for the benefit of the rural communities.

Size and Floristic Compositions

Nigeria has the largest mangrove forest in Africa and the third largest in the world. The mangrove forest extends from Badagry in the West to Calabar in the East covering a total area of 10,000km² along the coast. Defined by regular saltwater inundation, the mangroves form a vegetation band 15 to 45km wide parallel to the coast. The mangrove region is widest on the sides of the Niger Delta 35 – 45km and narrows towards the centre to a width of 15km except for the channel of the Brass River, which has extensive mangroves far upstream. Acid sulphate, silty clay, clay loam and peat locally called “chikoko”, soils predominate in the mangroves. They tend to be saline and have almost neutral pH when wet. However, when the soils are exposed and thus become dry, the sulphides are oxidized to sulphuric acid, rendering the soil very acidic with pH 3. Bare areas which characterize mangrove areas dredged for petroleum well development are results of oxidation of acid sulphate mangrove soils exposed during dredging. At pH 3 to 3.4 which characterize such dredge spoil dump areas the soil appears too toxic for plant establishment.



The mangrove forests of Nigeria comprise principally only three families and six species as follows:

1. *Rhizophoraceae* (the red mangrove):-
Rhizophora racemosa, *R. harrisonii* and *R. mangle*. Of these *Rhizophora racemosa* is the most abundant taking about 90% of the mangrove forests. It occurs at the outer body of water. It forms a dense growth throughout the region. It is also the biggest of the three species attaining heights of up to 40m and dbh>90 cm at maturity. Being a pioneer, from the water body, it is followed by *R harrisonii* which attains heights of 5-10m and *R mangle* with heights less than 5m. In their distributin, *R harrisonii* occurs usually between *R racemosa* and *R mangle* the latter occupying the harder parts of the mangal soil.
2. *Avicenniaceae* – (white mangrove) *Avicennia africana*.
3. *Combretacea* – *Laguncularia racemosa* and *Conocarpus erectus*.

Nypa fruticans (Nypa Palm) an exotic palm has spread through the Eastern Delta and is common around the mouths of the Bonny and Imo Rivers. This exotic species has high national income value in its natural range where it is also cultivated and sustainably managed. So far attention is not being paid to its management in Nigeria. In degraded areas, sedges, grasses especially *Paspalum vaginatum* and the fern *Acrostichum aureum* thrive.

The most striking feature of the mangrove forests of Nigeria is the zonation of the dominant species more or less parallel with the shoreline, each zone except the overlap, consists of one tree species. Zonation is related to the physiological characteristics of the different species, corresponding to the frequency and duration of tidal immersion, soil

compaction, the extent of accumulation or erosion of soil and the salinity of the ground water.

Zonation suggests that there is a succession associated with aeration and subsequent changes in the level of land in relation to the water. The growth of vegetation in a particular zone also helps to create conditions for another plant association so that one community succeeds another until eventually an island type of vegetation not tolerant of sea water is established.

Rhizophora racemosa, being a pioneer grows on the soft muddy banks of the brackish creek. It is followed by the shorter *R. harrisonii* and *R. mangle*, which progressively prefer drier habitats. *Avicennia africana*, *Laguncularia racemosa* and *Conocarpus erectus* are progressively found on firmer landward grounds.

The Mangrove Soils

The dominant feature of the Nigerian coast is the Niger Delta which consists of swampy ground separated by narrow fresh or brackish lagoons (around Lagos) and anastomosing creeks. The network of creeks, separated by muddy deltaic deposits is not stable, since changes in currents and the rate of flow of the river causes erosion of materials already deposited and deposition continues to extend outwards.

Mangroves occur on the muddy banks of creeks where the water is brackish. Two soil types are roughly distinguished:

- (a) The soft mud area with “tall” *Rhizophora racemosa* (bordering the water courses in small bands of usually $\leq 100\text{m}$).
- (b) The relatively hard fibrous mud with a level surface just below high tide level with short, *R. mangle*. The three *non-Rhizophora* species occur in very limited areas and numbers and are economically unimportant except for limited uses.

Rhizophora racemosa can grow to tall heights and grows best under brackish water influence. *R. harrisonii* and much more *R. mangle* can stand higher saline concentrations. They are found on compacted soils formed of fibrous materials accumulating faster than decomposing, thus forming with increasing age a higher elevated increasingly dense layer, locally called “chikoko”, with high saline concentration. A succession from *R. racemosa* to *R. mangle* can be identified, *R. mangle* grows only to scrub height mainly on tidal flats. Treeless areas of “chikoko” mudflats are expanding on account of extremely high salt concentration. An estimated area of 40,000 ha. of unproductive “chikoko” exists in the Nigerian mangroves.

The time required for the transition from fresh alluvium to mature “chikoko” is about 100 years. Usually the Niger deposits enormous quantity (up to 40 million tons) of fresh silt annually into the system. There is also continuous erosion and redeposition of “chikoko”. In the transportation of the silt, the wash-load is subjected to consolidation, drying, oxidation, reduction and salinisation. Mangroves colonise the silt with the formation and incorporation of organic matters and the resultant accumulation of ferrous sulphide which renders the soil unsuitable for the growth of tall mangrove, *R. racemosa*. The circle is completed by the erosion and redeposition of the soil which promote further chemical changes and the conditions suitable for the colonizing mangrove are once more restored.

Yield and Utilization

Yield data for the Nigerian mangroves suggest that accurate information is yet to be established. Earlier estimates suggest that the Nigerian mangrove forests carry an enormous stock of standing volume. With a conservative estimate of 250m³ per hectare the total volume of mangrove in Nigeria is estimated at 250 million m³. However, a recent calculation indicates that Nigeria's mangroves would have a total standing volume of 30 million m³ and exploitable volume of 10 million m³.



Except for traditional uses mangrove species are not currently commercially utilized in Nigeria. In addition to fuel wood, local communities collect large variety of mangrove products such as food (crabs, shrimps), honey, medicine, dyes, thatching and numerous other household products from the mangroves. Mangrove salt and periwinkles (*Tymopanonus fuscatus*) are both important income sources for local people. Generally, the fishing population in the mangrove area are dependent on the mangroves to all intents and purposes.

Ownership

Traditionally mangrove swamps are community-owned. Communities rather than individuals held rights to most rural land. Today all land is legally vested on the state government though individuals and communities continue to use the land. The Federal Government owns all mineral rights. This is a source of anger and protests for communities in which oil developments is going on, as the industrial exploitation of natural resources from lands occupied by the rural communities does not appear to benefit such communities and has even led to impoverishment of agricultural soils on which the communities depend for livelihood.

Threats to the Mangrove Ecosystem

The Nigerian mangrove forests were earlier considered to be the least disturbed of the forest zones of Nigeria. That is not the situation today. In order to develop the Niger Delta areas, canals and road construction have been extensive since 1980. The Nigerian Oil Industry is located mostly in the mangrove forests. The activities of the numerous oil exploration companies have led to fragmentation, deforestation and degradation of the mangrove forest ecosystem. For example Shell Petroleum Development Company alone has shot over 120,000km of seismic lines and created vast degraded bare areas (yet to be estimated) resulting from dredging activities in the mangrove forest. Impacts of other petroleum development companies such as Mobil, Elf, Agip, Chevron on the Nigerian mangroves are yet to be estimated.



Since slots and canal creation do not consider the impact on local communities and ecosystems a lot environmental degradation and linked socio-economic problems are common. Destruction of fishing grounds and forest die back are just but a few such problems.

Mangrove Silviculture

The Nigerian mangrove is not being managed although it has potentials for numerous industrial uses. Consequently no standard silvicultural systems have been established. However, the “tall” *R. racemosa* has been recognized as the species with dependable potential for several industrial uses. It is good timber, and tannin/rayon source species. The Forestry Department of the Rivers State University of Science and Technology, Port Harcourt, Nigeria, has been investigating nursery and plantation techniques, for *R. racemosa*. With the use of inorganic fertilizer the sprouting time of mature *R. racemosa* propagule has been reduced from 35 to 20 days. The seedling is ready for planting out in three months with six foliage leaves.

A seven year old *R. racemosa* plantation established with nursery-raised seedlings on four (4) hectares of “chikoko” mudflats recorded $88 \pm 1.5\%$ survival, $5 \pm 0.2\text{m}$ mean height, $5.5 \pm 0.2\text{cm}$ mean dbh and 6.0m^2 mean crown cover in vigorous and good form. Studies of the natural regeneration patterns of the mangrove species indicate that natural regeneration is very inadequate and slow inspite of the enormous number of propagules produced per tree. It also shows a lot of population clustering in the order tree \geq seedling sapling. At maturity natural stand spacing is $\geq 3.6\text{m}$.

Conservation

The depletion of the Nigerian mangroves is a cause of serious environmental and economic concern. It is clear that serious depletion of the Nigerian mangroves is increasing markedly without sufficient monitoring, concern, or thought.

The biological and ecological importance of this Nigerian estuarine wetlands necessitates their conservation and management especially as society is now looking to the shallow coastal seas and estuaries to augment the supply of protein. The continuing deforestation and degradation of the mangrove resources will reduce, not only the terrestrial and aquatic

production and wildlife habitats but more importantly resource availability to the dependent rural communities which will be seriously impaired.

As a measure to educate and involve the dependent rural communities in mangrove conservation, the Mangrove Forest Conservation Society of Nigeria (MFCSMN) an NGO has acquired a 9 hectare piece of land at Iwokiri in Ogu/Bolo Local government Area of Rivers State of Nigeria for establishment of a Integrated Mangrove Conservation and Research Centre. It is a community-based poverty alleviating project. The objective is to foster mangrove conservation, development, utilization and self-supporting education. It is estimated to cost ₦381,292,358.37 about \$3,631,355.00.

This is the first and most positive step taken in Nigeria towards improving the mangrove-dependent communities by providing utilitarian conservation and sustainable self-supporting education. As a pragmatic, commodity-based and an adaptive integrated research and training institution, financial, technical and positive supports from organizations world wide shall have contributed immensely towards the development of the mangrove-dependent communities in Nigeria. It is a sustainable new dimension.

Rehabilitation of Degraded Bare Mangrove Soils

Characteristic of Nigerian petroleum development wellheads, slots and canal construction in the mangrove forests are several hectares of elevated dry, bare (void of any vegetation) and degraded mangrove soils. The Nigerian mangrove soil is an acid sulphate soil with pH 6.2 to 6.6. Containing Iron pyrites (FeS and Fe S_2). Dredge spoils from petroleum well slots and canals in mangrove forests are dumped extensively around the wellheads, and canals one to two meters far above tidal floods. The continuous exposure of the soils to atmospheric air leads to oxidation of the pyrites and the formation of sulphuric acid (H_4SO_4) which is abundantly released unto the soil reducing the soil acid level to pH 3. Under the hot tropical condition no plant can survive under pH 3 soil acidity hence the dredge spoils dumps remain bare, void of any vegetation. It is common to see 10 ha of such bare areas in a single location at an average of 3ha per slot. The total area has not been determined for the entire Nigerian mangrove forests.

Foresters in the River State University of Science and Technology, Forestry Department have been able to evolve re-vegetation technique for the bare areas by woody species selection and without external inputs such as fertilizer or lime. These include *Syzygium guineense*, *Dalbergia ecastaphyllum*, *Alchornea cordifolia* and *Chrysobalanus icaco* all indigenous to the area and appear naturally adapted to the acid condition but have to be planted in the rainy season.

This soil therefore supports lowland rainforest species and have potential for agro-forestry after re-vegetation as the nutrient levels are adequate for food crop production. Low pH is the only problem of the area. Rehabilitation of these disturbed mangrove soils will provide further opportunity for food production among the mangrove communities.

SOME IMPORTANT WILDLIFE OF NIGERIA

The available composition of the mammalian fauna has been documented by some researchers. (Brown, 1967; Howell, 1968; Child, 1974; Pelink, 1974; Milligan, 1979; Omoniwa, 1984 and Aber, 1986). These studies reflect those species which are associated with Sudan-Guinea Savanna woodland and include roan, hartebeest, oribi, hunting dog and Patas monkey. Species associated with perennial water system are waterbuck, kob, redbuck and green monkey. The major species associated with fringing forests is the red-

flanked duiker, Hippopotamus and Manatee which occur in pools and rivers. At least 12 orders of mammals have been identified, 55 of birds, 3 of reptiles; 9 spp of amphibians, 14 orders of fish have been documented on the Borgu Sector of the Kainji Lake National Park alone.

WILDLIFE CONSERVATION

Wildlife development efforts of government have been geared towards, protecting all known animal species in Nigeria from extinction. Other objectives of wildlife programmes include its conservation for sustained production of animal protein and for tourism. Specific projects and activities geared towards improved management of Nigerian wildlife resources include the development of National Parks, establishment and management of wildlife breeding centres; implementation of endangered species Decree No. 11. of 1985; establishment of wildlife rescue centres; and monitoring of wildlife habitat, and population. The financial allocation, ₦31.8 million by both Federal and State Governments in the last development plan, 1981 – 1985, is expected to be substantially increased in future plans.

In 1985, an endangered species Decree was promulgated in order to give municipal effect to the convention on International Trade (and traffic) in Endangered species of fauna and flora (CITES). This decree has provisions that seek to stop illegal trade in endangered wildlife and wildlife products.

It has been severally discussed that wildlife in many of the reserves has been decimated almost to extinction. In fact there are few surviving wildlife around areas of high human population density. The tendency to finish what is left of Nigeria's wildlife by illegal hunters has prompted the government to enhance anti-poaching campaigns and patrol of conservation areas through adequate and timely funding.

Proposals for the creation of more conservation areas of varying status are being considered while two wildlife Rescue Centres are about to take off. These programmes may ultimately be used to enhance insitu conservation through re-introduction of some animal species into their original habitats.

Domestication of wildlife species seems to be the alternative to poaching if the popular 'bushmeat' delicacy of Nigerians will be sustained. The emphasis is on people being continuously encouraged to raise some wildlife species at the back yard or some other vantage areas of their living premises. Species that are encouraged are, the guinea fowl, African giant snail, grasscutter, and cane rat.

PROBLEMS OF WILDLIFE DEVELOPMENT

PERCEIVED PROBLEMS

These include lack of knowledge. A state in which both government and the people are either not informed or are inadequately informed of the need to develop the wildlife resources naturally available to them. The wildlife and wildlife resources are often taken for granted – i.e. as nature's gift to man and so may not need fending or replenishment enhancement. A situation where people go into the bush and kill by trapping or shooting animals without regard to sex or age.

In some cases where due to sheer experience or continued prolonged exposure to relationship with wildlife, - animals and other life - forms of note people have noticed reduction in population or instability in animal incidence and abundance, hunters still do

their thing – crop all available individuals to satisfy the “needs” of the people. This is a problem because whereas the need is there for protein supplement, the renewability of the resources is compromised. This really should be opportunity cost reality – to kill out or to source for alternative.

The other or seeming only alternative is that of domestication. Domestication of wildlife species comes with it a whole of problem the greatest of which is probably SOCIAL ACCEPTANCE of the domesticatable species.

Scientists have outlined the domestication process but this is clad with economic problems associated with litter size weight (body) growth rate and protein quality. All these are purely economical, difficult to overcome as they are there poses a rather stiffer problem that of social taboo. Most wild species are either totems or deities in certain parts of the country and indeed the world. Superstition prevails over realities.

ESTABLISHED PROBLEMS

These are problems of enforcement of laws, regulation and rules / legislation due mostly to inadequate sanctions and or lack of corporate will. The skin of a python would yield fine handbags, belt and shoes etc. that would fetch about N10,000 (ten thousand Naira) and that python would have lived for 10 – 20 yrs but the law stipulates a fine of N500 for killing a python. The result is that poachers will dare to kill the python and pay the fine if caught than obey the Law. Also just 2 elephant tusks may cost N2m, (two million Naira) but the meat only about N500,000 and the fine to pay on killing an elephant illegally is N300,000 so the poacher again opts to kill the elephant and if caught prepares to pay N300,000 and makes a gain of N2,200,000.

Another problem is that of Government lording it over the community that actually owns the bush as the very community members will be the chief defaulters. They must be told why they must not harvest forest products.

INDIRECT DEVELOPMENT

In the mangrove ecosystem, the coastal ridge barrier forest lands, wildlife development had been more indirect than direct. In fact there has not been any programme planned to develop the wildlife of the mangrove areas, the deltaic systems and the coastal barrier island regimes in Nigeria. Attempts have been made at conservation efforts nationwide and forest protection but the wildlife status has not even been properly documented in the mangrove areas.



However, the wildlife is undergoing steady development due mainly to native laws and customs as most creeks, rivers and streams are communally owned or controlled. There

are rules and regulation for use of these natural resources. There are also beliefs and traditional authorities on some if not all the natural resources available to the “waterside people”.

These community members maintain SACRED places, sanctuaries and refugia, connoted differently as EVIL FORESTS, shoreline/river bank, shrines (mermaid houses). The result is that most animals finding peace, tranquility and safety in such places would rather always resort to the places than roam and be killed by poachers who will never venture into such prohibited places. These places now become protected areas as our parks, zoos and ranges.

EFFECTS OF DEFORESTATION

When terrestrial land areas (bushes) are exploited for whatever reason(s) such as clearance for agriculture, infrastructural development or mineral prospecting – (seismic activities) etc, the result is deforestation. When this occurs, vegetation covers are removed and the animals feel naked and forced to move. This forced migration of the various species of wildlife can be both advantageous and disadvantageous to the wildlife. They would be forced to run into predators or inadvertent danger – death or injury by machines or drowning for those that cannot swim. They can if lucky to escape all dangers, find themselves a safe refuge and blossom-increase in population. They may also be exposed to researchers who would not have been able to locate them before the deforestation and so be enlisted for studies. This will also trigger off survivorship instinct in them and make them alive resulting to succession and better adaptation to the new environment they find themselves.

FORCED COEXISTENCE

Another way wildlife in the mangrove ecosystem have been developed is inevitable exposure to man and other rather unacceptable species. A situation where antelope would be visiting the creeks and rivers to rummage for food. The antelope is a herbivore and does not feed on animals but require the cover of the dense mangrove forest since there has been a clearing of the vegetation up land. The antelope is not amphibious as it cannot live inside water but it evolved to be a good swimmer and can outwit its predators that cannot swim by associating with the mangrove environment. Common species in this system are the reptiles, birds and insects. The only mammals being hippopotami and manatee.

Some natural disaster such as wind throws and thunderstorm have resulted in decimation of the coastline, riverbank ecosystems to the end that an intermediate zone is created between the shoreline and the pure terrestrial land. Most fringing forest species of wildlife result from such actions and even the large mammals are cut up in what is more brackish than saline water body and they thrive there. There too they are protected as many hunters will be searching for them either up land or in the rivers.



Certain reptiles and carnivorous mammals lurk around living accommodation to prey on domestic animals because they cannot cope with the exposure of the disturbed forest for hunting – pythons seizing hens and goats and foxes stealing meat from homes. Some birds of prey hang out around village settlements for careless domestic fries etc. All these constitute partial domestication of wildlife species as they soon lose their fear for man.

Wildlife development therefore follows closely the forest development efforts since one could hardly talk of wildlife without mentioning vegetation and so with soils.

CONCLUSION

Mangrove land use does not appear to generate competition in Nigeria. Community struggles are directed toward alternative income-generating employment of direct compensation for damaged, polluted or utilized community life-supporting base, the mangrove forest, by industrial development operators. This is because the deltaic nature of the mangrove forests confers limited and specialized species on the ecosystem.

Nigerian foresters have succeeded in determining woody plant species that can be used to revegetate exposed bare toxic dredge spoil dump sites. There is, however, need for research to determine pragmatic and adaptive integrated land use potentials of the mangrove areas in the face of man-induced decline of the productive potentials of the ecosystem.

The Mangrove Forest Conservation Society of Nigeria has positively proposed an Integrated Mangrove Research and Training Centre (IMRTC) for sustainable mangrove utilitarian conservation skill development among the dependent communities. This needs recognition and various supportive contributions and encouragement.

An exclusive mangrove land use policy has become very necessary to save the remaining forests and ensure mutual development of the communities and the wildlife therein.

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PROVISION OF EQUIPMENT AND FACILITIES IN VOCATIONAL AND TECHNICAL EDUCATION FOR IMPROVING CARRYING CAPACITY OF NIGERIA'S TERTIARY INSTITUTION

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Abstract

The paper looked at the provision of equipment and facilities in vocational and technical education for improving carrying capacity of Nigeria's tertiary institution. Vocational and technical education consists of the applications of scientific concepts and principles to the practical skills, techniques and projects relevant to everyday life of the students. With an increase of students' number, adequate provision of equipment and facilities in tertiary institution will become vital enterprise for carrying capacity and development of tomorrow's leaders in order to meet the set goals. This paper was written to address these issues following the sub-headings: concepts of vocational and technical education; objectives of vocational and technical education; problems of vocational and technical education; funding vocational and technical education and the implications for carrying capacity in tertiary institution; effort made towards providing adequate vocational and technical education equipment for effective teaching of the subjects. Vocational and technical education equipment and facilities provision for carrying education equipment and facilities provision for carry capacity in tertiary institution; challenges of vocational And technical education programmers for carrying capacity in tertiary institution; challenges of vocational and technical institution. Recommendation were made and the paper was concluded with the following points that government should provide workshops, classrooms, equipment and necessary facilities in tertiary institution to improve the carrying capacity for effective teaching and learning.

Introduction

One of the issues of great controversy among educators in tertiary institutions today is the issue of the poor state of equipment and facilities. A school of thought argues that the problem is that of inadequate equipment required for teaching the students that is responsible for the quality of graduate the university produce. While another school of thought believes that it is the manner of utilization of the available equipment and facilities in the universities, the prime aim of this paper is to assess the adequacy and utilization of equipment and facilities in tertiary institutions.

Federal Ministry of Education, Science and Technology in 1985 decided to enhance the academic performance of students in different institution by equipping the schools with standard equipment. Okoro (1998) pointed out that the facilities which include the buildings, equipment, tools and school materials available are inadequate for effective use in schools. One of the major problems in tertiary institutions in Nigeria is lack of materials and equipment. Oranu (1990) revealed that lacks of physical facilities are the problems of tertiary institutions in Nigeria. On the problems existing in the schools and the system of education, it is lack of materials and necessary equipment in teaching science and technology subjects (Aromolaran, 1985). To achieve the sub-goals of equipping students to live effectively in the age of science and technology, the practice of starving the schools of equipment, facilities and fund need to change (Nwana, 1983). The National Policy on Education (2004) pointed out that the government is aware that only limited equipment and facilities exist for teachers at different levels.

Afolabi (1990) noted that the federal government is directing its attention and resources to the development of an engineering infrastructure that will enable Nigerian design, fabricate and mass-produce basic equipment, machine, tools and engines within the shortest possible time. He also stated the remarks made by the Federal Government that Nigerian must respond to the challenges of technological development in a methodological stage by stage process targeted at an ultimate sustainable national competence in era of industrialization in Nigeria. It is evident that inadequate provision of equipment and facilities is due to low level of funding tertiary institutions in Nigeria and this made it impossible to actually attain the desired carrying capacity in Nigerian universities. It is also clear that proper installation of equipment in our workshop cannot be carried out without adequate fund. Consequently, the workshops and laboratories as a means of aiding the teachers of vocational and technical education are not properly equipped for the tasks.

Nigeria remains a major defaulter in complying with the UNESCO recommendations that at least 26% of the National budget must be committed to education. The 2009 Federal government budget of N3 trillion has allocated only N183 billion to education. This translates to a mere 6% allocated to education. Osakwe (2009) pointed out that this is still below the UNESCO recommendation. These allocations were not quite adequate, as the institutions had not much to show in terms of rehabilitation for funds made available by the government.

Concept of Vocational and Technical Education

Vocational and Technical education is a comprehensive term referring to the education process when it involves, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills and knowledge relating to occupations in various sectors of economic and social life. The broad educational goals of vocational and technical education distinguish it from vocational “training” which is directed to developing the particular skills and related knowledge required by a specific occupation or group of occupations.

Objectives of Vocational and Technical Education

The objectives of vocational and technical education as stipulated in the National Policy on Education (2004) are:

- (i) to provide trained manpower in applied science, technology and commerce particularly at sub-professional grades.
- (ii) to provide the technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development.
- (iii) to provide people who can apply scientific knowledge to the improvement and solution of environmental problems for the use and convenience of man;
- (iv) to give an introduction to professional studies in engineering and other technologies;
- (v) to give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant, and
- (vi) to enable our young men and women to have an intelligent understanding of the increasing complexity of technology.

To enable the objectives of vocational and technical education to be realized in the institutions for carrying capacity, the provision of equipment and facilities in vocational and technical education programme should be addressed properly and be supplied to various institutions.

Problems of Vocational and Technical Education

The government cannot come out openly in support of the benefits inherent in vocational and technical education while at the same time paying lip-service to its funding and existence. Also the provision of equipment, facilities and tools cannot be carried out in some tertiary institutions and others left without any equipment or facilities.

However, anybody who has at least a little experience of what it means to give practical technology training to university students, that are inadequately equipped with materials, equipment and facilities will understand that it is almost impossible to get 100 or more students in one classroom to individually practice how to effectively use the only available machine, equipment or tool. Equipment, machines, facilities and instructional materials for the purpose of vocational and technical education should mean that these training items are provided in adequate quantity to a degree where it is possible for individual students to use during practical lesson in workshop. The success of the implementation of core curriculum introduced in 1985 will largely depends on the availability of the necessary equipment and facilities, the provision of the equipment and the effective utilization of equipment and facilities should be given priority attention to improve the carrying capacity in the institutions.

Mbaiorga (1991) stated that education planning is further complicated by the fact that in addition to the social, economic and political forces which concern other aspects of education, the vocational, technical and technology educators must be concerned with the technological changes, manpower trends, current and projected labour force demand, unemployment and host of related problems of equipment, facilities and conditions which may influence policy regarding vocational and technical education.

Funding Vocational and Technical Education and the Implications for Carrying Capacity in Tertiary Institution

The Vocational and Technical education institutions in Nigeria face serious financial problems today because the industries and the existing organizations that are the main consumers of the vocational products are not supporting and financing vocational and technical education programmes. The vocational and technical education in this regard does not have funds needed to execute developmental research projects/programmes. In Nigeria, we have engineers who cannot produce scientific or technical invention since most of our institutions do not have the equipment and where this equipment are available, there is shortage of personnel in technology, engineering profession and the professionals prefer to work in industries for more pay than teaching in schools. In the next millennium, Nigeria should take after the developed world like USA, Japan, India, France and West Germany, that usually support, sponsor the vocational and technical institution by industries, individual or organizations in addition to government subventions to enable these institutions execute their vocational and technical education programmes.

Nwaokolo (1990) stated that the problems of vocational and technical education are lack of basic instructional facilities for training, lack of trained professional teachers, and lack of capital. Oranu (1990) revealed that lack of physical facilities is the major problems of vocational and technical education in Nigeria. One of the problems in our system of education in Nigeria is lack of materials and necessary equipment in teaching the vocational, science and technology subjects (Aromolaran, 1985). Okoro (1990) made it known that ineffective teaching may be caused by lack of suitable tools, equipment and materials due to inadequate funding. They have to be supplied if remarkable improvement in the performance of students is to be made for the attainment of the carrying capacity needed in the tertiary institutions. The nation must therefore look ahead to evolving strategies for meaningful implementation of the present day vocational and technical education, curricula objectives, if the challenges posed by the contemporary needs are to be met. The logical thing to do is to identify the root causes of the ailment and apply appropriate cure (Oriaifo, 1988).

Vocational and technical education provided the necessary remedy in Nigeria. Afolabi (1990) indicated that the federal government is directing its attention and resources to the development of an engineering infrastructure that will enable Nigeria design, fabricate and mass produce basic equipment, machine, tools and engines within the shortest possible time. He also stated the remarks made by the Federal government that Nigerians must respond to the challenges of technological development in a methodological stage-by-stage process targeted at any ultimate sustainable national competence in industrialization in the next millennium for carrying capacity in the institutions.

Effort Made Toward providing Adequate Vocational and Technical Education Equipment for Effective Teaching of the Subject.

Aigbe (1990) stressed that a fresh indication of the state government commitment to vocational and technical education was given with the announcement of additional N50 million investment to the vocational and technical education sector. The government in this regard realized the problems and difficulties facing the tertiary institutions with obsolete sub-standard, out-dated, and damaged equipment. Aigbe added that the government assured the state that assistance will be given to the tertiary institutions for the purchase of materials, equipment and other facilities to provide the needed middle level technical and human resources for the state.

Umunadi (2007) cited Prosser's theories of vocational and technical education when he stated that the school workshops, laboratories and the total environment where vocational and technical education programme is given must be adequately equipped to reflect the actual working environment. That is the vocational and technical education workshops, laboratories and the working environment should be well equipped to attain the standard of where students will work after training. The school workshops should have the same equipment, tools, and materials in terms of types, designs and specification with the industry where the students will work after training.

Ifejike (1990) supported the theories of vocational and technical education when he pointed out that the teaching of vocational and technical education subjects require the use of specialized laboratories, workshops, machines, tools and equipment. Unfortunately, in Nigeria, the low level of funding of institution makes it impossible to properly and adequately equip their workshops, laboratories, studio and classrooms. A situation where 50 students crowd a piece of equipment, where the nearest a student get to understanding the use of a machine, cannot make for a true and successful acquisition of skills, in order to achieve the objectives and technological breakthrough in vocational and technical education. It is expected in vocational and technical education that the teacher must observe the students as they work in the school workshops, laboratory or classroom using the right instructional equipment and tools. It is necessary to correct them during practical work using the right equipment and facilities to enable the students meet the set objectives of vocational and technical education.

Vocational and Technical Education Equipment and Facilities Provision for Carrying Capacity in Tertiary Institutions

The major problem facing vocational and technical education includes inadequate quantities of equipment, machines, tools and instructional materials (Osuala, 2004). Carrying capacity can be achieved in tertiary institutions when there is fund for purchase of adequate equipment and facilities in our tertiary institutions. The development of capacity, potentials, self actualization, appreciation and application of knowledge gained to solve practical problems in the fast technological changing society cannot be achieved, if equipment, teaching techniques and devices are not adapted to the demands of the

technological and scientific age in which students have to live and function (Onyegegbu, 2001).

Vocational and technical education is the key for carrying capacity in tertiary institution in Nigeria. Vocational and technical education has been presented in this paper as a design activity, which leads to problems solving and decision-making. Vocational and technical education consists of the applications of scientific concepts and principles to the practical skills, techniques and projects relevant to everyday life of the students. The main thrust of the provision of vocational and technical education equipment and facilities is to assist the teachers to teach students and utilizing the equipment and facilities to learn and this ought to provide students with the necessary knowledge, skills and experiences as tools which students can use in translating theoretical principles into practical design for problems solving and making functional use of devices for carrying capacity in tertiary institutions.

Challenges of Vocational and Technical Education Programmes for Carrying Capacity in Tertiary Institutions

Vocational and technical education are applied science for the 21st century, as there is an increase number of tertiary institution students in Nigeria offering it. With an increase of students' number, adequate provision of equipment and facilities in vocational and technical education, classroom will become vital enterprise for carrying capacity and development of tomorrow's leaders. The glaring challenge is in the provision and utilization of these facilities and equipment in the vocational and technical education workshops, laboratories and classroom. Vocational and technical education teachers and students are faced with the following challenges:

- (1) The vocational and technical education equipment, machines, tools supplied should be properly installed with adequate provision of power supply to enable the equipment function as required by the capacity of the equipment and machines to assist development and carrying capacity in tertiary institutions.
- (2) Vocational and technical education teachers that are unskilled and lack the knowledge of using equipment and other facilities. They should be trained and retrained on the job, seminar and workshop, to enable the teachers gain current knowledge of new devices and equipment to cater for the desired carrying capacity in Nigeria.
- (3) Government should provide workshops/classrooms, tools, equipment and necessary facilities in tertiary institutions for vocational and technical education programmes to sustain and improve carrying capacity in tertiary institutions.
- (4) The government and non-governmental agencies should encourage vocational and technical education to assist in human resource and capacity building by funding the programme to improve carrying capacity in tertiary institutions.
- (5) The government should be able to send inspectors from Ministry of Education (Technical Division) to monitor the equipment utilization in each institution and to enforce the use of equipment during the period of their visit to improve the carrying capacity in Nigeria.

Conclusion

Vocational and technical education anywhere in the world has been described as a strategic and viable programme and a sine qua non to the attainment of the eight point of United Nation millennium development goals which require adequate provision of equipment and facilities in order to achieve set goals of the United Nations. This however is not the case in Nigeria situation. There is need therefore to move forward with the vocational and technical education programme of the developed countries. The

government in this era of technological advancement should provide the tertiary institutions with the necessary fund to purchase the equipment, facilities and manage the initial problems associated with the use of the equipment and training of vocational and technical teachers. Nevertheless, these problems can be surmounted with time. Nigeria cannot afford to be left out of the great benefits in vocational and technical education. It then becomes pertinent to provide the necessary equipment and facilities in the different institutions to prepare the institutions for the improvement of carrying capacity. The provision of facilities will stimulate the interest of students in the study of vocational and technical education subjects and improve the carrying capacity of tertiary institution in Nigeria.

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AERIAL AND GROUND SURVEYS AS A TOOL IN GAME SELECTION FOR DOMESTICATION (THE KAINJI EXPERIENCE)

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INTRODUCTION

There are several tools used in game selection for domestication social acceptance, adaptability and game inventory to mention but a few. In this paper we must devote most of our discussion on game inventory, game social stress condition both of which are most related to survey of animal population. If there be no game inventory, how do we know the available lot of game to be selected from. And if we do not delve into the social organization of the game spp. how do we know the various stress conditions that game animals encounter, and which condition exposes or predispose them most to death. A survey must be carried out in trying to find out any of the above mentioned conditions relative to the conditions we can improvise.

In selection of game spp. to be domesticated an inventory of the available game animals has to be taken and this inventory is only possible through censusing. Aerial census of animals population, is geared towards confirmation of the results of ground surveys. Sometimes both complement each other. Certain places or habitats are difficult to penetrate such as mangrove swamps and thick deciduous tropical rain forests. In such places aerial surveys will be the best tool to use in ascertaining the types and estimating the numbers of wild animals present.

When the inventory is taken, each sp. is studied for a knowledge of its social organization and physiological adaptability. Some animals are shy and would flee at the sight of human beings, examples include the oribi, duiker and these will be difficult to class either as fit or unfit for domestication by using only the ground census method. An aerial survey would in this case be necessary for the purposes of selection of these animals for domestication. Such surveys would go a long way in aiding the livestock officer on which of the three levels of domestication would be employed relative to the spp. – Ranching, farming or intensive rearing.

In assessing animal population particular attention must be paid to seasonality. Some animals do not expose themselves readily in the wet season. There is no need to migrate to water holes and river valleys and there would be enough vegetation covers for them little or no wandering occurs. Others are strictly nocturnal such as the hippopotamus, bats. Some animals change habit as the season changes, examples include local movement of individuals and population. In dry season, switching of food preferences, reduction in population etc.

PROBLEMS OF AERIAL SURVEYS

Surveys carried out from aircraft in the air have a series of problems ranging from choice of airplane to meteorological. During the past twenty years, light aircraft have played an increasingly important role in wildlife research and managements. Research workers and

game department are becoming more dependent on aircraft to increase their flexibility in research and other aspects of wildlife work. The various characteristics of the wide variety of available aircraft today have not been fully appreciated. There are reports that there are over 45 different types of aircraft available in use for such works and that they range from two-seater trainers to medium size twin-engine airplanes and helicopters.

In choosing an aircraft, right for the right job, the following are considered: Cost, useful load, speed, Runway requirements, seating capacity and noise level.

Lamprey (1969) recounts that attempts to census large mammals population from the air are frequently made in East Africa with results of doubtful value. He argues that the feasibility and reliability of total counting are points of considerable uncertainty and depend on many variable factors which include:

- (i) spp. to be counted
- (ii) Type of flight pattern used
- (iii) Height above ground of the aircraft
- (iv) Vegetation and nature of the terrain
- (v) Weather
- (vi) Time of day
- (vii) Pilot and observer experience
- (viii) Fatigue factor and length of time flown.

The degree of fatigue produced by the aircraft type is of obvious consideration. There are many causes of fatigue, some still little known and a good summary of the problem could be found in the Agricultural Pilots manual, published by the department of civil aviation in Australia. They consider that fatigue is contributed to by all of the following agents: heat, cold, noise, vibration, pressure, accelerative forces, the maintenance of posture over long periods, boredom, frustration, the need for prolonged vigilance and concentration, apprehension, anxiety, fear, sense of responsibility, psychological reaction to physical discomfort, and frequent critical peaks of activity during flight.

High wing airplanes are generally preferred to low wing chiefly for the purposes of visibility. In most high wing airplanes used for counting, door and panels are removable.

The countability of animals are influenced by the following:

- (1) Animals outside the observers' visibility profile
- (2) Animals in the visibility profile but invisible
 - a. Physical Obstruction
 - b. Animals that hide
 - c. Panel Observation
- (3) Physical characters of the environment
 - a. Illumination. Here position of sun in relation to lighting and observer position (see illustration)
 - b. Average visual acuity in man.

The limits of visual acuity as applied to counting animals are difficult to establish due to the wide variation in condition encountered, but generally speaking, counting is not attempted above 1000ft and most work is done in the

range of 200-800ft. Being too close to the animals impairs countability in that too much details is distraction.

- (4) Counting rate: There are many occasions when animals potentially visible to the observer go unrecorded and the factors responsible for this are related to the rate at which the observer must discriminate and record the animals. And fairly definite limits on the countability of plainly visible animals can be seen.

If the observer intends to count all the animals in the visibility profile in one pass of the aircraft an indication of the “critical density” above which they become uncountable could be shown as in the table below:

COUNTABILITY OF ANIMALS AT VARIOUS AIR SPEEDS EXPRESSED AS DENSITY PER 100 YARDS OF VISIBILITY PROFILE

Air speed m.p.h	40	60	80	100
Sec. to cover 100 yds	5.1	3.4	2.6	2.0
No. of animals countable				
Per 100 yds	15.3	10.2	7.8	6.0
Density per mile	270	177	137	105

Source: Graham & Bell (1969).

In the table a counting rate of 3 per second has been used. This seems the approximate maximum rate an observer could expect to maintain for extended periods (Watson 1967). Where groups of closely compacted animals exceed 100 they must for most practical purposes be considered uncountable by the human observer since the flying time required is usually incompatible with the economics of the operation.

Another problem of the countability is the effect of distribution. Groups of animals are more readily seen than solitary ones and where both configurations occur together bias towards searching for groups is likely others include patterns of distribution in a group viz: lines or circularly shaped groups; uni directional or randomly orientated and regular or even spacing.

The noise level of the aircraft in use is another parameter for choice of aircraft. Most of the animals ran away from the noise of the airplane when first seen, so some animals were missed on counting. Roan antelope and hartebeest are not disturbed by the approach of Land rover as known from ground observation and the same may be with the noise of aircraft. However, if the power-off glide performance of the airplane is good enough then noise level can to some extent be taken care of.

Also the weather conditions will greatly affect aerial surveys. When clouds are low as with overcast of cumulus clouds, flying is not advisable (authors personal experience). The visibility is poor and navigation is rather instrument and not visual. This means that even when grids are flown no observations are reliable. Animals that hide will not be seen. Even very visible animals in open field will not be seen. There would be a wrong assessment of the animal behaviour or response to external disturbances.

PROBLEMS OF GROUD SURVEYS

There are many methods of carrying out a population study on the ground and all of them have their peculiar problems. Wild animals do not like interaction or disturbance from other animals and especially man, this brings to bear on them social stress. For an animal species to be effectively domesticated or even considered for domestication, the social stress has to be non-existent or brought down to tolerable levels. This is where the capture and recapture method of population census becomes tricky. The very first two assumptions of the method viz:

- (1) Marking does not affect the mortality or behaviour of the animals, the marks are not lost and marked individuals are readily recognized.
- (2) The marked animals mix randomly in the unmarked population following their release impose limitations to the use of this method as a tool for selection of animals to be domesticated. It is however useful in the sense that it gives an indication of the animals' social stress amenability.

When the sample area is large, direct count of the whole population becomes difficult except for animals that have large bulk and the habitat relatively open. Strip censuses are used when it is impractical to carry out whole population count. Here sighting of animals is the possible short-coming. It seems needful to mention here that the only ground survey method fit enough as a tool for selection of animals for domestication would be that method which guarantees fearless exposure of the animals as counted giving details of the population structure – age, sex, size and behaviour. Such a method is far fetched, the closest being the King census and the fixed transect belt methods. In these something has to be done in case of shy animals, which flee on the sight of any other animals and/or sound. Such animals include, Grey Duiker, Oribi, Water Buck etc. (Kainji Experience).

Seasonality also affects ground surveys. In the Kainji Lake National Park, the best time for ground survey is the dry months of the year, especially when some burning had taken place. Visibility at this time is best. The park is dry and water holes are drying up so there is a compulsory movement of most animals towards the valley of the Oli River. At this period it will be possible to study the interaction of the animals as they meet at a common drinking place. At the rainy or wet season, survey is best done to study the behaviour of the rather solitary species. So by and large surveys are necessary to get an inventory of the available animals in the wild, further surveys would be necessary to document the behaviour and organization of the animal species so that surveys could be a tool for selecting animals for domestication.

EFFECTS OF SURVEYS IN SELECTION OF GAME FOR DOMESTICATION

The distribution and abundance of animals in an area is dependent on the vegetation patterns and that is dependent on the geology and climate of the area. The major parts of the Kainji Lake National Park (KLNK) in the east (Halstead 1971) and the West (Klinkenberg, 1965) are underlain by undifferentiated metasediments. The annual rainfall is about 1200mm (Ayeni, 1980).

The main vegetation associations in the area are *Isobertinia Tomentosa* woodland, *Azelaia Africana* woodland, *Acacia* 'complex' and *Burkea Africana* – *Terminalia avicenioides* woodland. These vegetation types are recognizable from aerial photographs (Geerling, 1976). Milligan (1976) has shown that there are significant differences between the species ordination in the vegetation types. This can only mean that the animal species available and their distribution would vary accordingly. The available mammalian species could be put into two groups, the Oli Valley group and the Savanna group. Milligan (1979) reported that the

Oli Valley group composed kob, red duiker, waterbuck, warthog, bushbuck, baboons and monkeys; while the Savanna group included hartebeest, roan antelope, grey duiker, oribi and elephant. Buffalo was apparently intermediate between these two groups.

With surveys like these a check list becomes readily available to the livestock officer who now becomes armed with a tool for game selection for domestication.

Such a check list had been documented by Ayeni, Afolayan, and Ajayi (1982) in the master plan for the management of Kainji Lake National Park. Six types of wild mammals occur in the area and include members of the orders:

Carnivore	16 Species
Rodentia	13 Species
Artiodactyla	12 Species
Chiroptera	6 Species
Primates	5 Species
Insectivore	2 Species

The following are represented by only one species; Pholidota, Proboscidea, Sirenia, Tubulidentata and Hydracoides. According to Child (1974) 24 species of amphibians and over 350 spp. of birds occur in the Park.

The relative abundance of this game would aid in selection criteria of game for domestication. So surveys are important as they say silently, what they are and in what proportions and conditions.

SUMMARY

In spite of the difficulties in carrying out successful surveys and in spite of the fact that most figures of animal abundance documented are only estimates of animal populations it is almost difficult to select game for domestication without a knowledge of what is available. Various methods have been employed in surveys be they aerial or ground. Counting has been made more reliable by adjusting the methodology and of course subjecting the results to statistical analysis. Most biases are removed and so the information given by most surveys are reliable. In the Kainji Lake National Park sampling methods have been subjected to continuous comparison and changes. The results of surveys on the ground are cross checked by result in the air and a reliable documentation is assured.

RECOMMENDATION

It is recommended that aerial and ground surveys would remain unbeatable as a tool in game selection for domestication. However, the methods and techniques employed must suffer constant review as science is dynamic. Other studies could be carried out on the survey results just as a back up.

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ANALYSIS OF ADULT FEMALE CLOTHING MADE WITH ADAPTED PATTERNS AND FREE HAND CUTTING: CONSTRAINTS AND PROSPECTS

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ABSTRACT

The main purpose of this study was to analyse adult female gown made with adapted patterns and free hand cutting. The specific objectives are to determine whether bodice part of a female gown, skirt part of a female gown and a female gown made with adapted patterns fit better than the ones made with free hand cutting. There were three research questions from which three null hypotheses were formulated. The study utilized an experimental design. A sample of 30 students was drawn from the target population of 550 Home Economics students of Federal College of Education (Technical) Omoku and University of Education, Port Harcourt. A systematic sampling technique was used to select the sample. Instrument used for the study was a 4-point likert scale questionnaire of strongly agreed, agreed, disagreed and strongly disagreed. Values were assigned as follows: SA-4, A-3, D-2, and SD-1. The data collected was systematically analysed using mean and t-test. The three hypotheses were tested at 0.05 level of significance. Findings revealed that a female gown made with adapted patterns fits better on the shoulder, sleeve, bust, waist, and hip than a gown made with free hand cutting. Findings also revealed that the gown made with adapted pattern look more outstanding and dressy than the one made with free hand cutting. Based on these findings, some recommendations were made. It was recommended that : Graduates of Home Economics that specialize in Clothing and Textiles should be encouraged to establish industries where they can make patterns according to contemporary fashion in sizes for sale. There should be an awareness programme organized by Home Economists to dressmakers who uses free hand cutting to make use of adapted patterns in sewing. Seminars/workshops should be organized by Home Economists on pattern making regularly for dressmakers.

INTRODUCTION

Clothing includes all types of garments worn by human beings such as shirts, blouses, skirts, trousers and gowns. World Book Encyclopedia (2001), has described clothing as the different garments worn by people throughout the world. According to Ezema (1996), Clothing is a basic human need and it is any article placed on the body in order to protect, beautify, or to adorn it.

Clothing are worn for the simple fact that they protect the body against weather conditions, beautify the body and communicate to others about the wearer. Esiowu and Igbo (2008), are of the opinion that individual clothing also tell others whether the wearer is conservative or daring, out-going or reserved, casual or organized, a leader or a follower, confident or unsure. Ahia (2001), has stated that beyond the use of cloths to protect the bare body, it serves as a means of group identification, gender stereotyping, ritual distinction and status symbolization and these other functions of clothes create serious religious, social and economic pressure which people of the world have to bear.

Shailong and Igbo (2009), have opined that besides protection, clothes act as means of personal communication by expressing the individual unique personalities for modesty and for attraction, easy identification and for social statues. And that proper Clothing is what differentiate man from other animals.

Clothing for men and women are made from fabrics. These can be achieved through the use of adapted patterns, commercial patterns or the use of free hand cutting. Adapted patterns are made from blocks. Blocks are achieved through the drafting of patterns using the actual measurement of the person concerned without ease. These blocks which are in five pieces are later used to adapted to any style of garment as desired for onward transfer to the fabric, then sewing can commence.

According to Ekumankama and Igbo (2009), a pattern is a piece of paper drafted and cut to size and shape which is used for sewing dresses. They went further to say that a designer uses a foundation pattern (block pattern) as a basis for making the pattern for a design (style pattern).

Adaptation of pattern is the process of developing a new pattern to any style of your choice using the drafted blocks. These patterns adapted should bear the seam allowance and pattern signs to guide the dress maker on the laying, cutting and sewing. Adapted patterns are usually placed directly on the fabrics for cutting and sewing.

Commercial patterns are patterns that are internationally produced and packaged for use by dressmakers. These are not locally made. Instructions for use are usually indicated on the envelops and the main pattern. Commercial patterns are produce in varieties of styles excluding styles for Nigerian traditional clothes. Adaptation of commercial pattern can also be done if the dress maker wish to change the style from what he/she has bought to suit him. Commercial patterns are placed directly on the fabric according to the instructions written on them and the envelops. Then sewing can be done. The use of commercial pattern is less stressful as it does not require any drafting.

“Before Nigerian government banned importation of ready-to-wear clothes, second hand clothing (Okirika) and commercial patterns in 1986, parents were not finding it difficult purchasing garments for their pre-school children. The main objectives of this ban is economic self-reliance. This has now led Nigerians to make use of local garment manufacturing companies in the provision of garments. these local manufacturing companies make use of free hand cutting techniques” (Shailong and Igbo 2009).

A lot of garments worn these days apart from ready-to-wear garments are made from free hand cutting. Free hand cutting is a method of cutting a style of a garment directly on the fabric without the use of a pattern. Shailong and Igbo (2009),described free hand cutting as a method of cutting the fabric marked with chalk based on the measurement and cut directly without the use of a paper pattern. However the measurement of the individual is utilized directly on the fabric in free hand cutting. While using the free hand cutting and there is a mistake, the fabric will be wasted.

According to Iloeje (1995), as cited by Shailong and Igbo (2009), free hand method of garment construction may spoil the garment entirely, thereby wasting the fabric. They went further to say that free hand cutting is time consuming and slow, therefore cannot be conveniently used for mass production. From the writer’s experience, free hand cutting has resulted to unfitted garments and quarrels among dressmakers and their clients.

A lot of people prefer ready-to-wear clothes due to the unsatisfactory jobs from some tailors that uses free hand cutting for their dress making. This has made the budget for clothing to increase for most individuals thus affecting the output of the tailoring institutes. For the purpose of this research study an analysis will be carried out on clothes made with adapted patterns and free hand cutting.

CONSTRAINTS OF SEWING WITH ADAPTED PATTERNS/FREE HAND CUTTING

There are a lot of constraints associated with sewing using adapted patterns. The processes of drafting and adaptation of patterns before laying, cutting and sewing is time consuming and may be difficult for an inexperienced person. It can be boring to a dressmaker or frustrating if the individual lacks the needed competence. He/she may not be able to meet up with his/her clients.

“Some women attend a formal program to develop their design abilities. Furthermore many other women have given up sewing because they are disappointed by the result. This mythical women may have a very busy life with little time to go to classes. She has heard about making your own patterns but assumes it is difficult, technical and requires attending a special school. At the library she has seen books on pattern drafting. They only added to her misunderstanding as they did not tell her how to start learning such a new skill”. (Gizeski 2009).

Making clothes with free hand cutting can lead to the destruction of fabric because during direct cutting on the fabric the dress maker can make a mistake and amendment may be difficult or not possible. Free hand cutting may result to garments not fitting well on the shoulder.

PROSPECTS OF SEWING WITH ADAPTED PATTERNS/FREE HAND CUTTING

Gizeski (2009), has explained that the unifying principle of pattern drafting for fit and fashion is that patterns are designed so women will look and feel wonderful in their clothes. It presents a stepwise system for a student to accomplish that goal. And that after the fundamentals are understood, a student can experiment creativity and novices then become professional designers.

Clothes made with adapted patterns are cheaper than ready – to – wear clothes and they can be made to ones choice and exact size. World Book Encyclopedia (2001), has stated that clothing and other items sewn at home may cost less, fit and wear better and have more individuality than ready –to – wear products. Finally free hand cutting consumes less time in the process of sewing.

STATEMENT OF PROBLEM

Clothing as one of the primary needs of an individual are worn to protect and beautify the body. Therefore factors have to be considered for the choice of clothing whether they are ready-to-wear or locally tailored. Locally sewn clothes are achieved with the use adapted patterns or free hand cutting. The use of free hand cutting and the use of adapted patterns by most dressmakers have posed a lot of problems.

Firstly it is assumed that there is a high rate of fracas between dressmakers and their clients due to the fact that clients feel they get unsatisfactory services from their dressmakers. On the other some dressmakers are not knowledgeable about the use of block patterns to produce new styles for dress making.

Secondly most people resolved in patronizing ready-to-wear clothes which are sometimes more expensive because they don't get the satisfaction they want from their dressmakers. Thirdly, it is assumed that tailoring institutions are no longer booming as they should have been since most clients are unsatisfied with the poor styles processed by dressmakers. Could this assumption be true?

The use of free hand cutting has given rise to the above problems. The problem of this study therefore is to analyze adult female clothing made with adapted patterns and free hand cutting and also pointing out their constraints and prospects.

RESEARCH QUESTIONS

This study sought answers to the following research questions.

1. What are the differences between the fitting of female bodice part of a gown made with adapted patterns and free hand cutting?
2. What are the differences between the fitting of female skirt part of a gown made with adapted patterns and free hand cutting?
3. What are the differences between the fitting of female gown made with adapted patterns and free hand cutting?

RESEARCH HYPOTHESES

The following null hypotheses formulated were tested.

1. There will be no significant difference between the fitting of female bodice part of a gown made with adapted patterns and free hand cutting.
2. There will be no significant difference between the fitting of female skirt part of a gown made with adapted patterns and free hand cutting.
3. There will be no significant difference between the fitting of female gown made with adapted patterns and free hand cutting.
- 4.

PURPOSE OF THE STUDY

The main purpose of the study is to analyse adult female clothing made with adapted patterns and free hand cutting stating their constraints and prospects. Specifically, the study will find out:

1. If female bodice part of a gown will fit better when they are made with adapted patterns or free hand cutting.
2. If female skirt part of a gown will fit better when they are made with adapted patterns or free hand cutting.
3. If female gown will fit better when they are made with adapted patterns or free hand cutting.

SIGNIFICANCE OF THE STUDY

Clothing and Textiles is an area of Home Economics that can provide opportunities for the acquisition of skills for self-reliance through the construction of garments. Lemchi (2002), observed that as a skill oriented course, Home Economics possess the capability of equipping individuals with salable skills that make for self-employment, hence self-reliance. Generally, it has been observed that most dress makers prefer to use free hand cutting while sewing because it is faster way of sewing not minding if it is an accurate method or not.

The study will provide information on the importance of garments made with adapted patterns. With the information provided in this paper dress makers will see the benefits dresses made with adapted patterns instead of using free hand cutting while sewing.

Dress makers will recognize the importance of the use of adapted patterns which limit wastage of fabrics and reduction of mistakes. Also the information on how to place the pattern on the fabric making sure of using the right grain and placement of design of the fabrics is known. This paper will reveal to the dress makers that garments made with adapted patterns may fit better on the body and look more attractive. Finally, this study will serve as a source of information for future researchers who will research on related topics.

SCOPE AND DELIMITATION OF THE STUDY

The scope of this study covers the two tertiary institutions where Home Economics is studied in Rivers State. They are:-

1. University of Education, Port Harcourt.(NCE Year three students).
2. Federal College of Education (Technical), Omoku, Rivers State. (Year three students)

LIMITATION OF STUDY

During the course of carrying out this research work, the researcher encountered some limitations. Some of the problems are that it took some time to be able to get students to wear the clothes made for the research and model them to stay as long as 1 hour to enable the respondents give answers to the items in the questionnaire. Time factor was also a problem encountered by the researcher.

METHODOLOGY

RESEARCH METHODOLOGY AND PROCESSES

This chapter dealt with the description of methods used in carrying out the study. Specifically it described the research design, population, sample/sampling technique of the study, development of research instruments and technique for data analysis. It also dealt with the development, validity and reliability of the instrument. The data collection and method of data analysis were described.

DESIGN OF THE STUDY

The study utilized the experimental design. It examined and compared the fitting of female clothes made with adapted pattern and free hand cutting.

POPULATION OF THE STUDY

The target population consisted of all the Home Economics students in the two tertiary institutions where Home Economics is studied in Rivers state.

SAMPLING/SAMPLING TECHNIQUE

The sample for the study was selected from the final year students of Home Economics in the two colleges. The sample consists of 10 final year Home Economics students of University of Education, Port Harcourt (NCE) and 20 final year Home Economics students of Federal College of Education (Technical), Omoku, Rivers state. They are chosen because of their maturity and adequate exposure to the content of Clothing and Textiles at the institutions. Therefore the sample is made up of 30 students. The study involved only females as no male enrolled in Home Economics in the two institutions. For sample selection, systematic sampling technique was used in selecting 30 students for the study.

RESEARCH INSTRUMENT

The instrument that was used for the study was a structured questionnaire containing 18 items. The instrument is based on the research questions of the study and also based on the practical work (clothes made) for the study. The questionnaire consists of questions constructed on a 4-point likert scale. The values are: Strongly agreed = 4, Agreed = 3, Disagreed = 2 and Strongly disagreed = 1.

VALIDITY

The validity of the instrument was seen to meet the purpose for which the instrument was designed by four Home Economics lecturers who are familiar with the course content of Clothing and Textiles of the tertiary institutions. Two lecturers of Education department also had opportunity of assessing the instrument. The experts read, made corrections and redirected the content of the instrument. The instrument was therefore considered to possess a content validity.

RELIABILITY

The researcher carried out a pilot study using 8 respondents from College of Education, Warri, Delta state. The level of reliability was determined by applying the split-half reliability coefficient. The responses of the respondents was split into two that is odd and even while the Pearson Product moment correlation formula was used to analyse the data to get 0.70 as calculated coefficient value. To transform the split-half correlation into an appropriate reliability estimate for the entire test, the Spearman Brown prophesy formula was employed and the computed correlation coefficient value was 0.95. Thus, the instrument was considered suitable and reliable for the study.

METHOD OF DATA ANALYSIS

The data collected was analysed by calculating the mean of the total responses to each of the questionnaire items. T-test statistics at 0.05 level of significance was used to test the null hypotheses of the study.

PRESENTATION OF RESULTS AND DISCUSSION

In this chapter, the presentation of data collected for the study were made. The interpretation and discussion of findings were also presented. The presentation was according to the research questions and hypotheses posted.

RESEARCH QUESTION 1

What are the differences between the fitting of female bodice part of a gown made with adapted patterns and free hand cutting?

Table 1.

Mean and standard deviation values of responses on the fitting of bodice part of a gown made with adapted patterns and free hand cutting.

S/N	ITEMS	N	MEAN	SD	REMARKS
1.	The bodice part of gown made with adapted pattern fits better on the shoulder.	30	3.33	0.02	Accepted
2.	The sleeve of a gown made with adapted pattern fits better on the body.	30	3.17	0.08	Accepted
3.	The gown made with adapted pattern fits better on the bust.	30	3.2	0.02	Accepted
4.	The gown made with free hand cutting fits better on the shoulder.	30	1.8	0.87	Rejected
5.	The sleeve of a gown made with free hand cutting fits better on the body.	30	2.1	0.69	Rejected
6.	The gown made with free hand cutting fits better on the bust.	30	2.13	.68	Rejected

Presented in table 1 are mean scores showing Colleges of Education students' responses on the fitting of bodice part of a female gown made with adapted patterns and free hand cutting. Finding showed that out of the 6 items examined items 1, 2, and 3 had the mean

scores of (3.33, 3.17, 3.2) respectively which is above the cutoff of 2.5 and therefore accepted. These results shows that a female gown made with adapted patterns fit better on the shoulder, body and bust more than a gown made with free hand cutting. Also items 4, 5, and 6 had the mean scores of (1.8, 2.1 and 2.13) which were below the cutoff mean and therefore rejected.

HO 1.

There will be no significant difference between the fitting of the bodice part of a female gown made with adapted patterns and free hand cutting.

Table 2.

T-test value of Colleges of Education students’ responses on the fitting of the bodice part of a female gown made with adapted patterns and free hand cutting.

SUMMARY

ITEM	N	T-test	df	Overall t-test	Table t-	Remark
1 / 4	30	9.56	28	22	2.05	Significant
2 / 5	30	8.23	28			Significant
3 / 6	30	8.63	28			Significant

Table 2 shows the summary of t-test of significant difference between two mean scores of Colleges of Education students’ responses on the fitting of bodice part of a female gown made with adapted patterns and free hand cutting. The calculated t-value however showed that all the items were significant. (P < 0.5: items 1 / 4 : 9.56, 2 / 5 : 8.23 and 3 / 6 : 8.63.) The overall calculated t – value however showed that there was significant difference between the fitting of the bodice part of a female gown made with adapted patterns and free hand cutting. The overall calculated t – value of 22 at df 28 was more than the table t – value of 2.05. Thus, the result shows that the bodice part of a female gown made with adapted patterns fits better than the one made with free hand cutting.

RESEARCH QUESTION 2

What are the differences between the fitting of female skirt part of a gown made with adapted patterns and free hand cutting?

Table 3.

Mean and standard deviation values of responses on the fitting of skirt part of a gown made with adapted patterns and free hand cutting.

S/N	ITEM	N	MEAN	SD	REMARK
7.	The gown made with adapted patterns fits better on the waist.	30	3.3	0.04	Accepted
8.	The gown made with adapted patterns fits better on the hip.	30	2.8	0.31	Accepted
9.	The gown made with adapted patterns drapes well on the body.	30	3.2	0.02	Accepted
10.	The gown made with free hand cutting fits better on the waist.	30	1.83	0.024	Rejected
11.	The gown made with free hand cutting fits better on the hip.	30	1.63	0.013	Rejected
12.	The gown made with free hand cutting drapes well on the body.	30	1.73	0.005	Rejected

Presented in table 3 are mean scores showing Colleges of Education students’ responses on the fitting of skirt part of a female gown made with adapted patterns and free hand cutting. Finding showed that out of the 6 items examined items 7, 8, and 9 had the mean scores of

(3.3, 2.8, 3.2) respectively which is above the cutoff of 2.5 and therefore accepted. Also items 10, 11, and 12 had the mean scores of (1.83, 1.63 and 1.73) respectively below 2.5 the cutoff mean and therefore rejected. These results shows that a female gown made with adapted patterns fit better on the waist, hip and drapes well on the body better than a gown made with free hand cutting.

HO 2.

There will be no significant difference between the fitting of the female skirt part of a gown made with adapted patterns and free hand cutting.

Table 4.

T-test value of Colleges of Education students’ responses on the fitting of skirt part of a female gown made with adapted patterns and free hand cutting.

SUMMARY

ITEM	N	T-test	df	Overall t-test	Table t-value	Remark
7 / 10	30	17.3	28	23.3	2.05	Significant
8 / 11	30	19.5	28			Significant
9 / 12	30	36.7	28			Significant

Table 4 shows the summary of t-test of significant difference between two mean scores of Colleges of Education students’ responses on the fitting of skirt part of a female gown made with adapted patterns and free hand cutting. The calculated t-value however showed that all the items were significant. (P < 0.5: items 7 / 10 : 17.3, 8 / 11 : 19.5 and 9 / 12 : 36.7.) The overall calculated t – value however showed that there was significant difference between the fitting of the skirt part of a female gown made with adapted patterns and free hand cutting. The overall calculated t – value of 23.3 at df 28 was more than the table t – value of 2.05. Thus, the result shows that the skirt part of a female gown made with adapted patterns fits better than the one made with free hand cutting.

RESEARCH QUESTION 3

What are the differences between the fitting of female a gown made with adapted patterns and free hand cutting?

Table 5.

Mean and standard deviation values of responses on the fitting of a female gown made with adapted patterns and free hand cutting.

S/N	ITEM	N	MEAN	SD	REMARK
7.	The gown made with adapted patterns look outstanding on the body.	30	2.6	0.07	Accepted
8.	The gown made with adapted patterns look dressy on the body.	30	2.87	0.09	Accepted
9.	The gown made with adapted patterns fits well on the body.	30	2.7	0.011	Accepted
10.	The gown made with free hand cutting look outstanding on the body.	30	2.2	0.30	Rejected
11.	The gown made with free hand cutting look dressy on the body.	30	2.43	0.17	Rejected
12.	The gown made with free hand cutting fits well on the body.	30	2.2	0.30	Rejected

Presented in table 5 are mean scores showing Colleges of Education students' responses on the fitting of a female gown made with adapted patterns and free hand cutting. Finding showed that out of the 6 items examined items 13, 14, and 15 had the mean scores of (2.6, 2.87, 2.7) respectively which is above the cutoff of 2.5 and therefore accepted. Also items 16, 17, and 18 had the mean scores of (2.2, 2.43 and 2.2) respectively which is below 2.5 the cutoff mean and therefore rejected. These results show that a female gown made with adapted patterns look outstanding on the body, look dressy on the body and fits well on the body better than a gown made with free hand cutting.

HO 3.

There will be no significant difference between the fitting of a female gown made with adapted patterns and free hand cutting.

Table 6.

T-test value of Colleges of Education students' responses on the fitting of a female gown made with adapted patterns and free hand cutting.

SUMMARY

ITEM	N	T-test	df	Overall t-test	Table t-value	Remark
13 / 16	30	7.3	28	28	2.05	Significant
14 / 17	30	4.44	28			Significant
15 / 18	30	0.83	28			N.S.

Table 6 shows the summary of t-test of significant difference between two mean scores of Colleges of Education students' responses on the fitting of a female gown made with adapted patterns and free hand cutting. The calculated t-value however showed 2 out of the 3 items were significant. (P < 0.5: items 13 / 16 : 7.3 and 14 /17 : 4.44.) The overall calculated t – value however showed that there was significant difference between the fitting of a female gown made with adapted patterns and free hand cutting. The overall calculated t – value of 28 at df 28 was more than the table t – value of 2.05. Thus, the result shows that the female gown made with adapted patterns fits better than the one made with free hand cutting.

DISCUSSION OF FINDINGS

The discussion of findings was based on the study which was to analyse adult female gown made with adapted patterns and free hand cutting. To this effect, analysis was made on data received through questionnaire distributed to the students to which responses on the analysis made with adapted pattern and free hand cutting. Findings from the study revealed that the bodice part of a gown made with adapted pattern fits better on the shoulder, bust and sleeve than the one made with free hand cutting. This is in agreement with World Book Encyclopedia (2001) that stated that clothing and other items sewn at home (with adapted patterns) may cost less, fit and wear better and have more individuality than ready – to – wear products.

Secondly, findings from the study revealed that skirt part of a gown made with adapted patterns fits better on the waist, hip and drapes well on the body than the one made with free hand cutting. In support of this Shailong and Igbo (2009), have cited Ileoje (1995) by stating that free hand method of garment construction may spoil the garment entirely, thereby wasting the fabric. Therefore if the garment is spoiled, it will automatically not fit well on the body.

Thirdly, findings from the study also revealed that the entire female gown made with adapted patterns fits better on the body, look more outstanding and look dressy on the

body than the one made with free hand cutting. According to Cizeski (2009), the unifying principle of pattern drafting for fit and fashion is that patterns are designed so women will look and feel wonderful in their clothes.

SUMMARY

The study analysed adult female gown made with adapted patterns and free hand cutting. The problem of this study was to examine if clothes made with adapted patterns fit better than clothes made with free hand cutting. The study provided answers to the following research questions.

1. what are the differences between the fitting of female bodice part of a gown made with adapted patterns and free hand cutting?

2. what are the differences between the fitting of female skirt part of a gown made with adapted patterns and free hand cutting?

3. what are the differences between the fitting of a female gown made with adapted patterns and free hand cutting? To meet the objectives of this study three null hypotheses were formulated as follows:

1. There will be no significant difference between the fitting of female bodice part of a gown made with adapted patterns and free hand cutting.

2. There will be no significant difference the fitting of a female skirt part of a gown made with adapted patterns and free hand cutting.

3. There will be no significant difference between the fitting of female gown made with adapted patterns and free hand cutting.

From the study reviewed, there was an indication that a female gown made with adapted patterns fits better on different parts of the body than a female gown made with free hand cutting.

The researcher made two gowns for an adult using adapted patterns and free hand cutting. The questionnaire was based on the objectives of the study and the practical work which was used to collect data for the study. The questionnaire consisted of how female gown made with adapted patterns and free cutting fit on different parts of the body. Mean scores and standard deviation were used to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance. Answers to the research questions are as follows;

1. Female gown made with adapted patterns fits better on the shoulders, bust and sleeve more than female gown made with free hand cutting.

2. Female gown made with adapted patterns fits better on the waist, hip and drapes well better than the one made with free hand cutting.

3. Female gown made with adapted patterns are outstanding, look dressy on the body and fits well generally on the body than the one made with free hand cutting.

The three null hypotheses were rejected. The findings were as follows;

1. There was a significant difference between the fitting of the bodice part of a female gown made with adapted patterns and free hand cutting.

2. There was a significant difference between the fitting of the skirt part of a female gown made with adapted patterns and free hand cutting.

3. There was a significant difference between the fitting of a female gown made adapted patterns and free hand cutting.

CONCLUSION

This study focused on the analysis of female gown made with adapted patterns and free hand cutting. It was discovered that a female gown made with adapted patterns fits better on the shoulders, sleeve and bust than the one made with free hand cutting. Also the gown made with adapted pattern drapes well on the body, fits better on the waist and hip

more than the one made with free hand cutting. Generally the gown made with adapted patterns look outstanding, look dressy and fit the whole body better than the one made with free hand cutting.

RECOMMENDATION

Based on the findings of this study the following recommendations aimed at improving our locally made clothes were made.

1. Graduates of Home Economics that specialize on Clothing and Textiles should be encouraged to establish industries where they can make patterns according to contemporary fashion in sizes for sale.
2. There should be an awareness programme organized by Home Economists to dress makers who uses free hand cutting to make use of adapted patterns while sewing.
3. Seminars / workshops should be organized by Home Economists on pattern making regularly for dress makers.

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NATIONAL PHILOSOPHIES OF EDUCATION AND IMPACT ON NATIONAL DEVELOPMENT

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Abstract

Way back in Greece of the 3rd century BC, the role of definitive national philosophy of education as a basis for teaching of young people was recognized and effectively applied. Nations in the contemporary world that have recognized the need for a definitive national philosophy of education as the springboard for national development appear to be at the forefront of development and those with vague national philosophies of education appear to experience developmental problems. This paper attempts a comparative study of some national philosophies of education and how they have impacted on development effort. It submits that developing countries should make effort to adopt focused national philosophies of education and suggests self-reliance with entrepreneurship at the core as one of such.

Keywords: Philosophy, education, national, development, entrepreneurship

Introduction

Greek city states in antiquity were distinguished polities basically because of their education systems. Athens was particularly important, having hosted such popular institutions as the Academy of Plato and the Lyceum of Aristotle. Each city state had a defined philosophy of education that guided teaching and by extension, learning. Aristotle, in his *Politics* as quoted by Howie (1968) stated, “Thus in Sparta and Crete the educational system and most of the laws are directed towards the establishment of military power for the purposes of war” (p. 95). Sparta in particular was known for war and thus body building and gymnastics which in today’s world constitute health and physical education) were the focus of the education system. In Athens, the focus was on the humanities and logic and democracy were of prime interest.

Why is it necessary to have a focus particularly in education? Peters (1980) notes, “To ask questions about the aims of education is therefore a way of getting people to get clear about and focus their attention on what is worth while achieving” (p. 28). One of the achievements of a system could be the development of the national economy. Peters (1980) presents a metaphor when he saw education thus: “Just as gardens may be cultivated in order to aid the economy of the household, so children must be educated in order to provide them with jobs and to increase the productivity of the community as a whole” (p.28). There is a positive relationship between level of education in a country and the level of socio-economic development. This is why Campbell (1964) in Maduewesi (1998) holds that “the leading nations are the reading nations.” In the specific area of entrepreneurship, research by the Global Economic Monitor (2003) has shown that there is a positive correlation between entrepreneurship and economic development as well as positive correlation between entrepreneurship education and total entrepreneurship activity in a nation.

One approach to national development is to develop the citizens by way of making them self-reliant. Self-reliance implies independence that can be achieved through private

effort in entrepreneurship. This is the situation in capitalist economies where private entrepreneurship has been allowed to flower. Socialist economies such as China and Russia have subtly and slowly but surely embracing private entrepreneurship which, in China in particular, has had a salutary effect on economic growth. Developing countries should consider having definite national philosophies of education with self-reliance at the core. Some national philosophies of education and the impact on national development are discussed here.

Singapore

Discussing education under comparative studies with respect to the East Asian country of Singapore (one of the four 'Asian Tigers' or economic miracles of the world) should fittingly start with its modern history, reason being that colonized countries in Africa and less progressive, formerly colonized countries in Asia need to drop the excuse of colonialism as the cause of their sustained underdevelopment. Singapore became a British colony in 1819 and remained colonized for nearly one and half centuries. In 1963, the country, as part of Malaysia, became independent. It became a Republic in 1965 after separating from Malaysia.

Although the population is small (about 4.6 million in 2006), the country should be expected to be underdeveloped not only because of her colonial past but because it has no crude oil, imports all her energy needs, and only 0.9% of the country's land mass is available for agricultural production. Yet, as at 2006, Gross Domestic Product was \$132 billion, per capita national income was \$29, 474, life expectancy stood at 81.9 years and literacy rate was 93.9%. In terms of human development index, Singapore is put in the High Human Index group as it was at the 27th position (UNDP, 2010). Nigeria, a republic two years before Singapore, colonized for a little over half a century, the world's 6th largest exporter of crude oil with a land mass that is 55% cultivable and a resourceful population of 140 million by 2006 (FGN, 2006) could by 2006 boast of GDP of \$115 billion, per capita national income of a paltry \$797, life expectancy of 47.8 years, and literacy rate of 70.7%. Nigeria's Human Development Index position was 142nd (out of 169 countries) in 2010 (UNDP, 2010). Could the education systems have played a part in these divergent indices?

While education spending in Singapore usually makes up about 20 per cent of the annual national budget such that public education is subsidized and there is government assistance for private education for Singaporean citizens, the Nigerian Federal government has over the years made an average budgetary provision of 0.9% for education. The national philosophy of primary education of Singapore places "a good grasp of English Language" as number one item, followed by mother tongue and mathematics. That of Nigeria (FRN, 2004) requires teachers and pupils to wait till Primary 4 before using English Language for teaching and learning. The 'language of the environment' (with or without orthography) is expected to be used for teaching from Primary 1 to 3 even when such languages do not have words that can accommodate science and most other fields of study (Ubong, 2009).

Another philosophy that is central to the Singaporean education system is that of Confucianism. The central concept is *ren (jen)* which to Confucius meant that "the good life is an endless aspiration for ethical perfection." Morality is thus a crucial part of Singaporean education system just as it is in Japan. In Nigeria, moral instruction is still subject to debate and is mentioned in passing in the National Policy on Education (FRN, 2004). Probably the emphasis on moral education in the national education policy accounts for the reason Singapore

The main language of instruction in Singapore is English, officially designated the first language within the local education system in 1987 (The Strait Times, 2009). English is

the first language learned by half of the children by the time they reach preschool age; it becomes the primary medium of instruction by the time they reach primary school. The foundation stage is the first stage of formal schooling and includes four years from Primary 1 to 4 during which a foundation is established in English, mother tongue (Chinese, Malay, Tamil or a Non-Tamil Indian Language) and Mathematics. Other subjects taught from Primary 1-6 include civics and moral education, arts and crafts, music, health education, social studies, and physical education. Science is taught from Primary 3 onwards (Inca, 2006). Singapore has consistently held the first position in international education scores in mathematics and science for several years. Singapore Primary Mathematics series and other national textbooks have been adopted and used in the United States of America (USA) and other countries.

Japan

Way back in 1951 when a whole lot of countries in the world were yet to taste independence and take on the myriad tasks of development including the education of the citizenry, F. N. Kerlinger wrote of Japanese education. He saw the Asian nation's educational system as being based on the philosophy of *shūshin*. The principles that *shūshin* embodied in the opinion of Kerlinger (1951) "were the centre of the Japanese curriculum. They were the centre of Japanese life itself." What was *shūshin*? Kerlinger (1951) summarizes it as "morals, ethics, moral science, moral training, morality." In essence, morality was, and is still the central philosophy of Japanese education.

One way of establishing whether this has impacted the society is among others, looking at the way the world sees Japan with respect to morality. Of 178 countries, Japanese stood at number 17 on the Transparency International scale of nations with respect to corruption in 2010. Denmark, New Zealand, and Singapore took the first position as the least corrupt nations of the world in 2010. Nigeria was at the 134th position while Somalia took the last position of 178th.

Shūshin is said to have started during the Meiji era in Japan. The Meiji period (1862-1912) appeared to have been the most eventful period in Japanese history. Emperor Meiji engineered changes in all aspects of Japanese life including education. In 1872, a new educational system was set up known as the Gakusei with emphasis on mathematics, science, and culture as well as Japanese language and morality. Although examination was top priority, examination malpractice was unheard of as well as other acts of immorality in the education system. This has largely been sustained to the present. Apparently because Japanese philosophy of education has morality as the central issue, a number of other things follow including discipline which has led to high levels of achievement.

In summary, Japanese education has had a focus since the Meiji era and that focus – morality - has reflected in diverse ways that have had positive and enduring impact on the entire Japanese society. Morality means a high sense of discipline which is reflected in the life of the youths who see education as a path to the good life and put in so much that drop out rate is low and graduation rate very high. It follows that a disciplined youth population grow up to be a disciplined adult population. This is the famed *multiplier effect* theory in economics which holds that one action that has linkages touches several aspects of life in a positive manner generating cumulative effects that are greater than the individual acts (also described as social action in sociology).

United States of America (USA)

Early education in the USA followed the European (British) tradition. Major changes were however effected, the most important fall out being the public school system. Education was, and is still being seen as the basis of a free society based on the principles

of democracy. Given its crucial nature, education, in the opinion of Thomas Jefferson (1743-1826), should be the responsibility of government.

Horace Mann (1796-1859) was the first American to introduce reforms into the educational system principally, by advocating public education. He is also credited with establishment of the first school for teacher education in the USA. He extended the position of Jefferson, positing four ideas:

1. Universal popular education if the Republic is to endure;
2. Education should be free from sectarian religious influence although morality must still be emphasized;
3. Education is the primary responsibility of the state;
4. The state has a right to raise taxes to finance public education.

John Dewey also had an enduring impact on American education through his writings and the philosophy of pragmatism cum instrumentalism. Two other American philosophers, Charles Sanders Pierce and William James were also pragmatists.

The philosophy of pragmatism has been the backbone of American education and life generally. It is what has seen the landing on men on the moon and what has informed the superlative developments in science and technology, and the basis of the American Dream.

Russia

Russian history has a lot of twists and turns but the country shot more into the world stage when it became the de facto laboratory for a new experiment in governance known as communism with the economic philosophy of dialectical materialism developed by Karl Marx (1818-1883) and Friedrich Engels (1820-1885) as the basis. Before the Marxists shot onto the stage however, there was the Czars or emperors, who saw education as dangerous for the masses. The Bolsheviks followed after the 1817 revolution; they saw education as the power base of the nation although how that was to be done was not articulated. The Bolsheviks also aimed at rooting out inequalities and religion. These were the basic educational aims of the revolutionaries in Moscow. Shulman (2001) however notes that “Beyond this, they had no developed educational philosophy, only a collection of vague and often conflicting ideals and objectives” (p. 415). In evaluating the Soviet educational system during the days of communism, Shulman (2001) submitted:

The educational system adequately served Stalin’s purpose by quickly turning out cadres with basic literacy and skills. Now it is struggling to provide young people with the higher and more comprehensive knowledge needed to meet the goals of today’s Soviet leaders ... The educational system faces problems that mostly relate to the question of how to take full advantage of advances in science and technology (p. 418).

It is necessary to recall that the Soviet Union successfully launched the first manned mission into space with Astronaut Yuri Gagarin making history. Yet it was the USA that made the greatest foray by landing men on the moon. To date, Russia, what is left of the former Union of Soviet Socialist Republics (USSR), is yet to make any big move beyond Gagarin. This, aside from slow development of the economy (HDI position is 65, life expectancy 67.2 years, and per capita national income at \$15, 258.00 – nearly half of that of Singapore - all in 2010) slow development of democracy among other things, show that the lack of a definitive national philosophy of education has been a disadvantage to national development.

Nigeria

Section 1 of the 4th edition of the Nigerian National Policy on Education (NPE) (FRN, 2004) treats the “Philosophy and Goals of Education in Nigeria.” The introduction outlines the basis of Nigeria’s national policy on education, stating that it is derived from the nation’s five main national goals as listed in the 4th National Development Plan (1970-75).

The document (FRN, 2004) then goes on to provide a further backdrop to Nigeria’s national policy on education by making an attempt to provide a foundation by way of a national philosophy of education. The document therefore states in Section 1 sub-section 4: “In Nigeria’s *philosophy of education* (italics in the document), we believe that:

- a) education is an instrument for national development; in this end, the formulation of ideas, their integration for national development, and the interaction of persons and ideas are all aspects of education;
- b) education fosters the worth and development of the individual, for each individual’s sake, and for the general development of the society;
- c) every Nigerian child shall have the right to equal educational opportunities irrespective of any real or imagined disabilities, each according to his or her ability;
- d) there is need for functional education for the promotion of a progressive, united Nigeria; to this end, school programmes need to be relevant, practical, and comprehensive, while interest and ability should determine the individual’s direction in education.

Above are omnibus provisions on what should be the country’s philosophy of education. Within these provisions are philosophical concepts such as Dewey’s multiple approaches to education delivery in a); humanism in b); egalitarianism in c); progressivism, pragmatism, and individualism cum humanism in d). It is pertinent to note that this sub-section is a *believe* and believe, although regarded as one of the conditions of knowledge, is not a confirmed position in philosophy. Okoh (2003) has contrasted belief and knowledge or truth, noting that among other things, believe is but a state of mind (in spite of the commitment to it) and is not performative, justifiable, and is not a product of a scientific-rational process. Thus although the government may be committed to the principles outlined in the philosophy of education, they need not justify or actuate them.

The document continues, in Section 1 sub-section 5, again on the same issue of Nigeria’s national philosophy of education, stating that it is based on:

- a) the development of the individual into a sound and effective citizen;
- b) the full integration of the individual into the community, and
- c) the provision of equal access to educational opportunities for all citizens of the country at the primary, secondary, and tertiary levels both inside and outside the formal school system.

These are no more than a rehash of what was said in earlier sections, with provisions that can hardly be reduced to actionable parameters. The plethora of provisions continue till sub-section 8 (f) where self-reliance is specifically mentioned: “acquisition of competencies necessary for self-reliance” (p. 8).

The need for definitive statements is important particularly with respect to mission statements. General statements are hardly actionable and difficult for operators and other stakeholders to understand. As an example, the first goal of primary education of the State of Singapore is to give children a “good grasp of English Language” (Ministry of

Education, 2005) while mother tongue and mathematics take the second and third positions respectively. Nigeria's NPE would rather that Nigerian children start school using the mother tongue till Primary 3! Section 4, sub-sections e) and f) state:

- d) The medium of instruction in the primary school shall be the language of the environment for the first three years. During this period, English shall be taught as a subject.
- e) From the fourth year, English shall progressively be used as a medium of instruction and the language of the immediate environment shall be taught as subjects.

It is evident that those who designed the policy forgot the impact of the mother tongue and vernacular English in the academic work of children. In some communities, particularly semi-urban and poor neighbourhoods in large cities, the major language of the environment is vernacular English or 'broken' or 'pidgin' English. One wonders what would be the product if pidgin is used as the medium of instruction in line with the expectation of the NPE, after all, majority of Nigerian local languages have no orthography.

The language provision in the NPE is of course the classic case of conflict theory (social reproduction theory) in which the education system ensures that low class children grow up to be low class adults since the NPE with respect to language of instruction is applicable – in practice – to community and public schools. No private school would dare to wait till Primary 3 before using English as the general language of instruction.

In essence, Nigeria does not really have a definitive national philosophy of education. This is evidently why Okoh (2005) warned of "The risk of an educational system without a philosophical base." A national philosophy of education should, among other things, "identify and clarify the justification for education" (Okoh, 2005) based on certain questions. Thus in the decade of the sixties, following the declaration of President John F. Kennedy that America must land a man on the moon in the 1970s, the education system was re-oriented towards science and technology, based on the long held philosophy of pragmatism that American philosophers William James, C. S. Pierce, and John Dewey canvassed. And America did land man on the moon ahead of the Soviet Union that challenged President Kennedy; Soviet Union was the first to send man into space in April 1961. President Kennedy had declared in 1961 that America's prime objective was that, "before this decade is out, of landing a man on the moon and returning him safely to the earth." Apollo 11 landed men on the moon in 1969 and brought the three astronauts back to earth successfully. Interestingly, Soviet Union, represented by Russia, is yet to land man on the moon but is rather cooperating with America to set up and maintain laboratories in space.

Agenda for Action

Decades back, Mwalimu Julius Nyerere proposed an economic system based on the philosophy of self-reliance for Tanzania (Nyerere, 1967, 1978; Major & Mulvihill, 2009). There were problems in executing the proposals presented by this sage as detailed by Kassam (1995) yet the basics of his proposal remain valid till date: that one problem of underdevelopment is an education system that produces white collar workers chasing after non-existent jobs. Africans, nay developing countries, should have a philosophy of education that produces persons that can stand on their own after school. Pragmatism, in the spirit of pragmatism should be central to education particularly in the school system. There is an urgent need for a reorientation towards education for self-reliance rather than education for job-seeking. All schools should have their curricula to reflect a reasonable

dose of entrepreneurship, after all, every discipline has the potential for business development and entrepreneurship education would enhance the actuation of the business potentials in every graduate of schools at all levels.

Conclusion

The structure of a nation's national philosophy on education can positively or negatively affect virtually all aspects of life and all sectors of the nation. Developing nations need to review their national philosophies to make them more focused and few and then design goals to actuate them. One focus should be entrepreneurship which can encourage self-reliance.

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TIME MANGEMENT AND SCHOOL ADMINISTRATION IN NIGERIA: PROBLEMS AND PROSPECTS

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Abstract

It is quite obvious that time is always used as an excuse by many policy planners and implementers for not meeting their expected targets. Others complained about time for other reasons. This paper tries to examine the relative importance of time as a resource available to both planners and administrators in course of carrying out policy formulations and implementation of educational activities to achieve educational goals. It also emphasized that proper time management facilitates qualitative teaching and learning in accomplishing educational goals and objectives. It started with an overview of time, definition of time and time management, application of time management in school administration, scheduling of activities and time tabling process. Finally summary and some recommendations on how to improve school administration through proper time management were highlighted.

Keywords: Time management, School Administration, Prospects, Problems

Introduction

Despite the type of activity to be performed, time is the most crucial resource first to be considered. From primordial to modern administrative settings challenged by technological innovations time still remains major determinant of successful or unsuccessful completion of task. Every activity following due processes of life is facilitated by appropriate allocation of time. Biblically God completed creation on earth for seven days; even the Great Noah Ark was built timely as directed by God before the great flood destroyed the world at that period. All these are time elements. Time determines the imperativeness of any other resources in accomplishing organization set out objectives and goals. Without time management the efficient and effective use of all resources will be impossible. Mullins (2005:265) points out 'that whatever, the attributes or qualities of a successful manager, or the quality of subordinate staff, one essential underlying criterion is the effective use of time'. Hence Drucker (1988) refers to time as 'the limiting factor for effective executives'. Therefore time management stands as an effective tool necessary for organization effectiveness in realization of set out objectives and goals.

In economics, all resources are inadequate relative to the available demand and pressure. This makes it exigent in economic sense for consideration of time as the scarcest resource administrators must look out in the day to day administration of their organization. Based on this Drucker (1988) emphasized that time is a '**unique resource**' which cannot be rent, hire, buy or otherwise obtain more time. He maintained that time is totally irreplaceable and everything requires time and its supply is totally inelastic. To me, time is a valuable resource one has to efficiently use to accomplish stated objectives or goals.

In both private and public profit organizations time is crucial and lead resource in effective running of the system. For example the opening and closing periods of work is based on the individuals and organization agreed time. There must be maintenance of status quo especially the ideographic and nomethetic dimensions to avoid time conflicts between the employer and the employees. Believing Drucker, time itself cannot be rented,

hired, bought or obtain more time, but only the personnel or services can be rented, hired or bought for the specific time. For instance in business organizations personnel are paid for extra time used as overtime because it is the personnel that is rented, hired or bought for the time used. Incidentally, this practice is witnessed in the school organization where an extra mural class is privately organized for that purpose the teacher could be paid for the services rendered. An effective school administrator ensures that school planned time are not arbitrarily abused by staff .as a bureaucratic organization time management is necessary for enhancing productivity.

Time management philosophy tends to x-ray the importance and appropriate utilization of time as a resource in accomplishing organization objectives and goals. Managing time appropriately leads to achieving results easily with limited resources. Consequently, any productive system, whatever its structure, human, technology or financial support requires efficient and effective time management procedure. To improve quality of school activities requires cooperative effort of all members through time management. Obviously time is very important administrative tool in carrying out daily duties by the administrators, teachers, students, community and government. A time management plan enables effective administrator to identify if he is using his time effectively and doing important activities with the highest energy levels in the system.

The time required in accomplishing given task is carefully analyzed; other resources are also mobilized with time to achieve the desire result. Management techniques are time dependent like Management Information system (MIS), Management by Objectives (MBO), Critical Path Method (CPM), and Programme Evaluation Review Techniques (PERT). Based on this, Mullins (2005.185) refers time as one of the most valuable, but limited resources and it is important that managers (administrators) utilize time to the maximum advantage. For not realizing time as a scarce resource most administrators run out of time before expected result is achieved.

Time management is also important for effective inspection and supervision of school in bringing the much needed quality. Effective time management ensures unambiguous objectives, proactive planning, well defined priorities and actions; participatory and successful delegation of activities. Nevertheless, time is continuum and all activities or roles performance depend on it whether voluntary or involuntary in avoiding conflicts. Time management facilitates the symbolic relations between the school and society in efficient and effective use of available school resources. Without this mutual relationship realization of school needs would be difficult, untimely and other resources wasted as the community may starve it of facilities and assistance required from them. Hence the school success is made easy or destroyed by extension of relations and services timely or untimely from the wider society.

Time management appropriately adopted by school administrators helps to improve standard, save costs, remedy poor situations, leads to value and above all, harmonizes organization focus. Improving school administration requires time to provide all it takes to make a quality school (administrators, teaching and non teaching staff, classrooms, libraries, desks, chairs, tables, environment and entire school plant management etc). It upholds the principle of Just-in-Time approach in managing school process for quality assurance at various levels of education. Improper use of time has been attributed to poor administrative styles by most administrators in handling organizational task. This paper therefore view the following areas of concern

1. What is time and time management?
2. Application of time management in school Administration
3. Scheduling of activities and time tabling process
4. Summary and Recommendation

What is time and time management?

Time is very unique in any particular time zone. The difference in time is its allocation to activities according to one's priority. For example 7.00am is 7.00am and 06.00pm is 06.00pm everywhere in Nigeria. If two persons want to start an activity at a particular place they use the same time for the task. However, if they are at different locations their time for starting the job may differ. One important thing about time is its specificity. As one chooses to start by 07.00am another may start by 07.10am. The choice of an individual or group determines to a great extent the use of time in that particular situation. Time however, is very useful for goal setting activities and helps in crisis management which ensures activities are measurably, realistically and specifically carried out. There is obvious need for administrators to be conscious of the value of time, and the need to timely apply administrative and interpersonal skills to the benefit of the school.

Time is a part of the measuring system used to sequence events, to compare the durations of events and the intervals between them, and to quantify rates of change such as the motions of objects. Time is an evolving thought and it constantly changes as we live and carry out our daily activities. On the other hand, time management is defined as the planning, organizing, scheduling, and budgeting one's time for the purpose of generating more effective work and productivity. A time management schedule boosts job efficiency and reduces tension. Most often we embark on unimportant tasks and neglect the critical activities. A time management process mends this. Time management enables placing more emphasis on results and careful monitoring of progress through task delegation, team management and cooperative skills in accomplishing school goals.

Application of time management in school administration.

There are four main ways administrators can apply time management principles in school administration. They are planning, organizing, implementing and evaluating.

Planned School time.

According to Charles Richard in Lara (2003) states that 'the time we have depends on the time we use'. In order to manage time successfully, administrators must have self-knowledge and set out goals to achieve. Such an awareness of what goals to be achieved helps to prioritize activities. Planning school time involves adequate patterning of time according to activities in order to enhance role performance and accomplishing tasks within a set out period. Planning helps to avoid conflict among use of resources based on the fact that resources are limited including time. Time is planned in such a way to enable easy goals achievement with the available limited resources to the administrator. Planned school time therefore means a designed way by school organization to arrange all its activities for efficient and effective role performance in realization of school results.

In school organization, time is managed through the use of time table. Time table is a specific arrangement of time scheduled according to specific activity. It is used to show the uniqueness of activity in every formal organization. In typical school situation time is arranged for various activities to be performed ranging from opening and closing devotion, classroom work, agricultural work, craft, examinations, labour, sports, recreation, prep, dining and closure etc. All these are ways of planned school time. Internal school administration can effectively be done with proper planned time for the various activities utilizing the available resources toward their realization. Education planners make policies and programmes while Administrators see that policies made are carried out within specific period for the effective functions of the school.

One problem of planned school time is the hasty approach to policies by the school planners without given considerable time for planned policies and programmes to be actualized. Changes are made without considerations to obvious facts. Basically the

implementation processes of planned school system are not timely leading to transparent failures in the system. For instance, the movement from 6-3-3-4 to UBE (9-3-4) system is still ill prepared. There are crises of insufficient trained administrators, teachers, school facilities and fund to manage the school as pupils are found in most areas learning under deplorable and congested situations. Where some facilities exist like so called modern primary schools built there are pressures due to improper planning. This poses great question on the prospect of the UBE scheme, obviously it appears that changes made do not have enough difference in the system. For instance the introduction of UBE has been criticized as appearing to be a new system but it follows the 6-3-3-4 system of education because both have true resemblance in terms of common problems. This situation appears like putting old wine in a new keg.

Planned time is important to avoid failure. It is a Just – in –time Approach that ensures errors detection and correction in time before advancing next stage of the process. The educational changes going on require proper control and management to assure quality timely, so that they do not have unpleasant effect on the system. Even the 6.3.3.4 does not have the full weight of technical base it requires, if they have, necessary facilities to facilitate technical skills are not easily found in the schools. Changes in the school system must be line with timely societal needs. Reliably, Maduagwu (1998) assertion that ‘education is one of the tools to effect a society’s goal towards development’ supports this reason. The school requires proper time management for good teaching and learning process to take place (enough time to plan enough time to implement). Therefore planners and administrators must budget and legitimate the time to accomplish set out goals as well as compare the total estimated time for expected maturity.

Organized school time

Organizing is the next stage after successful planning. Organizing involves ordinarily arrangement of all planned activities. At this stage of time management, organizing has to do with time in bringing all the required resources together. It deals with assemblage of resources for facilitating the easy realization of set out goals. Organizing time in its simplest meaning relates to putting time into jobs according to people, place or needs. In this regards, administrators involved in internal school administration must in this process assign role responsibilities to staff accordingly with targets. There must be date line for any administrator to have target met.

Organized time helps (i) analyze allocated time to events (ii) evaluate time for each event (iii) cost time for total events (iv) pressing events to be identified (v) coordinate all events (vi) improve standard (vii) team participation process (viii) easy task implementation.

There is no one best way to organize school time by any administrator but the school as a formal organization is regulated through the instrumentality of the state or federal ministry of education who determine externally school time like reopening and closure of school, period for external examinations (WAEC, NECO). The school internally allocates time to different activities like curriculum, classes, sports, labour and internal examinations among others.

Time management provides an opportunity to create work schedules for easy goal accomplishment. It involves the school organization developing and maintaining a corporate, flexible schedule which leaves room to include the things that are most important to the school. There are different types of schedule for different activities

including personal and corporate activity schedule. The resources available to are not only limited but can be efficiently and effectively managed when activities are properly organized, coordinated and controlled by the administrator.

Typical organization of time in a training session

Activity Day	Time						
	0900 - 10.00am	10.00 - 10.15 am	10.15 - 12.00 noon	12.00 - 2.00pm	2.00- 3.00pm	3.00- 3.15pm	3.15 - 4.00pm
1	1 st session	Short break	2 nd session	Lunch break	3 rd session	Short break	4 th session and closure
2							
3							
4							
5							

Extract of school organized time table for typical class SS 3 A

Day	0740- 08.00	0820- 0900	0900 - 0920	0920 - 1000	1000- 1040	1040- 1120	1120- 1200	1200- 1240	1240- 0120	0120- 0200	0200
Mon	Devotion	Eng	Eng	Govt	CRK	Phy	Break	Acct	Agric	Hist	Closure
Tue		Math	Acct	Bio	Econs	-		Lit	Bio	Phy	
Wen		Phy	-	Agric	Agric	CRK		Govt	Chem	Bio	
Thurs		Govt	Econs	Hist	Eng	-		-	Lit	Hist	
Fri		CRK	Lit	-	Chem.	Chem.		Econs	Acct	-	

From the above, it could be seen that various activities are handled without undue interferences. It enables one subject teacher to handle different classes on the same subject but at different periods as shown below for typical English teacher handling SS3 A,

Organizing school time facilitates easy teaching and learning. This Idu (2004.22) points that organizing helps the principal after planning to ensure that the teachers are teaching what they are supposed to teach. It also ensures that all the materials including classroom furniture are maintained for future usage. Organizing time helps to achieve all these purposes in school administration.

Implemented time

Time planned and organized helps to accomplish not only set out objectives and goals but enables its operators to go extra mile in achieving what necessarily would have not been achievable. Planned and organized time is easily implemented, and engenders facilitative actions. For example time table indicates planned and organized time for classes, recreation ,labour, examination, opening and closure of school to mention but a few. One greatest importance of time table is creation of space for simultaneous activities which helps activities to be implemented without conflicts like classroom allocation to various periods and subjects. Implemented time ensures complete mobilization of all planned activities according to schedule. Educational planners and administrators must ensure use of time appropriately in the school through team work. Implementing planned time requires collaborative efforts by staff for quality implementation of school activities.

Evaluated time

Time cannot only be planned, organized and implemented but must also be evaluated to show its efficient use in accomplishing set objectives and goals. This helps to find out the workability of planned activities whether they can be accomplished within the time allocated to them. For example a teacher covers the class syllabus planned for 10 weeks before the end of term examination is administered to the students establish that the period of teaching – learning has been effective on one hand. On the other hand, their performance in the weekly test or examination may prove whether the whole time served its purpose because poor performance may indicate wasted period. A review of allocated time to activities indicates where deficiency exists.

Evaluated time also helps to determine saved periods at the end of each session, the problem encountered as well as the capabilities of the teachers and students in effective teaching and learning. Today, the efficiency and effectiveness of school administration is determined by the level of students' performance during examinations like NECO, SSCE, Junior WAEC, and GCE etc. Efficient time management is an assurance for accomplishing school activities in time. Time evaluation serves a lot of purpose by seeking answers to this basic question

- i) Whether time plan worked for the accomplishment of goals?
- ii) Did it help in accomplishing school result?
- iii) What next needs to be done?
- iv) Are there any changes to be made?
- v) What will be the future of the system?

Time management principles

The efficient and effective use of time is a prerequisite for accomplishing task easily. Therefore the following principles need to be adopted.

- 1) **Use of proper time schedule:** This helps to avoid conflict among major actors carrying out school activities and ensure each task is fully accomplished as planned.
- 2) **Avoid too much procrastination:** All planned activities must be carried out according to specific time allocated like subject periods, labour, sports, prep and siesta etc. no particular activity should be put off without sufficient reasons because this may affect time allocated for other activities.
- 3) **Adopt good method of task delivery:** Planned activities can only be accomplished timely if the process of performing the task is well defined. This tends to put self-confidence on the people undertaking the task. This is the basis for equal opportunity of academic and non academic personnel participation in school decision process.
- 4) **Use of appropriate tools for the job:** For instance, classroom, blackboard or pen board, table, chairs, desks, books etc those are required for effective teaching and learning by the teacher and pupils. Basically, where they are lacking accomplished of result will take time to actualized.
- 5) **Evaluate different task levels:** For instance the senior classes require more teachers and time because of different courses than junior classes'. Likewise larger classes are to be

allocated larger classroom than smaller class. This gives room for proper management of school time.

6) **Initiate good school climate:** Good climate allow appropriate use of time than sterile climate. Good school climate here refers to the favourable conditions prevailing for effective participation of members in realization of school set out goals. A school where time is not organized there is bound to be poor relationship existing and wastage of resources.

7) **Simplified time evaluating process:** Assessment procedures must be standardized, reliable and valid in testing what it intends to test within the allocated time. If the process is ambiguous much time will be wasted for the particular activity to be achieved.

Time Management an Instrument of Change

In critically evaluating contingency approach, it has shown realistic instance of changes in variables that constitutes organization structure. It considers the situational variables rather than a number of classical and human relations propositions. Despite its limitations, contingency model depicts the idea of innovative changes in organization management. Schmidt (1968) in Uche (2010) notes "that an organization that lacks viability cannot hope to survive in the world of today and will never see the world of tomorrow". Change therefore is an instrument of time in organization development. It becomes imperative that for innovative changes to occur time use must be appropriate, else, the expected results may not be achieved. Planned change may not be accomplished in event of poor time management; else, other activities may overrun it. It is absolute necessary that school planners follow the change processes through timing societal changes.

Time management as characteristic of effective goal

Effective goal contains a time element (Mills and Friesen, 2001). In school, goal is achieved when those been empowered knows when their progress will be measured. This gives them focus and work towards it. This is why examination bodies like WAEC, NECO and JAMB fixed the examination dates and schedule ahead for the students and schools to prepare on time. The performance of the school in general and students in particular is determined by summation of their level of preparedness before examinations.

Even the internal school examinations are scheduled with specific dates and time. Without this process school set out goal cannot be easily achieved. Significance of time is very important in school administration as Uche (2010) pointed that organization development needs deliberate planning of school resources such as time, energy, money more so longer period of time is required for serious and self sustaining projects to be achieved.

Time Management an effective tool for capacity building

Time management creates self-assured behaviours on what to be done and when it will be done. In the internal school administration the principal is saddled with a lot of tasks which require proper attention. In meeting this demand there is need for delegation of tasks to teachers like labour, sports, social and disciplinary masters and or committee to assist in the running of the school which the principal cannot do alone.

These functions are rotated periodically amongst staff thus building confidence in achieving set out school goals. Effective delegation process enhances capacity building as time is given to role participants to develop particular skill on the job. It has been shown that many administrative problems are self generated by administrators who failed to delegate task to staff members. The ability to delegate successfully determines the effective use of time in developing other organization members.

Summary

Time management enables teachers and students have some choice in their teaching and learning strategies for successful accomplishment of education goals. Time management principles encourage proper classroom management through planning, organizing and reviewing teaching and learning techniques, situations and proffer possible solutions since the classroom is the teachers' clinic. Effective time management can have a dramatic effect on our life. Time management should be considered by any administrator for effectively managing school resources in meeting the expected school outcome.

Recommendations

For effective and efficient running of school, planners, administrators, teachers and students keep time management log to indicate how time is being used. Important activities should be marked as priorities followed with proper planning. There should be time saving approach through team work and delegation for most activities and proper schedule of time. As a contemporary issue it is adequate if practicing school planners and administrators as well as management students are trained in this area. This will bring the much need quality in the school management system.

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A NEW KIND OF VISUAL-MODEL INSTRUCTIONAL STRATEGY IN PHYSICS

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Abstract

The authors' interest is connected with the application of new technologies in physics education as a means of improving the learning achievement of Physics students at different stages of learning. The New Kind of Visual Model instructional strategy introduced in this research is a computer intelligent-based PowerPoint visual simulation used to investigate learning achievement in physics. The research study adopted the Quasi-Experimental Research design. The population comprised of a sample of 168 Secondary School Class-two Physics students purposively selected and treated to 40 minutes tutorials class on the concept of motion. The instrument used consisted in two parts: PowerPoint Computer-simulated visual models which constituted the treatment; and printed materials used to elicit responses to the treatment. There were two activity groups: Experimental group; and Control group. The research study revealed that New Kind of Visual Model instructional strategy contributed positively to learning achievement in physics; result also show that there is significant effect of treatment on students' retention of learned materials; and has positive significant effect on students' learning attitude. New Kind of Visual Model instructional strategy will reduce the effects of novelty in method of instruction in all areas of teaching-learning, and may constitute a basis for the use of conceptualism in Computer-aided physics education.

Keywords: New Kind of Visual Model, Computer intelligent-based Learning, PowerPoint visual simulation

Introduction

Tasks that are interactive in nature activate students' understanding and tend to fix the acquired knowledge of learners. The activation of students' understanding, the fixing of the acquired knowledge of learner all tends to influence the form of presentation of learned concepts by students. The authors' interest in presenting New Kind of Visual Model (NKVM) as an instructional strategy is connected with the application of new technologies in physics education as a means of improving the learning achievement of students at different stages of physics education. The New Kind of Visual Model instructional strategy introduced in this research is a computer intelligent-based PowerPoint visual simulation which lets a learner play and view presented concept as desired. It is based on the Random Access Visual Model, which allows the user to select and display a segment of a video at desired speed.

The main aim of the authors' concept of learning and teaching physics is improving the creativity level in students at different stages of education during problem solving process at their lessons, especially with the use of ICT tools. It is believed that the results of the research will be used for preparation of theoretical basis for formulating the main assumptions for multimedia in physics education and specifying theoretical premises of

conceptualism in computer-aided physics education didactics. The authors prepared the PowerPoint visual simulation with Computer intelligent-based Learning models in connection with improving student's cognitive skills at various stages of physics education.

World-wide, researches show new teaching strategies and tools that integrate ICT with other instructional strategies in an effort to aid and effect student-centred learning (Nahum, K., (1987); Choi, and Gennaro, (1987); [Edward](#), (1996); Kathy, Wendy, Noah, Christopher, Carl, Mike, Krista,, Ron, Sam, and Noah, (2006)). According to these research endeavors, learners are active when teaching is taken out of the learning environment, keeping in mind the demands of the curriculum during the teaching-learning process. This research study is therefore conceptualized on exploring the effects of the use of NKVM instructional strategy in the teaching and learning of the concept of motion using Computer Simulated Models accentuated in PowerPoint presentation. It is a simple computer simulated video models that attempts to reduce the effect of novelty, and offers the teacher to play at desired pace. The research study is aimed at introducing to the Nigerian teaching-learning audience that NKVM instructional strategies is an effective tool in the teaching-learning of physics.

Developing NKVM of motion used in this research study involved developing the PowerPoint visual simulation using the Concept Map of motion earlier developed for a similar research (Akeju, Rotimi, and Kenni (2011)).

The following steps were involved in developing NKVM:

- (a). Identifying the presented concept of motion
- (b). Computer-generating visual model components
- (c). Using PowerPoint to animate the visual model components

The typical visual model components used in NKVM are shown in the attached PowerPoint file and which can be replayed using the following basic steps: -

- a. Load the PowerPoint package (on your PC)
- b. Click on the PowerPoint files
- c. Click on 'NKVM' file
- d. Click on the 'slide show' icon (on your PC)
- e. Using the right-hand click, proceed to view the models in sequence as desired

Research Hypotheses

The hypotheses tested in the research study are:

1. H_{01} : There is no significant effect of treatment on students' learning Achievement
2. H_{02} : There is no significant effect of treatment on student's retention of Learned materials.
3. H_{03} : There is no significant effect of treatment on students' attitude to Learning phys

Methodology

The research study adopted the quasi-experimental research design. Pre-test and post-test were used. The population comprised of Senior Secondary School Class II Physics Students in Ekiti State, Nigeria, and the sample of 168 purposively selected for the research. There were two activity groups of 84 respondents respectively, the experimental group, and the control group. The instruments used in the research study are of two types, mainly: - (i). NKVM used as treatment on the experimental groups and (ii). Printed matters of two sections, and comprised of section (a) of 20 structured questions used as pretest and posttest for both groups to elicit response to learning achievement respectively; and (b) 10 structured response item used as posttest for the experimental

groups only to elicit response behaviour to the strategy. The control groups were treated to 40 minutes of tutorial classes, while the experimental groups were treated with NKVM. There was a pre-test for both groups, then, treatment, and post-test to both groups two weeks latter. The method of statistical analysis used for the research study is the T-test.

Results

The summary of statistical analysis and test of hypotheses on NKVM is summarized in tables below:

Table 1 – T – test summary of the effect of treatment on students’ learning Achievement in physics

Variables		N	Mean	t – cal.	Df	t-tab	inference
Treatment on students’ learning achievement	Exptl	168	3.28	29.05	167	1.96	Significant
	Contrl	168	7.60				

At $p < 0.05$

From the table t-cal is greater than t-tab at significant level $p < 0.05$. The null hypothesis is rejected. We therefore conclude that there is a positive significant effect of treatment on the learning achievement in physics.

Table 2 – T – test summary of the effect of treatment on students’ retention of learned materials

Variables		N	Mean	S.D	t – cal.	df	t - tab	Inference
Treatment On retention	Exptl	84	8.76	1.25	11.32	166	1.96	significant.
	Contrl	84	6.41	1.47				

At $p < 0.05$

From table 2 above t-cal is greater than t-tab at significant level $p < 0.05$. The null hypothesis is rejected. We therefore conclude that there is a positive significant effect of treatment on the students’ retention of learned materials

Table 3 – T – test summary of the effect of treatment on students’ learning Attitude to physics

Variables	N	Mean	S.D	t – cal.	df	t - tab	Inference
Treatment Lecture method	84	9.78	1.25	6.17	83	1.96	Significant.
	84	8.79	0.57				

At $p < 0.05$

From table 3 above t-cal is greater than t-tab, at significant level $p < 0.05$. The null hypothesis is rejected. We therefore conclude that there is a positive significant effect of treatment on the students’ learning attitude to physics

Discussion

The major findings revealed by the research study shows that post-test mean score is higher than the pretest mean score, thus there is a significant effect of NKVM instructional

strategy on physics students' Learning achievement. Result also show that there is a significant effect of treatment on student's retention of learned materials. This is in agreement with research findings by Clarence, 1944, and Abimbade, 1997. Furthermore, the study showed that the students were favorably disposed towards the instructional strategies, which is in agreement with findings by Kathy, et al (2006); Jegede, et al (1992); Choi and Gennaro (1987); Dean (2008), MERLOT (2006), and Uniserve Science (2009).

Conclusion

NKVM instructional strategy tends to have an interactive-lingering effect that prompts recall of learned materials even two weeks after the instruction period. This might not be unconnected with the psychology of learning which is predicated on the fact that what is heard is easily forgotten, what is seen is often remembered, and what is practiced is easily remembered, thus making the NKVM instructional strategy worthy, effective, and complementary to the discussion method of instruction. NKVM also defer from the use of real life situations that are often colorful and can influence novelty.

Findings show that in the learning achievement test, post-test mean score of the experimental group (8.28) is higher than the posttest mean score of the control group (7.60), thus there is a significant effect of the instructional strategy on students' learning achievement. Result also indicated the experimental group was able to recall a higher percentage of learned materials after the two weeks interval than the control group, which shows a positive significant effect of treatment on student's retention of learned materials. This finding is in agreement with research findings by Clarence, (1944). Furthermore, the study showed that students in the experimental group were favorably disposed towards the instructional strategy, as they took active part in the class activity. These findings are in agreement with previous research findings by (Kathy, et al (2006); Jegede, Okebukola, and Ajewole, (1992); Zollman and Robbert (2008), and Wendell, (1970)) in which they asserted that learners learned better with visual models.

However, the observed singular effect of using NKVM instructional strategy may have been as a result of novelty and the excitement of learning with a new method of instructional strategy, and perhaps these feelings might wear off over time. These effect and the effects of some other intervening variables are arguments to support further future study on the strategy, which will serve to establish the efficacy of NKVM instructional strategy in any method of instruction in the teaching-learning process.

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BUILDING TEACHER CAPACITY IN CLASSROOM ASSESSMENT TO IMPROVE STUDENT LEARNING IN BASIC EDUCATION LEVEL

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Abstract

Education is a social institution and is subject to change in response to social dynamics. Because the teacher can provide the much needed quality control devices through student assessment, he/she can be seen as the manager, motivator or at best, the managing director and chief executive officer of the educational system. However, the Nigerian teacher is incapacitated in many areas due to the nature of environment he/she operates. The most meaningful information for improving instruction and providing clear and useful feedback to learners is collected daily in the classroom through classroom assessment of the learners. There is a direct relationship between appropriate classroom assessment techniques and higher student achievement, to the extent that when practiced effectively, can improved student learning. The academic imperative is for teachers to renovate their professional competence and capacity to be able to respond to the dynamics of classroom assessment. This paper therefore, discussed the status of Nigerian teacher and learning today, areas of capacity building for teachers to be able to respond to challenges of classroom assessment, the relationship between classroom assessment and improved student learning. It recommended among others, the training and retraining of teachers on newer methods/techniques of classroom assessment and teachers sharing ideas with peers through teacher moderation (collective assessment of student work).

Introduction

Education, whether at the basic, secondary or tertiary level, as a social institution is subject to change in response to social dynamics. Curricular changes demand for changes in approaches and methods of teaching as well as the techniques of student assessment. The Federal Government of Nigeria (FGN) (2004:8) posits, “Any fundamental change in the intellectual and social outlook of any society has to be preceded by an educational revolution”. Education exhibits “permanent as well as constant changing attributes that try to adapt to new demands and circumstances (Okeke, 2004:3). One of these new demands is building of teacher capacity in classroom assessment.

In Nigeria today, we hear many remarks about the teacher and the teaching profession. We read and people inform us that:

- The standard of education among our learners at all levels of education in Nigeria has fallen;
- Graduates of tertiary institutions are of low quality;
- Those who can, do; those who cannot, teach; those who cannot teach, teach;
- Examination processes have been bastardized;
- Teachers do not objectively assess students;

- Very fascinating question still: Do parents and guardians know who is teaching their children, what they teach, how they teach and how the children are assessed?

The implications of all these statements are critical to the development of Nigeria as a nation. They point to the fact that Nigeria has a defective educational system and the sector worse hit is the basic education level.

FGN (2004), emphasizing on the primacy of basic education states that the rest of education system is built upon it and it is the key to the success or failure of the whole system. It proceeds to give the goals of primary education as follows:

- To inculcate permanent literacy and numeracy, and ability to communicate effectively;
- Lay sound basis for scientific and reflective thinking;
- Give citizenship education as a basis for effective participation in and contribution to the life of the society;
- Mould the character and develop sound attitudes and morals in the child;
- Develop in the child the ability to adapt to his changing environment;
- Give the child the opportunities for developing manipulative skills that will enable him to function effectively in the society within the limits of his capacity; and
- Provide the child with basic tools for future educational advancement, including preparation for trades and crafts of the locality.

These goals will form the basis of basic education in all the states of the federation. It further states that basic education shall be tuition free, universal and compulsory and gives its curriculum as:

- Language:
 - Languages of the environment.
 - English.
 - French.
- Mathematics.
- Science.
- Physical and Health Education.
- Religious Knowledge.
- Agriculture/Home Economics.
- Social Studies and Citizenship Education.
- Cultural and Creative Arts (Drawing, Handicraft, Music and Cultural Activities).

It goes further to prescribe educational services to be provided to include:

- School Library.
- Basic Health Scheme.
- Counseling.
- Educational Resource Centre.
- Specialist Teachers of Particular subjects such as Mathematics, Science, Physical Education, Language Arts (in relation to English and Nigerian Languages), Music, Fine Arts and Home Economics.

The instrument through which this curriculum is to be executed or implemented is the teacher. The Nigerian teacher plays significant responsibilities and roles in the development of a functional and relevant educational system. The quality of the teacher and his inputs into the development of the instructional system will influence the learners and graduates produced at all levels of our educational system. The teacher can provide the much needed quality control devices in our educational system at all levels and therefore, he/she can best be

described as a manager, a motivator, the captain/pilot, interactive agent, as a manager, and above all the chief executive officer and managing director of the Nigerian educational system (Ibe-Bassey, 2001).

Education change is likely to accompany, not only change in curriculum (learning) in terms of subjects taught, syllabi, approved textbooks, etc, school conditions such as environment, class size, infrastructure, but also the quality of classroom assessment. For teachers to meet these multiple contemporary challenges for basic education, certain capabilities for effective response must be built in today's Nigerian teacher.

The Nigerian teacher and Learning Today

A teacher is a professional who earns his/her professional status. He/She is just not conferred with this status. The teacher can teach and he/she knows what he/she wants to teach and how he/she will teach. He/She has the knowledge about teaching as an art and he/she is skillful. The teacher can actualize the potentiality for knowledge already in the learner and can accurately assess or evaluate the level of achievements of the learner without any biasness. The teacher can translate knowledge, skills, attitudes and values with certain professional principles. Unfortunately, today, what we find in some of our public and private schools are cheaters, because they cannot teach in such schools with the basic and fundamental professional principles within any instructional process which classroom assessment is a critical part.

Most of the teachers at the basic education level lack the qualities of a professional teacher. The professional teacher according to Ibe-Bassey (2000), is a:

- Mediator of learning
- Manager of instruction
- Planner of instruction
- Disciplinarian/Controller of student behaviour
- Confidant of student
- Parent substitute
- Judge of achievement
- Scholar/Research specialist
- Curriculum implementer, etc.

Teaching and learning complement each other. For a teacher to teach there must be a learner or student. A learner or student acquires knowledge, skills and inspiration from the teacher who teaches. The Longman Active Dictionary defines **learn** as to get knowledge of subject or skill by studying or doing it. The Advanced Learner's Dictionary defines it as to gain knowledge or skill by study, experience or being taught (Hornby, 1995). By way of summary, "learning is a change in human disposition or capability, which persists over a period of time, and which is not simply ascribable to process of growth... it exhibits itself as a change in behaviour, its interference is made by comparing what behaviour was possible before the individual was placed in a 'learning situation' and what behaviour can be exhibited after such a treatment' (Gagne, 1977:3). Simply put, learning is said to have taken place when a person gains knowledge or skill by studying, doing or being taught. Classroom in its ordinary meaning is a room that holds a class of pupils (learners) to be taught by a teacher.

Translating is a systematic, rational and organized process of translating knowledge, skills, attitudes and values in accordance with acceptable professional principles and practices. Classroom assessment is very critical in teaching and learning, since teaching is simply a process of making things known to people and which has a learner/student-centered dimension.

A professional and effective teacher is continuously involved in systematic instructional planning if learning must be achieved effectively and efficiently. In instruction, the teacher arranges, orders, and organizes all human, material, temporal and spatial resources to facilitate the learning of his students and learners. Since the teacher is involved in the systematic instructional planning, an effective classroom assessment will help him integrate into the instructional situation the following:

- * Learner's characteristic
- * Instructional objectives
- * Instructional strategies
- * Instructional responses and
- * Evaluation techniques

The Need for Building Teacher Capacity in Classroom Assessment

The most meaningful information for informing instruction and providing clear and useful feedback to students/learners is collected daily in the classroom (Asp, 2000). This overall process carried out by the teacher is referred to as classroom assessment. Generally, student given account of students and determine whether the intention or goal of the teaching has been realized. This is a vital indicator of student's capability and a justification for parents' /guardians' expenditure of scarce resources.

FGN (2004) recommends the use of continuous assessment evaluation method in schools. Continuous assessment is a "method of ascertaining what a student gains from development, taking account of all his/her performance in tests, assignments, projects and his/her general attitudes and interest in the school performance" (Igwe, 2005:206). The main characteristics, he explained, are its coverage in terms of special knowledge, attitude, and interest and skill development of the students. This task for the teacher requires hard work, mental energy, thoroughness and diligence considering large class size and diversity that characterized Nigerian schools today.

There is no doubt that no educational system can rise above the quality of its teachers (FGN, 2004). This means to achieve a functional educational system, the teachers must be able to respond to educational changes meant to achieve such objective. Fear of change is very fundamental to human nature. Consequently, in most cases, teachers have the tendency to resist change and insist on old practices. To allay fears of teachers, their capacity to deal with the new challenges must be built for improved performance.

Capacity is "the ability to understand or do something" and building is "an increase in the amount of something over a period of time" (Hornby, 1995: 219). Building capacity of teacher in education process therefore, is the conscious attempt at upgrading, renovating, and acquiring skills, abilities and strategies that must increase consistently over time and enable teachers react appropriately to academic dynamics including professional training, lesson delivery, effective use of instructional materials, teachers communication skills, provision of effective role model, effective discipline and students' control, improved conditions of service and most importantly, quality of classroom assessment to determine the needs of his/her learners in the learning process.

Appropriate classroom assessment techniques and tools can help teachers at the basic education level plan or modify instruction, communicate important learning goals to pupils, and result in corrective feedback about how to improve. High quality classroom assessment techniques have also been linked to higher student achievement. For example, Black and William (1998) summarized a number of studies showing that the introduction of formative assessment techniques helped low achievers more than other students and thus, can raise achievement overall by reducing the gap. They further found that there is considerable evidence that assessment when practiced effectively, can improve student learning.

One of the most powerful research- based strategies for linking assessment to improved instructional practice is teacher moderation. This process involves teachers in a collaborative discussion of student work, based on predetermined assessment criteria. Teachers who engaged consistently in the moderation process of student assessment are likely to:

- assess student performance more consistently, effectively, confidently and fairly;
- build common knowledge about curriculum expectations and levels of achievement;
- identify strengths and areas for growth based on evidence of student learning;
- adjust and acquire new learning by comparing one's thinking to that of another student teacher; and
- Share effective practices to meet the needs of all students, monitor progress, and celebrate growth.

The most powerful aspect of teacher moderation as a strategy for effective classroom assessment is the collective sharing of effective strategies in planning next steps for instruction.

Crooks (1998:445) in a review of the impact of classroom evaluation practices on students, noted that “the choice of evaluation approaches seems to be particularly potent in its effect” and suggested that “there is something approaching a law of learning behaviour for students namely, that the quickest way to change student learning is to change the assessment system”

Stiggins (1999), has popularized the use of term “assessment literacy “as a way of defining the particular kinds of assessment skills teachers need. He noted that many teachers did not have course work in their pre-service programs to develop these skills. Shepard (2000) defined the need for new classroom assessment skills based on emerging research and discipline-based standards. She suggested that teachers need to make the following changes in their assessment practices:

- change the nature of conversations with students so that students develop greater knowledge of and responsibility for learning goals;
- assess students' prior knowledge and use that information in planning better instruction to meet student needs and match student interests;
- give students feedback in ways that go beyond grades such that they are helped to understand what quality work or thinking looks like; and
- get clear about the explicit criteria for open-ended/performance tasks and involve students in self assessing.

In addition to the improvements listed above, others have found that the typical assignments and assessments given to students received low-level, less than challenging work assignments (Karweit, Price, Riocciuti, Thompson, and Vaden-Kiernan, 1997). To complicate matters, studies show that teachers think they are providing challenging learning opportunities to a greater extent than they actually are. Even in our college, polytechnic and university classrooms, those who have studied assessment practices have found that teachers tend to think they are teaching to higher-order thinking goals tend to weakly represented (Angelo & cross, 1993).

Where does the responsibility for building teacher classroom assessment capacity lie? Recently, several reports have suggested that improvement efforts, in general, have focused exclusively at the school level for too long. Elmore & Burney (1998), Spillan (2000) suggest that more models of how Ministry of Education develops strategies for influencing changes at the classroom level are needed. As a first step, Ministry of Education and the school must have a clear sense of what good classroom practice looks like.

Teacher Capacity-Building for Effective Response to Challenges of Classroom Assessment

Actualizing assessment reform at the classroom level is a long-term endeavour that will not happen as a result of a single workshop or conference. Such reform involves learning about and then implementing more effective assessment methods and strategies in the classroom with their pupils/students. To achieve these, the following initiatives are vital in building teacher capacity in classroom assessment to improve student learning:

1. **Creating effective classroom assessments:** this can be achieved by:
 - Teachers being trained on how to develop high quality classroom assessment through workshops and use of models;
 - Government preparing and providing explicit guidelines describing good classroom assessment practices;
 - Teachers creating assessments and asking for “expert” feedback on their quality; and
 - Mandating teachers to participate in professional development at all times.
2. **Examining grading and reporting practices:** To effectively practice this:
 - Guidelines that articulate principles of good classroom assessment must be developed and revised with much teacher input;
 - The idea of distinguishing between the formative and summative purposes of particular assignments such that not all student work has to be graded will make more sense to teachers;
 - Teacher capacity should be developed here to understand how to use assessment to improve the quality of student learning and not just to grade;
 - Teachers capacity need to be developed in the areas of understanding the importance of (i) focusing on the more recent assessment evidence (ii) viewing grading as more than number crunching (i.e. reporting achievement on targets or standards) and (iii) reporting achievement separately from behaviour.
3. **Implementation of Classroom Assessment:** The capacity of teachers needs to be built here because:
 - Teacher must regularly examine the quality of student work and the quality of work they assign students (i.e. cognitive challenge, purpose);
 - Leadership support and time are critical for teachers to be able to work together on improving assessment;
 - For sustained results, there must be balance between pressure and support (i.e. teachers must be expected to improve the quality of instruction and should be supported in doing so by all the means at the disposal of the school.

There are many ways teachers at the basic education level can work together to improve their assessment practices if their capacity is built in the above three areas. For example, the teacher may:

1. Have to understand the standards set and clarify instructional goals as a first step toward better assessment;
2. Work together on integrating more performance assessments into their assessment methods;

3. Work together to find and use assessments as windows into students' thinking in an effort to become better at diagnosing student needs;
4. Design institutional interventions based on assessment information;
5. Look together at the quality of student work;
6. Design grading and reporting system (McCloskey & McMunn, 2000);
7. Examine the quality of their assignment (Matsumura, 2003);
8. Formulate vertical and horizontal curriculum linkages (Kinght, 2002).

Through these activities, schools can develop into communities of practice that continuously revisit and restructure the learning environment for the benefit of the student through student assessments.

Conclusion

The need for teachers to possess skills in classroom assessment methods through improved capacity building has been highlighted in this paper. Only through classroom assessments can teachers gain a holistic picture of what students know and are able to do. Classroom assessments allow teachers especially at this basic level of our educational system to diagnose problems of student achievement, provide formative feedback to students, and make reliable and valid evaluations of student performance using multiple methods. Using classroom assessment as a formative process can help bridge the gap between the classroom and high stakes testing achievement.

Recommendations

The paper recommends among others the followings:

- Teachers should be trained and retrained to update their professional status in order to effectively respond to the changing needs of new methods of classroom assessments;
- Teachers must be developing and trying out new assessment methods that give them better information about how to help students improve;
- Teachers should appreciate and learn to talk to their peers *about ideas* that enhance effectiveness of classroom assessment;
- Increased funding of library services by government where teachers are encouraged to collect, review and read relevant researches as well as searching for high quality instructional materials;
- Teachers should endeavor to attend seminars, symposia, workshops and conferences regularly to update their professional competence in classroom assessments.
- Special allowance called "Continuous Assessment Allowance" should be provided for teachers at the basic education level to help them provide (where inadequate) the requisite inputs for pupil assessment; and
- Teacher moderation through collaborative assessment of student work is highly encouraged to achieve/enhance consistency and reliability, collaborative planning, fairness and equity and alignment of instruction.

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SCIENCE TEACHING AND LEARNING: QUALITATIVE AND FUNCTIONAL CHEMISTRY EDUCATION, DOES GENDER AND AGE AFFECT ACADEMIC ACHIEVEMENT

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Abstract

One of the key points in Late President Yar'adua's 7-point agenda is the accomplishment of qualitative and functional Education. This can be monitored through assessing academic achievement of students. Chemistry Education occupies a central position to all disciplines. This study examined the correlates between age and gender on academic achievement (CGPA) of Chemistry students. The study used thirty six (36) females and forty (40) males giving a total of sample seventy eight (76). Scatter – plot, mean and standard deviation were used for the descriptive statistics while univariate analysis of variance (ANOVA) and multiple regression were used for inferential statistics. T-test was used to test the null hypothesis formulated ($P < 0.05$). Result revealed a linear relationship between, age-CGPA and gender-CGPA. A low positive correlation coefficients was obtained for ages and gender ($r = 0.006$ and 0.105) which were not significant. The predictor variables jointly accounted for 1.1% of the variance, age was the better predictor. The null hypothesis tested was accepted implying no significant difference in academic achievements of students. It was suggested that some more variables be included so as to determine significant correlation of students' academic achievement of Chemistry students.

Introduction

On assumption of office on May 29th 2007, late President Musa Yar'adua met a nation with vital infrastructure such as roads, power, water etc in comatose state, while key sectors such as manufacturing, agriculture, education and transport were floundering (Ochiama, 2008). It was against this background that the president unveiled a 7-point agenda which he hoped would put back the economy on track. In his inaugural speech, late Yar'adua had said that his administration would focus “on accelerating economic and other reforms in a way that makes a concrete and visible difference to ordinary people”. These, he said are the kernel of what has come to be known as the President's economic blueprint. He enumerated the seven point agenda as: power and energy; food security and agriculture; wealth creation and employment; mass transportation, land reforms; security; qualitative and functional education and pursuance of the rule of law. Qualitative and functional education at all levels of education has been the clamour for educational policy makers since time immemorial.

Chemistry occupies a pivotal position in Science and Technology and is needed by everybody and in every aspect of human endeavour (Agwagah and Harbor-Peters, 1994; Akinsola, Tella and Tella, 2007; Olayemi, 2009; Abubakar & Eze, 2010; and Abubakar and Uboh, 2010; Ejimaji and Abubakar, 2010). Since Chemistry education is a compulsory subject in engineering and allied courses for tertiary education, then, there is need for a qualitative and functional Chemistry education to be in place as one of the fulfilment of the 7-point agenda of the Federal Government.

Quisumbing in (Acceladjo, 2004) mentioned that true test of quality education is the degree to which one can share what he has learnt with others to improve the quality of life. Qualitative and functional Chemistry education can be evident in the academic achievement of students emphasising their cognitive level. This now brings us to the issue

of academic achievement in chemistry. Agwagah and Harbor-Peters (1994) reported that gender related differences existed in Chemistry learning and achievement. Busch (1995) reported that female students have significantly lower self-efficacy than males with respect to Chemistry related and other traditionally male dominated subjects including computer. Other researches on inter-relationship of gender and Chemistry have reported no significant gender influence on achievement in Chemistry. Agwagah and Harbor-Peters (1994) have reported that little differences are identified between males and females in Chemistry achievement at ages 9 through 13 years but at age 17, females perform poorer than the males. Tenzin (2002) reported that younger students out performed their peers in Chemistry, English, HCG, Science and overall scores while older students achieved at a higher level than the younger ones.

Hence, this current study is designed to assess the significant relationship of both gender and age on academic achievement of Chemistry students of the Federal College of Education (Technical), Omoku, Rivers State. Specifically, it will ascertain which variable gives a better percentage of variance to the academic achievement of the students.

Statement of the problem

The late President Yar'adua's 7-point agenda is to build on the greatest accomplishments of the past few years, concentrate on rebuilding our physical infrastructure and human capital in order to take our country forward. Development of human capital is a strong tool for a Nation's growth. A qualitative and functional education is an essential ingredient to rebuild human capital in a Nation. Chemistry education stands central to all courses, hence the all important need to focus on the quality of Education which is evident in the academic achievements of students. Several factors affect academic achievements, they include gender and age. So, the problems are how the effect of these two variables: age and gender contribute to the academic achievement of chemistry students?

Purpose of the study

The purpose of this study was to determine if there were significant relationships and contributory effect of the gender and the age on the academic achievement of Chemistry student. Also, the effect of gender on academic achievement in Chemistry was ascertained.

Research Questions

1. Are there any relationship between gender age and achievement of Chemistry students?
2. What is the individual contribution of each of the two predictor variables: gender and age to student's performance?
3. What is the combined contribution of the two predictor variable to students' academic in Chemistry?

Research Hypothesis

H₀₁: There is no statistical significant difference in the academic performance of female and male Chemistry students of F.C.E. (Tech.), Omoku in 2007/08 session.

Methods

Population and Sample

The population of this study comprised all the chemistry students in the School of Science at the Federal College of Education (Technical), Omoku, Rivers State. From the population, the academic session of 2007/08 was used for this study. The sample consists of seventy-six (76) students made up of forty (40) males and thirty-six (36) females spanning NCE 1, 11, and 111 academic levels.

Materials / Data collection

The college approved cumulative grade point average CGPA result that reflects the overall academic performance for the session for each student was obtained from the records of the chemistry department. Each student's age and gender were obtained from the School of Science Education records and the admissions unit of the college.

Procedure and Data Analysis

The gender, age and CGPA of each student were entered into a database. The statistical package SPSS was used for the comparative analysis. Mean, standard deviation and scatter plot were utilised for the descriptive statistics. Inferential statistics was established using bivariate correlation, univariate analysis of variance (ANOVA), t-test and multiple regression analysis. The scatter plot of the variables revealed a linear relationship, hence Pearson correlation was used to determine the significance of the relationship of age – CGPA and between gender-CGPA. T-test was used to test the hypothesis formulated for the study level of statistical significance was set at $\alpha = 0.05$

Results

Results are as presented below

Research Question 1

Are there any relationships between gender age and academic achievement in Chemistry?

Table 1: Correlation matrix of age, gender and CGPA

Variables	CGPA	Age	Gender
CGPA	1		
Age	0.006	1	
Gender	0.104	0.015	1

Result from Table 1 revealed that both Age and Gender correlated positively with CGPA, hence they both have predictive validity on CGPA. The correlation coefficients however, were not significant.

Research Question 2

What is the individual contribution of each of the two predictor variables: gender and age to student's performance and which variable most significantly affect their CGPA?

Table 2: Percentage contribution of Age, Gender on CGPA

	Age	Gender
R - (R)	0.006	0.105
R- square (R^2)	0.000	0.011
% Contributed	0.000	1.100

Table 2 revealed that Age contributed only 0 % to the variance observed in CGPA while Gender contributed 1.1%

Table 3: Relative contributions of each of the variables and their significance

Variables	Standard Error	beta values	T	Significance
Age	0.021	0.004	0.035	0.972
Gender	0.204	0.105	0.900	0.371

Research Question 3

What is the combined contribution of the two predictor variable to students' academic achievement in Chemistry?

Table 4: Summary of the Multiple Regression Analysis
ANOVA ^b

Multiple R=0.105 R square = 0.011 Adjusted R square = 0.016 Standard error of estimate = 0.80718					
model	Sum of square	df	Mean square	F	Significance
Regression	0.529	2	0.265	0.406	0.668 ^a
Residual	47.563	74	0.652		
Total	48.092	76			

a. Predictor (constants), Age, Gender

b. Dependent Variable: CGPA

Results in Table 4 shows that the predictor variables jointly account for 2.1% of the variance observed in students CGPA, the result is however not significant.

Research Hypothesis

H01: There is no significant difference in the academic performance of female and male chemistry students of F.C.E (Tech.), Omoku in 2007/08 session.

Table 5: Mean rating, standard deviation and t-analysis of chemistry students

Sex	N	Mean	Std	df	t-cal	t-crit	Decision on hypothesis
Female	36	2.30	4.27	76	0.09	2.0	Accept
Male	40	2.19	5.2				

The result in table 5 revealed that t calculated was 0.09 which is lesser than critical t-value of 2.0 indicating acceptance of H01. Hence, gender was insignificant in the academic performance of chemistry students in the 2007/2008 session.

Discussions

In 2007/2008 session the department of Chemistry/Computer Education, recorded thirty-six females and forty males. The highest and lowest ages for females and males were 35 & 15 years, and 30 & 15years respectively. The highest and lowest CGPA for females and males were 4.58 & 0.65 and 4.53 & 0.88 respectively. Findings from the study revealed that the two predictor variables age and gender had low positive correlation ($r=0.006$ & 0.105) respectively on CGPA of Chemistry students. However, the result was not significant at 0.05 confidence interval. This imply that both age and gender were positively related to the students. Russell, Barfield, Turnbull, leibach and Pretlow (2008) also record a low correlation coefficient ($r=0.07$) between age and GPA of registered health information administrator RHIA certificate examination scores. Also, Yousefi, et al (2010) recorded a low correlation coefficient ($r=0.22$) between age and academic achievement among 400 Iranian students in the age range of 15-19years. From Table 2, gender was a better contributor to the variance in CGPA of the students at only 1.1% while age did not contribute anything at 0%. Owolabi and Etuk-iren (2009) recorded a low positive correlation 1.3% variance between gender and academic achievement of Pre-NCE Mathematics students. However, Olayami (2009) reported an insignificant low negative correlation ($r = -0.143$) with 4.6% variance for gender-academic achievement of Physical Chemistry students of F.C.E (Tech.) Akoka. Using multiple analysis of variance (MANOVA), De Paula and Hlawaty (2004) reported a statistical relationship for their four two-way interaction of age-country, gender-country, achievement-country and

achievement-age. Using the extended-fisher application, for the three levels of ages 13-15, and 17 year olds, they illustrated a significant difference on the 22 dependent learning styles.

The Beta values from Table 3 can be used to express mathematically the combined influence and contribution of the variables thus:

$$Y = 0.15x_1 - 0.018x_2$$

$Y = \text{CGPA}$ $x_1 = \text{Age}$, $x_2 = \text{gender}$

Table 5 revealed a lesser t-value than the critical t-value. So, gender is not significant in the academic achievement between females and males in the department. Equally, Abubakar and Eze (2010), Abubakar and Ejimaji (2010); Abubakar and Ihiegbulem (2010), Abubakar and Uboh (2010) have all reported no statistical gender differences in Mathematics, Chemistry, Integrated Science and the overall School of Science students respectively of F.C.E (Tech.), Omoku, Rivers State in the 2007/2008 session. On the contrary, Yousefi et al (2010), reported a significant gender difference in academic achievement of Iranian students. Akinsola et al (2007) recorded no gender difference in procrastinatory behaviours and academic achievements between males and females students of University of Ibadan and University of Lagos.

Conclusion

This research contributed to the broad understanding of the connectedness of observable traits: age and gender on academic achievement of Chemistry students. It sought to establish the significance and relational effect of age and gender on Chemistry students' academic achievement (CGPA). The data have provided evidence of a positive correlation between age-academic achievement and gender-academic achievement. Both age and gender were insignificant in academic achievement of the students but gender was the better contributor to academic achievement. This findings reiterate the success of the increasing clamour for gender equity at all levels of education which the Millennium development goals advocates for and in line with the Federal Government's 7 – point agenda of qualitative and functional education at all educational level towards improving the teaching of Chemistry.

Recommendation

Based on the findings from the study, it is recommended that for further studies, more predictive variables be added to age and gender so as to ascertain more significant predictors of academic achievements of Chemistry students. There is the need to keep learners firmly anchored on a set of human values; to teach young teachers how to process the vast variety of information so that they pick up chemistry knowledge that are qualitative and functional to themselves and the society at large. Interactive approaches and activities should be put in place to address our foremost concern of strengthening the moral fibre of our learners and opportunities inside the classroom and within classroom that will help them acquire life-long skill and imbibe esteemed principles and values, all these go a long way in improving the teaching of Chemistry for the attainment of the 7 point agenda of the federal government.

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**VOCATIONAL AND TECHNICAL EDUCATION STUDENTS'
PERCEPTIONS ON SELECTED TEACHING METHODS IN TERTIARY
INSTITUTIONS: A CASE STUDY OF SOUTH-SOUTH GEOPOLITICAL
ZONE NIGERIA**

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Abstract

The study examines vocational and technical education students' perceptions on selected teaching methods in tertiary institutions: a case study of a south-south Geopolitical Zone, Nigeria. A questionnaire was developed by the researcher and used in data collection for the study. Mean, Standard Deviation and the Z-test statistic was used in data analysis. The major findings were highlighted in the study where it was revealed that individualized method of teaching was preferred to the field trips method in the teaching and learning technical education subjects because the courses are practically oriented that require the acquisition of knowledge and skills to enable the individual carry out such skills through individualized training. Based on the findings of the study, it was recommended among others that lecturers should combine both field trip and individualized instruction as situation demands for improving teaching and learning of vocational and technical education courses.

INTRODUCTION

Teaching method refers to the ways and means which a teacher adopts to guide the students through teaching and learning activities in order to accomplish the desired goal. (Akinsende, 1998). There are many teaching methods and techniques available to the teacher. These methods and techniques are designed for communicating with students. Effective teaching and learning takes place when the teacher knows which method or technique to use in a particular situation to meet specific goals.

The choice of a method of teaching has multiplied greatly in recent time. The need for vocational and technical education teachers to be motivational in their teaching method cannot be overemphasized; hence the teacher is aware that students come on teaching and learning situation with different traits (Umunadi, 2008). In developing teaching methods and techniques, teachers are faced with the task of placing the students in an educational setting tailored to the students learning. The setting in which services are rendered has a strong influence on the students and teachers (Igbo, 2007).

Some researchers observed that most teachers apply the conventional method of teaching. In this method of teaching mentioned above, most of the students struggle to identify and actually understand the instructional method and technique in different perceptions. In order to address the concept and misconceptions in definition of appropriate teaching methods used by the teachers that can lead to better understanding of the topic and performance of students in the tertiary institution, the researcher has selected two frequently used teaching methods used by vocational and technical education teaches in tertiary institutions. The selected teaching methods are individualized instruction and

field trips.

Individualized Instruction

Individualized instruction is a technique that permits a student to work towards achieving objectives that are appropriate for him and be allowed to work at a pace that is challenging but does not push him faster than he is able to achieve (Dave, 1970).

Field Trips

Field trip is a group visit to locations for the purpose of observing on-the-spot situations under special guidance. The field trip provides a link between classroom and actual life situation. It permits learners to experience that which could never occur in classroom or laboratory.

Statement of the Problem

The conventional method of teaching commonly used by the teachers in tertiary institutions appears ineffective for the teaching of vocational and technical subjects, hence, it is desirable to examine two major methods of teaching that can improve teaching and learning of vocational and technical education courses. The two methods are the individualized instruction and the field-trips methods.

Purpose of the Study

Specifically, the study seeks to:

1. Identify the teaching methods appropriate for teaching vocational and technical education students.
2. Determine teaching methods that can enhance vocational and technical education students skills acquisition.
3. Ascertain students' perceptions of these methods, which can enhance vocational and technical education students' performance.

Research Question

1. What are students' perceptions on the teaching method that can enhance the students' performance?

Hypothesis

H₀: There is no significant difference between the mean responses of students' perceptions on teacher use of individualized instruction and field-trip methods.

Methods and Materials

The research design is descriptive survey. The population was made up of the 60 students of the third and fourth year of Technical Education students of the Department of Technical and Business Education, Delta State University, Abraka, Nigeria. There was no sampling because the population of students was not large, so all the students were used for the study. The instrument used was a two-10-item questionnaire. The questionnaire was designed using a four-point Likert-type rating scale namely Strongly Agree (SA), Agree (A),

Disagree (D), Strongly Disagree (SD), with a corresponding weights of 4, 3, 2, and 1 respectively. The questionnaire was designed to elicit information from the respondents. Their opinions on the two methods of teaching were sought. Three experts validated the instrument all of them from Delta State University, Abraka, Nigeria. A grand mean value of 3.00 and above qualifies the teaching method while a grand mean value below 3.00 disqualifies the teaching method. The Z-test statistic was used to test the significant difference between the mean responses of students' perception on teacher use of individualized instruction method and field trip method.

Results

Research Question

What are students' perceptions on the teaching method that can enhance the students' performance? Data analyzed for the research questions are presented in tables 1 and 2.

Table 1: Responses on Students' perceptions on individualized method of teaching in tertiary institution N=60.

SN	Item	SA	A	D	SD	X	SD
		4	3	2	1		
1.	Teacher likes individualized instruction technique because it permits a student to work towards achieving objectives that are appropriate to him	42	8	4	6	3.4	6.08
2.	Personalizing educational programmes is a recognition of individual abilities and goals so as to enable them achieve the best of their abilities	46	9	3	2	3.6	6.64
3.	Students are always active, involved and responsible for their instruction	46	10	2	2	3.6	6.41
4.	Teaching and learning is shifted to the learner as the central actor	50	2	8	0	3.7	6.26
5.	Varied alternative and optional learning experiences are available to meet the stated objectives	43	10	2	5	3.5	6.28
6.	The strategies or methods of instruction are designed to reach students as individuals	47	5	6	2	3.6	6.27
7.	Teacher uses a variety of media and instructional resources	43	10	6	1	3.5	6.41

8.	The learning environment is designed for flexibility and variety	48	3	6	3	3.6	6.16
9.	Frequent testing is done so that correct responses are recognized and rewarded	50	2	8	0	3.7	6.26
10.	Students are evaluated in terms of individual performance and not by comparison with others	36	10	10	4	3.3	5.68
	Grand Mean					3.55	6.26

The results obtained from Table 1 indicated a grand mean (3.55) with SD of 6.26 which qualifies the individualized instruction method of teaching to be effective in technical education courses in tertiary institutions.

Table 2: Responses on Students' Perceptions on Field-Trips Method in Tertiary Institutions N=60.

SN	Item	SA	A	D	SD	X	SD
		4	3	2	1		
1.	Teacher likes teaching using field-trips methods	16	10	30	4	2.6	5.06
2.	Teacher prepares his students for the purpose of observing on the spot situation under guidance	21	8	5	26	2.4	5.04
3.	Teacher uses field-trips method because it provides a link between classroom and actual life situation	17	9	20	14	2.4	5.09
4.	Field-trips permit students to experience that which could never occur in classroom or laboratory	13	6	21	20	2.5	5.46
5.	Field-trips will make students pass their exams	8	8	20	24	2.0	5.72
6.	Field-trips helps students to develop insight into the operations in industries set-up	10	3	29	18	2.0	5.98
7.	Field-trips make learners have opportunity to observe, touch, hear and work with employees of the company	6	10	30	14	2.1	5.69
8.	With the experience gained from field-trips, students will be able to buy their own tools and equipment	10	4	21	25	1.9	5.90

9.	Company will employ students after field-trips	18	13	20	9	2.6	5.01
10.	Field – trips will ensure that teacher sets up the objectives before it takes place	8	18	25	9	2.4	5.09
	Grand Mean					2.26	5.40

The results obtained from Table 2 indicated a grand mean (2.26) with SD of (5.40) which disqualified the field-trips method of teaching technical education courses in tertiary institutions.

Hypothesis

H_{0f} : There is no significant difference between the mean responses of students' perceptions on teacher use of individualized instruction method and field-trips method.

Table 3: Z-test summary on students perceptions on teacher use of individualized institution method and field-trips method.

Teaching method	Means	SD	N	DF	Z-cal	Z-crit	Level of sign	Remarks
Individualized inst method	3.55	6.26	60	118	1.199	1.960	0.05	Not Significant
Field-trips method	2.26	5.40	60					

The results obtained from Table 3 showed that there is no significant difference in the perception of students. In the table 3 Z-calculated of 1.199 was obtained against the table value of Z-critical of 1.960 at 0.05 level of significance. Since the Z-cal is greater than the Z-critical, the null hypothesis is rejected as remarked in Table 3, thus indicated that there is no significant difference between the mean responses of students' perception on teacher use of individualized instruction and field-trips methods.

Discussion

The findings of this study revealed that the field-trips method was not appropriate for teaching technical education courses in tertiary instructions. Their responses indicated that they did not learn the practical aspect of the courses effectively when the field-trips method was used by the teachers. Skills acquisition is the bedrock of technical education. Olaitan (1983) observed that for learning process to be effective, knowledge of the subject matter as well as skills development in teaching practical courses are essential. The students' responses showed that teaching is not effective hence they do not gain practical experience when field-trips method is adopted. They observed that field-trips is a mere sightseeing exercise.

On the other hand students tend to look at individualized method as one of the most effective method of teaching technical education courses. There is no significant difference between the mean responses of student's perceptions on teacher use of individualized and field-trips methods. This indicated that they would learn better using

both methods of teaching technical education courses.

Conclusion

Educators have advocated for the use of all the methods of teaching or a combination of both the individualized and field trips methods to improve quality of teaching technical courses so that slow learners can be helped to improve upon their learning process (Njoka, 1989).

Recommendations

1. Lecturers should be given in-service training on how to improve the methods of teaching to enhance the teaching and learning process.
2. Government should provide tools and equipment in the tertiary institutions to enable the teachers use both methods of teaching maximally to promote the teaching and learning process.
3. Teachers should combine both individualized instruction and field trips methods as the situation demands to make teaching and learning effective.

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ANALYZING PROFESSIONAL DEVELOPMENT PRACTICES FOR TEACHERS IN PUBLIC UNIVERSITIES OF PAKISTAN

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Abstract

Professional development for teachers is an essential element of plans to improve the quality of education. Professional development in a broader sense refers to the development of a person in his or her professional role. More specifically, professional development of teachers refers to the achievement of enhanced learning experience in research and teaching with synchronized system so that he/she could deliver effectual knowledge to his / her students in particular and to the society as a whole. Exploring this imperative aspect of teaching human resource in universities, current study analyzes the initiatives taken by public universities of Pakistan for professional development of their teachers. The aim of this explanatory study is to investigate the issues and challenges regarding professional development mechanisms of public universities of Pakistan. It elaborates their performance development procedures and strategies and unearths the influential factors and challenges which are faced by these university teachers regarding performance development systems. The sample of the said study comprised of randomly selected teaching staff of five major Public Universities of Pakistan. Along with detail questionnaires, in depth interviews had been conducted with teaching staff of the sample universities in order to achieve the deeper insights of the challenges and issues regarding teachers' professional development. The study reveals that foreign scholarships to university teachers, research grants and training programs are various effectual measures taken by Higher Education Commission of Pakistan for Public universities. However, comprehensive monitoring system, quality assurance and impact measurement of the said measures are lacking elements which create dissatisfaction among teachers in public universities of Pakistan. Also, lack of training for improved teaching in semester system, communication gap among seniors and junior faculty, decreased guidance for modernized research conduction, overburdened teaching load are some of the hindering factors in professional development of teachers which are been revealed by the current research.

Keywords: Professional Development, Higher Education, Training Mechanisms

Introduction

Professional development of teachers is critical for the gradual improvement of educational standards. A qualified teacher would always deliver quality knowledge which in turns would improve the quality of education in an educational institute. It can be declared that the only real source of sustainable competitive advantage in today's knowledge intensive world is the ability to learn faster than the competition. Professional development of teachers is pivotal for the achievement of overall institutional goals. Innovations exude through the

remarkable performance of teachers but the point of concern is that not much significance is being given to their professional development at the university level.

Teaching is a profession which elucidate the brains of students and the path which leads them to different other professions. The teachers' knowledge and the transference of that knowledge carry critical significance. As the world has gone to swiftly changing mode, the traditional teaching practices and professional development activities are not adequate to match up the speed. In this context the key importance should be given to the career-long professional development of teachers.

Professional development is actually based on giving access to the teachers to most up-to-date and finest teaching tools. This gives an upright support to the teachers who want grow professionally –bringing out the exceptional talent which they have and refine their skills. All teachers want to update their knowledge and follow best teaching practices.

It is important for higher education teachers to stay updated but stand-alone workshops have got low chances to bring a big change in teaching practice. However, addition of embedded and on-going professional development, raising the communities where professional learning could be possible through the interaction amongst colleagues, upholding of administrative staff and coaches, could increase the chances of dramatic improvement (Joyce and Showers, 2002).

In the mid 70s the in charge of professional development at York University Richard Garner, coined the idea of continuing professional development. It entails the idea that the individuals should continually seek improvement in their knowledge and professional skills, beyond the initial training they get to carry out the jobs. It means that in-service training should be provided to the teachers and under the umbrella of university they would be responsible for their lifelong career development (Sandra Gray, 2005).

A decade or two ago, building a favorable combination of circumstances for professional development was a tough job to do, but the arrival of web tools and online learning made this transformation facile. By utilizing the technology the institution can improve the dormant skills of teacher by making them connect with teacher mentors, coaches, experts and colleagues over time and space. This could integrate the professional development of teachers into their day-to-day experiences. Through using online collaboration tools like discussion boards, blogs and virtual coaching teaching qualities could be improved which brings the student achievement as well. It is the requirement of time to provide professional development opportunities to the teachers so that they could prepare their students to compete globally and adorn the name of institute with stars.

Researches being conducted till date put emphasis on both in-house and external professional development of teachers. Both play the significant role in enhancing teacher capital and extolling organizational capacity. As a teachers' knowledge and abilities are impetus for student learning. University should focus on building the capabilities of teachers-particularly their knowledge, intellectual development and their expertise because 21st century demands of higher education have dramatically shifted from transfer of knowledge to creation practical knowledge.

Current climate of reform demands, that teachers should adopt the teaching methodologies and practices that have never been contemplated before. Success depends on the ease with which they learn new teaching skills and discard the outmoded practices. Higher Education Institutions need to provide opportunities for teachers to work collaboratively in practical sessions with researchers. A learner-centered foundation is required in order to get the long-term results through professional development.

With the growing challenge of 21st century higher education system is also undergoing the changes all over the world. Changes in the higher education institutions becomes more rapid with the start of new millennium as many governments and educational organizations

taking serious action and implementing plans for educational reforms. Today when higher education has taken transition from traditional norms of 20th century to updated trends of education in 21st century, countries desire their higher education institutions to be the grooming nursery for leaders, intellectuals and human capital of tomorrow. The strategic vision has to be shifted upon assurance that teacher fully understand the importance and the required skills according to the demand of the 21st century and also guide his students the usage of these skills, achieving better understanding of subject matter and developed problem solving skills and enhancing their ability to develop and implement different teaching strategies.

The same is implemented by Higher Education Commission (HEC) of Pakistan in Pakistani public and private universities. Undoubtedly teachers are the most important agents in these reforms. As being subject and object of change teacher professional development has attained major attention during the past few years in Pakistan. Professional development of higher education teachers became the primary concern of Higher Education Commission of Pakistan in last decades. Commission has initiated various strategic measures for teachers in higher education institutions of Pakistan. Major measures include foreign scholarships, inclusion research facilities in institutions, National Academy of Higher education which is the updated institute for teachers training, research grants and many more. Undoubtedly, said initiatives have played their imperative role in professional development of teachers in universities of Pakistan. However, skill utilization by these initiatives and effectiveness with potential challenges and issues are still to be explored. The unelaborated areas which are been considered in current research includes professional development activities that have significant utilization by teachers, positive effects on teacher's professional development focusing on their knowledge, and acquired skills and commitment of teacher. This paper focuses on issues, challenges and satisfaction impact of those initiatives by Higher Education of Pakistan which have been taken regarding professional development of teachers in Higher Institutions of Pakistan. Major objectives of current study are

- To analyze and understand the performance development initiatives for teachers by public universities of Pakistan.
- To identify, what are the challenges and issues that are faced by public universities of Pakistan for effective staff performance development and what efforts can be made to improve it?

Literature Review

All the developed countries with extremely high progress ratio in educational field conform to the fact that professional development of teacher is the key requirement of an improved and efficient education system. Today, same concern is of prime importance in developing countries as well. This literature review concisely includes the literature giving insights of effective professional development of higher education teachers, its methods, influencing factors, impact on the performance of an individual and on organizational progress as a whole.

Professional Development is an unbroken chain of activities which involves training being offered to the employees, systematic exercise of newly learned activities and proffering the feedback, yielding the time limits and providing the support by giving follow up. Successful professional development programs offer the similar learning activities to the teachers which they would apply in the classroom and foster the learning environment for their students. Universities have a growing interest to develop as learning organizations and provide a platform for the teachers to share their experiences and expertise in more systematic manner (OCED, 2005).

The definition acknowledges that the professional development in university is a continuous process which provides an opportunity for the teachers to explore, learn and adopt new teaching methodologies. An individual's knowledge, attitude and skills get updated through learning according to the changing demands of the profession which plays a part in overall organizational development.

Fullan (1991) emphasized the point that Professional Development is a sum total of all the informal and formal learning experiences of an individual from the day he started his career as a teacher till his retirement. He further elaborated that professional development is process to explore and develop the understanding of advancements in the pedagogy. Teachers should be supported in effective manner in order to cope with advance technologies, modern teaching practices and updated research skills so that they not only flourish learning environment by their acquired teaching skills but also create innovative knowledge by research and theory development. Melnick and Adams (1975) emphasized that opportunities to grow as a professional should be provided to the teachers through out their career. They should be offered different activities like continuing the education, training courses, workshops, knowledge management systems, scholarships for higher studies as well as the collaboration with colleagues and expert coaches and mentors for enhancing research association.

Neuron (2007) came up with a different point of view that the Professional development actually unfolds the new horizons of progression. It stirs up an urge to think out of the box, supports new learning styles, contributes to the growth of intellectuals and regards an unusual skill set. Professional Development in this regard simply a smaller part of holistic philosophy behind career progression of a teacher. This philosophy describes a new dimension to the professional development, as it emphasizes that professional development involves the activities which are different, the new learning experiences are being offered. It compels the person to appreciate and learn unusual teaching practices which foster mutual learning with student extreme interest. All this brings a satisfaction as people feel more attracted towards the novelty. It also adds up their intellectual skills which enable the teacher to perform in appreciable manner.

Hoban (2002) elaborated a few distinct types of professional development for teachers using different tools and methodologies:

- **Workshops:** offered to keep the teachers updated about new initiatives related to their subject or general teaching practices.
- **Coaching & mentoring:** is being followed as the integral part of the educational setup.
- **Educational Courses:** offered by the university at weekends or in the evening by making adjustments in the working schedule for professional development of teachers
- **Seminars:** being conducted by the subject matter experts, the topics could range from the general to more specific type. It is normally a daytime activity followed by the discussion session.
- **Research:** subject related or interest based individual or group research could be done by the teachers to grow professionally and in order to propose new solution paradigms for emerging issues in their respective discipline.
- **Online Training:** programs being offered to the teacher can be completed as per their own interest and convenience. Lectures and course materials could be

accessed online. Course related issues could be shared on the discussion boards by the trainees.

- **Higher Education:** opportunity being offered by the university to increase the qualification of teachers.
- **Collaborative Networks:** of teachers could be made in order to exchange learning experiences & expertise.
- **Educational Conferences:** a meeting for exchange of information and expert knowledge arranged by the University for the Professional Development of teachers.

The fundamental aim of professional development of higher education teachers is improving and updating the skills and knowledge of the teachers in order to deliver their best in teaching and to meet the challenges of time (Diaz Maggiori, 2004; Jones, 2001). Ali (2007) asserts that professional development of teachers is continuous process which involves acquiring, disseminating and executing knowledge in order to spread it in new generations. He further forces that effectual learning by students depends upon how seriously the knowledge and ideas are perceived and taught. Boyer (1987) put it in plain words saying that “all faculty members throughout their careers, should themselves, remain students. As scholars they must continue to learn and be seriously and continuously engaged in expanding intellectual world”. Memon (2007) further emphasized that professional development of university teachers should not be seen as induction or orientation of teachers but significant area of professional development is in the form of continuous teacher career development through enhancing their discipline knowledge and pedagogy in order to facilitate student learning. Hoban (2002) highlights reflection, collaboration and sharing as three key aims of teacher professional development. Similarly, Nicholls (2002) defines three main areas of professional development as a) professional knowledge base, b) competence in professional action, c) development of reflection. Major question which arises here is about the pathway or method through which this professional development could take place. However, there is no single approach which can guarantee effective staff development; different universities use various blends of approaches according to their resources and demands. Memon (2007) summarizes two types of approaches (listed below) which are being used for teacher professional development in universities.

(i) Initial Professional Development Approaches

- Orientation
- Induction
- Auditing
- Team Teaching

(ii) Continuing Professional Development Approaches

- Mentoring
- Appraisal by Self and Others
- Action Research
- Self Reflection/Evaluation

- Peer Coaching/Peer Reviews
- Clinical Supervision/Peer Consultancy
- Group Work/Team Learning
- Observing Good Practices
- Participation in Seminars/Conferences/Workshops
- Students Feedback
- On-line Distance Education
- Research and Scholarship Activities

Source: (Memon, 2007)

Skerritt (1992) forced that for teacher's continuous professional development, action research is most progressive way of teacher learning in universities. She defines action research as "research by higher education teachers themselves into their own teaching practice and into student learning". She further asserted that action research can benefit the teachers in their critical attitude, research in teaching, accountability and self evaluation. Miller and Pine (1990) supported the same point by emphasizing that action research is staff development process which enhances professional enquiry, improves education, increase awareness about learning environment and teacher development (cited in Skerritt, 1992). Nicholls (2001) calls attention to performance appraisals for professional development, he asserts that performance appraisal by students, head of department, peers or self, all plays important role for professional development. Because these appraisals are the ways of coming across weaknesses and strengths, by this data teacher evaluate his performance and reputation among his staff and students. Vonk (1995) highlighted mentoring as most long lasting relationship between senior and junior teacher for the guidance of junior teacher throughout his teaching profession. He further underscored that teachers during their first year of university, often find teaching as a hectic job, because 'they are confused by multitude of their experiences and not able to structure their experience'. At this time mentor can play important role in structuring their experiences, to facilitate them in teaching techniques, and to develop alternatives. Mentoring benefits teacher in high teacher morale, greater commitment and greater sense of empowerment, when teacher has a mentor to discuss problems and for guidance throughout the teaching career (Ashton, 1993; Fletcher, 2000). Similarly, peer coaching is supported by Smyth (1985) and Skerritt (1992), they stressed that it is collaborative process of collaborative discussion, observation and constructive feedback. Moses (1985) asserted on 'development at a distance' for teacher professional growth. He pointed up new service to staff, of loaning the books, articles, papers etc in the areas specified by them. This system of staff post fulfils the instant need of teachers of acquiring information and knowledge but is not sufficient for complete learning and generation of new knowledge as Skerritt (1992) asserted that learning by distance is not sufficient because "*generating the academics own theories, insights and understanding and facilitating their designing strategies which are appropriate for their particular purpose can be better achieved through on-campus discussions in seminars and workshops*". Gibbs (1981) supports the idea of mutual discussion in seminars and workshops. He put emphasis that workshops/seminars can be advantageous because through them everyone is actively and creatively involved in presenting the solutions, if the workshop leader or

coordinator is skilled in conducting workshops otherwise discussion can be chaotic and ineffective.

Whatever, the method or approach of professional development maybe adopted it should be supported by upper management. Because teachers will be ready to adopt change and improvement plans, only when, their efforts of making suggestions and improvements will be realized and appreciated by the upper management. Lucas (1989) accentuated that academic chairs are need to be trained in professional development of their faculty members because they are in better position of inducing ways of improvement of teaching in their subordinate teachers. The main purpose of teacher's professional development is to equip him with latest and updated teaching methods, improving his discipline knowledge, improving academic capacity through research and inquiry, enhancing intellectual and professional perspectives and all these aims of teacher development can be achieved by continuous professional education of teachers in order to provide students effective learning environment (Memon, 2007).

Methodology

The research is supported by survey strategy which was conducted to identify the issues of professional development for teachers in higher education of Pakistan. Five public sector universities were taken as study sample. In-depth interviews and questionnaires were used as key sources of collecting the primary data. The sampling method used in this research was Stratified sampling. Three strata were selected as Dean, chairman/HOD and faculty. The sample size determined by the researchers was 150 with 1.29 margins of error and 99% confidence level, belonging to all three strata explained above. In order to increase reliability of current research, in depth interviews have also been conducted from 65 teachers of the sample universities belonging to all three strata.

Findings and Discussion

Questionnaire results and respondents views from in depth interviews have shown that professional development of teachers is missing element in their performance management system. As 65% teachers have disagreed with the statement "My training needs are discussed in performance review meeting". Participants mentioned about communication problem with head regarding training or developmental needs. They insisted that teachers are just following traditional teaching style which they have observed at pre-service education stage and this has to be changed now because of changed nature of academic environment like semester system in universities. Major issue raised by the participants was teacher selection method in public universities. Respondents emphasized that teachers are recruited on their qualification and experience. There is no formal training about semester system before sending the teachers in classes, because of that their performance is affected, as there is no guidance in any form for semester system teaching. Research reveals that there is intense deficiency of specific programs and procedures for professional development of teachers regarding classroom teaching, modern teaching methodologies and class management in semester system.

Interview Results (with administrative staff) have shown that the main issue for absence of any comprehensive training is the budget constraint. Department Chairman and faculty deans emphasized that if department heads and deans want to conduct some in house training program they need specific budget for this, which is often seems to be a large problem in public sector universities. Secondly, department heads showed their concern about low motivation of teachers due to unattractive rewards. Teachers, because of their

socio-economic conditions are more inclined to serve their time, efforts or energies towards meeting their earning goals rather than on their professional development.

In addition to in house training efforts of universities, the Higher Education Commission of Pakistan has also established an institute named as National Academy of Higher Education which offers different training programs for university teachers in Pakistan. National Academy of Higher Education (NAHE) works under Higher Education Commission of Pakistan (HEC), whose purpose is to introduce new training programs for professional development of university teachers in Pakistan. NAHE offers training programs range from one day to three months. Focus of these courses is to 'make teachers reflective practitioners, and capable to integrate new research methodologies into instruction, and assuming new roles of instructional leadership, as it is necessary response to rapidly changing environment' (Awan, 2009). These programs are offered to all universities of Pakistan (private or public) in order to have vast learning and professional development of teachers from sector universities of Pakistan.

There is no doubt, that these faculty development programs by NAHE are playing vital role in professional development and teaching skill enhancement of higher education teachers in Pakistan. But some signs of dissatisfaction among participants of have been observed in the current research. Firstly, these programs are decided by NAHE focusing on complete training package for teachers. But according to most of the research respondents, there is no prior discussion on training needs of teachers. They insisted that program should be discussed with each university and should be made according to needs of teachers of each level (senior or junior). Secondly, those participants who have attended these programs mentioned that these faculty development programs are having highly rigid training format. They expressed that program consists of various modules, and time given to each module was not that much sufficient in order to obtain a deep insight. Thirdly, as these training programs are attended only by those who are nominated by their universities, by this process these training programs are only enhancing individual skills and learning but not promoting collective learning as department faculty. Among research sample respondents 73% teachers elaborated the importance of collective learning. They emphasized that there is immense need of collective understanding of whole faculty so that new norms could be flourished. Participants emphasized that they become nearly unable to apply new learning in their faculty/department because other teachers who do not have such training oppose to accept the change that has been learnt by only one or two teachers among huge faculty.

Another initiative of Higher Education Commission (HEC) of Pakistan is of flourishing the research culture in universities of Pakistan. Previously, research in terms of articles, research papers and journals, was missing element in universities of Pakistan. Considering the high standard of research in high ranked universities all over the world, Pakistani universities are now putting their best efforts in encouraging research culture among their teachers. In order to implement the philosophy, HEC has formulated the policy for public sector universities that every promotion within teaching sector of universities will highly be depended on research publications of the person who is applying for the higher post. Also, annual performance report for performance review of each teacher must be written on the basis of quality of research work done by the teacher. In addition to this, HEC is also offering full funding for national and international conferences participation to any university teacher and allocating budget for the national institutions who are publishing their own journals.

As compare to past scenario, where the teachers were recruited and promoted on the basis of higher qualification and experience, this research culture is like an organizational change especially in public sector universities of Pakistan. Teachers have welcomed this culture for

their professional and organizational development but our research in IUB shows that the major issue is of proper training and lack of research insights for the said change. Most of the (69%) participants expressed their desire to do high quality research work, but they mentioned that they have not been given proper training for this. They emphasized that support from senior colleagues and department heads regarding research skills development is highly unavailable.

Another, issue regarding research culture, raised by research sample participants is of busy teaching schedule in semester system. They stressed that there is stretched schedule in semester system consisting of regular classes, paper setting, paper marking, conducting presentations and checking assignments etc. Because of these extremely demanding activities of semester system, teachers do not have enough time to concentrate on their research work.

Almost all the interview participants (when asked about research or teaching emphasis in their university) mentioned that more emphasis in their university is on teaching not on research. They mentioned that this is because of problems of proper time management and lack of training or guidance for enhancing research skills. However, 78% of teachers agree that there is immense pressure from higher authorities to setup high quality research culture. Also, it is interesting to note here that some participants mentioned their concern about emphasis on research. According to them teaching should be improved first. They emphasized that teachers in Pakistani universities context have to enhance teaching skills first and then should concentrate on research side because it is primary need of students.

Conclusion and Recommendations

Undoubtedly, strategic vision of Higher Education Commission of Pakistan along with Public universities administration has contributed a lot for professional development of teachers. Still continuous monitoring and quality assurance system is highly lacking which creates dissatisfaction among teachers. Current study results have shown that teachers are overburdened with teaching extreme responsibilities without any comprehensive teaching training which equip them for further career progression. Public universities of Pakistan need to focus on in house training mechanisms particularly in the field of teaching and research improvement area of teachers. These in house training not only would develop effective communication among senior and junior teachers but would also serve the purpose of organizational learning where collective teaching methods would be implemented by the teachers. Same is the case in research skill of the teachers where teachers have enormous interest to contribute the society by conducting different problem solving researches but the find nothing but unavailable guidance. Public Universities of Pakistan need to focus on research skill transfer first and then could demand action researches from their teachers. All the findings lead to the demand of merit criteria during the time of recruitment and selection and a good mix of training programs in research and teaching so that teachers could give maximum output. There is immense need of knowledge management mechanisms among Public Universities and Public and Private Universities of Pakistan. Research analysis shows that teachers are willing to collaborate with national and international universities as they complained about lack of international and national collaboration among universities. This phenomenon would prove a major milestone in enhancing professional development of teachers as they would share diverse knowledge. Moreover, in depth interview content analysis shows that a major factor of de motivation towards professional development is unavailable reward system for better performance. Incentives could be attached with all the professional development programs so that employees feel motivated about taking an active part in developmental activities. In

addition to that, communication gap among senior and junior faculty members is proving to be a foremost barrier for effectual professional development of teachers. In this regard, universities need to foster mentoring culture where seniors should be encouraged to guide their juniors in research and teaching improvements so that collective progression and learning could take place in departments in particular and in universities as a whole.

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ASSESSMENT OF INTERNET – ASSISTED LEARNING RESOURCES (ILAR) IN TEACHING CHEMISTRY IN SENIOR SECONDARY SCHOOLS IN RIVERS STATE

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Abstract

Studies were conducted among secondary school students to assess the effectiveness of internet technology over the conventional method for data or resources generation in chemistry in Orashi zone of Rivers State. Two hundred and seventy (270) students were selected from eighteen (18) secondary schools in the study area, using random sampling techniques. Primary data were collected through questionnaire administration. Quantitative tool used for data analysis was Chi-square (χ^2) statistics. The findings from this study revealed that: the generation of chemistry resources using internet system is dependent on the level of awareness of the chemistry students: a greater chemistry resources using internet system is dependent on the level of accessibility of chemistry students to internet services. It is therefore recommended that: The Government should as a matter of policy in-cooperate ICT in secondary school education system, this will enhance computer literacy among teachers and students in Nigeria schools. Internet managed technology for teachers and students should be adequately integrated in the school curriculum for gathering chemistry resources in these highly technological ages.

Introduction

The computer application and internet technology in Education is a primary concern for educators all over the world (Olele, 2008). An Assessment of the efficacy of internet technology as a formidable information super-high-medium for resources generation in chemistry is an area that attracts greater concern in this area of information revolution (Williams and sawyer, 2001; Huges 1994). According to Ikpe (2005) the internet has created a cooperative society with current information and ideas that form a virtual community stretching from one end of the world to the other. It is imperative that a modern chemistry teachers/students must stay current in order to be relevant in this information age.

Over the years, conventional methods of gathering chemistry resources have presented a difficult terrain for updating information, in addition to scarcity of information (Iji, 2005, Betiku, 2003). However, online libraries with millions of volumes on any topic under the sun present an increasable source of information for chemistry researchers (Ije, 2006, Huges, 1994). The use of a personal computer and modern telephone line quipped with some of the local carriers or internet service providers (INFOWEB, LINK SERVE and THEOBECH) offer an online medium for downloading materials by the subscribers (Ikpe, 2005). Although, some aspects of skills are required for internet users. Its low cost implications and time efficiency involved cyber café a valuable source for updating knowledge in a broad field sciences. It is on this note that this study is conducted to assess the efficacy of internet system as a reliable sources of chemistry resources for students.

Statement of the Problem

Technology has gradually revolutionized the global setting with tremendous positive impacts on modern educational system (Ikpe, 2005). A modern education system must be equipped with the relevant technology such as internet service to facilitate information generation. Chemistry as a discipline with wide array of subsidiary fields requires a digital-based-approach such as internet services for gathering updated resources. However, some set-backs such as low level of awareness, poor internet services, non-accessibility to internet services, computer illiteracy among others militates against the smooth functioning of this scheme.

Purpose of the Study

The purpose of this study is to:

- i) evaluate the level of awareness of chemistry students in the use of Internet to gather resources in the subject area;
- ii) determine the total output in chemistry resources generated from internet system as compared to conventional library system;
- iii) determine the accessibility of chemistry students to internet services for collection of chemistry resources.

Research Hypotheses

The following hypotheses formulated were tested at 0.05 significance level.

- i) There is no significant difference between the level of awareness among chemistry students on internet resources and collection of chemistry information;
- ii) There is no significant difference between chemistry students outputs generated from conventional library system and chemistry students outputs generated from internet system;
- iii) There is no significant difference between the level of accessibility among chemistry students to internet resources and collection of chemistry information;

Significance of the Study

The results generated from this study will be useful in:

- i) creating awareness on the remarkable chemistry resources accruing from the use of internet system.
- ii) Mobilizing the government and cooperate bodies to equip the school system with internet services as well as organizing computer training in schools.
- iii) Providing based-line information on the benefits of internet system as a source of relevant resources in chemistry.

Research Methodology

Research Design

Survey research design was adopted for the study. Since information was collected from respondents.

Population of Study

The entire senior secondary two (ss2) chemistry students in Orashi region of Rivers State constituted the population of the study.

Sample and Sampling Techniques

Simple random sampling techniques were used to select two hundred and seventy (270) students from twenty (20) public senior secondary schools in the study area.

Instrument used for Data Collection

The instrument used for data collection was a questionnaire. Titled, assessment of internet-assisted learning and resources for teaching (AIALR).

Validity of the Instrument

The questionnaire was faced-and-content validated by experts from Chemistry Education Department FCE(I) Omoku, Nigeria. Useful corrections and recommendations were incorporated into the work as suggested.

Reliability of the Instrument

The reliability of the instrument was determined by test –retest technique. The reliability coefficient is 0.75, which is considered good.

Procedure for Treatment

The questionnaire were administered using students in their respective schools by the researchers. Time was taken to explain the method of response to the students. The questionnaire was partitioned into two parts: section A comprised of personal data of the respondents, while section B composed of twenty four (24) questions covering the purpose of the study. The scoring formats were categorized as follows:

- Students response that falls under upper class: 4(more than 4)
- Students response that falls under middle class: 2(3 – 4)
- Students response that falls under lower class: 1(1-2)

Data analysis was achieved through the use of T – test using the SPSS package.

Results of the Findings

Research Hypothesis 1: there is no significant difference between the level of awareness among chemistry students on internet resources and collection of chemistry information.

Independent Sample T – test

Awareness	N	X	Sd	Df	T	Sig level		Result
Low	45	12.13	1.74	88	-30.71	0.0	00	Rejected
High	45	34.80	4.63					

PZ 0.005

There is a significant difference

The analysis in table 1 indicates that the t – value = -30.71 is significant at 0.000. Mean value of low – level of awareness as 12.13 and high level of awareness is 34.80 with SD of 1.74 and 4.63. The null hypothesis (Ho) of no significant difference between the level of awareness among chemistry students on internet resources and collection of chemistry information is rejected. This result implies that the generation of chemistry resources using internet system is dependent on the level of awareness of the chemistry students.

Research Hypothesis 2: there is no significant difference between chemistry students outputs generated from conventional library system and chemistry students outputs generated from internet system.

Hypothesis 2:

Table 2

System	N	X	Sd	Sd	T	Sig	Result
Library	37	11.51	0.90				
Internet	57	34.74	5.16	88	-27.07	0.000	Rejected

$P < 0.05$

Null hypothesis is reject and the alternate accepted i.e there is a significant difference between.....

The analysis in table 2 indicates that t – value is -27.07 significant at 0.000 mean value of library and internet system output of 11.5 and 34.74 and SD 0.90 and 5.16 and Df =88

The null hypothesis (Ho) of no significant difference between chemistry student output generated from conventional library system and chemistry student’s outputs generated from system is rejected. This result implies that a greater chemistry outputs is generated from the use of internet system.

Research Hypothesis 3: there is no significant difference between the level of accessibility among chemistry students to internet resources and collection of chemistry information.

Hypothesis 3:

Accessibility level	N	X	Sd	Sd	T	Sig	Result
Low	42	11.93	3.44				N5
High	48	35.71	5.50	88	-24.18	0.000	Rejected

The analysis of table 3 indicates that the t-value of -24.18 is significant at 0.000, and the mean value of 11.93 and 35.71 obtained with SD of 3.44 and 5.50 Df is 88.

The null hypothesis (Ho) of no significant difference between the level of accessibility among chemistry students to internet resources and collection of chemistry information is rejected. This result implies that the generation of chemistry resources using internet system is dependent on the level of accessibility of chemistry students to internet services.

Discussion of Findings

The findings which stated that generation of chemistry resources internet system is dependent on the level of awareness among the chemistry students shows that there exists disparities in the level of awareness among Biology students to internet-assisted chemistry resources. This difference may be attributed to disparities in the level of technological advancement among the schools involved as reported by Ikpe (2005). This implies that the proliferation of microcomputers and other advanced technologies in schools and other areas has contributed significantly to increased level of awareness among some students (Ikpe, 2005; Rees, 2002). While, some areas are yet to be fully integrated to the light of this knowledge explosion as reported by Anderson, (1983) and Kochmen (1995).

The findings that there is significant difference in chemistry students outputs between conventional library system and internet system shows that internet system offers better opportunity for greater richness and topicality of contents, as well as present learner with sophisticated and up-to-date minutes information with examples as stated by Iji, (2002) and Udofia, (2006). Thus, it is possible for the generation of new prospects for understanding complex connection in the subject area (Iji, 2006).

The finding which also stated that the generation of chemistry resources using internet system is dependent on the level of accessibility of chemistry students to internet services, shows that internet system has tremendous potential to enhance accessibility to information quicker, cheaper and easier (Ikpe, 2005, Huges, 1994). This further proves that technology based method of gathering information, is undoubtedly the most effective means of rapidly distributing knowledge and information to the educationally poor and starved communities as reported by Iji (2003).

Conclusion

This study reveals that the generation of chemistry resources using internet system is dependent on the level of awareness of the chemistry students; a greater chemistry output is generated from the use of internet system, the generation of chemistry resources using internet system is dependent on the level of accessibility of chemistry students to internet services.

Recommendations

It is necessary to make the following recommendations based on the findings of the study. The Federal Government should as a matter of policy incorporate information and communication technology (ICT) in the secondary school education system, this will enhanced computer literacy among teachers and students in our schools; computer training for students and teachers should be intensified as well as implementation of computer-based approach as an effective tool for teaching/learning chemistry in schools, particularly in this information and communication technology driven age.

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**RELATIONSHIP BETWEEN SELF-CONCEPT AND MATHEMATICS
ACHIEVEMENT OF SENIOR SECONDARY STUDENTS
IN PORT HARCOURT**

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ABSTRACT

This study explored the extent to which the self-concept of students in Port Harcourt relates to their Mathematics, and General Academic Achievement. The population consisted of 6,478 senior secondary 3 (SS3) students from 13 state financed senior secondary schools in Port Harcourt. Stratified random sampling was conducted to select 3 schools (one school each from 2 mixed schools, 5 boys' schools and 6 girls' schools). The sample for study was 300 SS3 students from the 3 randomly selected schools. The instrument used for data collection was the Self-Description Questionnaire 111 (SDQ 111) developed by Marsh (1992) which contains 13 self-concept facets out of which 2 facets (Mathematics, and General Academic) were adopted for this study. The subjects were tested in Mathematics and scores obtained. The general average scores of the students on their promotion examination from SS2 to SS3 were extracted from their school records. The Person's Product Moment Correlation analysis was used to answer the research questions, while the transformed t-test was used to test all the 3 hypotheses formulated for this study. The results of the tests indicated that Mathematics Self-concept is significantly related to Mathematics Achievement, General Academic Achievement and General Academic Self-concept. The main implication of the findings of this study is that self-concept and Mathematics, and General Academic achievement of students are so strongly related that a change in self-concept facilitates a change in achievement. It was therefore, recommended that educational programme designers and developers, teachers, parents and students should make self-concept development of students an educational aim as important as academic achievement.

Keywords: Self-concept, Mathematics Achievement, General Academic Achievement.

INTRODUCTION

Students' performance in Secondary School Certificate Examinations (SSCE) administered by the West African Examination Council (WAEC), and the National Examination Council (NECO), continued to deteriorate from year to year, particularly in the areas of Science and Mathematics (Akubuiro and Joshua, 2004). For Nigeria, a developing country that needs Science and Technology for its development, the poor performance of students in Science and Mathematics and worse still, the very insignificant proportion of students who choose Mathematics as a course of study after secondary education have turned the concern of the government and people of Nigeria into anxiety. This situation does not favour Nigerian's move towards developing a science and technology culture.

However, this problem is not peculiar to Nigeria. Even the developed nations have similar worry and concern. A Gallup Survey commissioned by Bayer Corporation (2003) found nine in every ten Americans concerned about the lack of Mathematics skills of today's students to cope with a changing world that is progressively more difficult to understand, analyze, or explain. Futurists predict continual change emerging from the effects of increasing world population, advancing technologies, environmental degradation, migration and immigration, and challenges to world security (Marsh and Yeung, 1996). In coping with these emerging challenges, students have a competitive advantage when they are able to draw upon meaningful scientific knowledge and functional mathematical skills. According to Cech (2003), a progressively complex world calls for increasingly skilled people who understand Science and Mathematics.

The unresolved riddles therefore are: Why the poor performance of students in Mathematics despite the lofty uses to which Mathematics has been put (Euclid in Principles of Geometry, Einstein in Quantum and Relativity Theories, Newton in Laws of Gravitation and Motion, etc) and is yet to be put? What can be done to check the deteriorating performance of students in Mathematics, and make way for the acquisition of the requisite Mathematical skills for the understanding of today's complex world and the demands of tomorrow?

Some investigations revealed that the questions above, and even many more others, owe their answers to the complexity of self-beliefs (e.g. self-concept) that act on the students (Purkey & Schmidt, 1987; Chapman & Turner, 1997; Yeung & Lee, 1999). The above researches have shown close relationship between self-concept and academic achievement.

Statement of the Problem

The Nigeria nation and other nations of the world have shown tremendous concern about the poor performance of students in Science and Mathematics (Akubiro & Joshua, 2004; Bayer Corporation, 2003). This poor performance of students in Mathematics in Nigeria – a country that needs Mathematics for its development – deserves the total attention of educational planners, teachers and researchers in Nigeria for a possible turnaround of the poor performance of students in Science and Mathematics.

According to Marsh (1986), self-concept has been shown to be a very important educational achievement indicator as well as a desirable mediating variable leading to other positive outcomes, such that educational policy statements throughout the world list self-concept enhancement as a central goal of education. Whether or not educational policies in Nigeria list self-concept as a central goal of education is a topic for another study.

Suffice it to say that in Nigeria, few researches have been carried out which confirm the significant relationship between self-concept and Mathematics Achievement (Bassey, 2002; Jamabo, 1996; Osang, 1990). A lot more studies need to be done to replicate the above findings in Rivers State and other parts of Nigeria to answer the question: "Why poor students' performance in Mathematics", and possibly suggest ways to check the negative trend.

Purpose of the Study

The purpose of this study is to determine whether or not (and to what extent) significant relationships exist between Students' Mathematics Self-concept and Students'

Mathematics Achievement, Students' General Academic Achievements and Students' General Academic Self-concept. The following research questions directed the study:

1. To what extent does students' Mathematics self-concept relate to students' Mathematics Achievement?
2. What is the extent to which students' Mathematics Self-concept relate to students' General Academic Achievement?
3. To what extent does the Mathematics Self-concept of students relate to students' General Academic Self-concept?

Statement of Hypotheses

The study was guided by the following three null hypotheses:

1. There is no significant relationship between Students' Mathematics Self-concept and Students' Mathematics Achievement.
2. There is no significant relationship between Students' Mathematics Self-concept and Students' General Academic Achievement.
3. There is no significant relationship between Students' Mathematics Self-concept and Students' General Academic Self-concept.

Significance of the Study

Based on the results of this study, the poor performance of Nigerian students in Science and Mathematics could be hinged, totally or in part, on low Mathematics Self-concept. Thus educators, curriculum developers, teachers and parents would see the need to list self-concept enhancement as a central goal of education in Nigeria.

Review of Related Literature

The overriding theoretical orientation of this study is grounded in the perceptual psychology tradition. Perceptual psychologists postulate that all persons create their own reality through their perceptions of what they believe to be real. And that a person's behaviour is contingent on how an individual perceives and interprets his/her experiences (Combs and Gonzales, 1994). Thus from the perspective of the perceptual psychology, it is clear that to understand an individual's behaviour, we need to know how that individual perceives and interprets his/her experiences. In other words, to appreciate students' academic performance, we need to understand how students perceive and interpret school and school subjects.

The most influential and eloquent voice in self-concept theory was that of Carl Rogers who introduced an entire system built around the importance of the self (Hattie, 1992). In Rogers' view, the self is the central ingredient in human personality and personal adjustment. Rogers described the self as a social product, developing out of interpersonal relationships and striving for consistency. He maintained that there is a basic human need for positive regard both from others and from oneself. He also believed that in every person there is a tendency towards self-actualization and development so long as this is permitted and encouraged by an inviting environment.

Self generally means the conscious reflection of one's own being or identity, as an object separate from others or from the environment. There are a variety of ways to think about the self. Two of the most widely used terms are self-concept and self-esteem. Self-concept is the cognitive or thinking aspect of self (related to one's self-image) and generally means the totality of a complex, organized, and dynamic system of learned beliefs, attitudes and opinions that each person holds to be true about his or her personal

existence (Purkey & Schmidt, 1987). Self-concept can also mean the general idea we have of ourselves.

The idea of self-concept includes attitudes, feelings and knowledge about ability, skills, and social acceptance capability of the self. Self-concept covers all aspects of our cognitive, perceptual, and affective evaluation. Therefore, self-concept is simply a collection of personal attitudes towards oneself (Gross, 1992).

Psychologists have paid a lot of attention to factors related to the formation and development of self-concept. This issue is very important to the field of mental health, as an individual's conception of his or her person, which is linked to the personality, to a certain extent determines the attitude of that person to his or her environment, and to a larger extent the person's academic performance. It may then be suggested that if self-concept is positive and normal, the individual will possess normal mental health. Adversely, if self-concept is negative and abnormal, the individual may behave abnormally in his or her environment. The implication is that good mental health (resulting from positive self-concept) makes for positive academic achievement.

The consensus appears to be that self-concept is largely acquired. This point is very pertinent for students and for those who are involved in their upbringing, particularly their parents and teachers. Other factors affecting self-concept are the behaviour of others around the individuals, and social stimulation.

Marsh (1992) showed that the relationship of self-concept to school achievement was very specific. According to Marsh, general self-concept and non-academic aspects of self-concept are not related to academic work, but general academic achievement measures were found to relate positively to general academic self-concepts and are highly related to success in that content area.

Many students are not confident about their mathematical ability to solve problems. A poor attitude towards the discipline is thought to plague learners at every level of schooling. The fear of both answering mathematical questions in class and/or taking mathematical tests has been studied by Marsh, and Hocever (1985) and Stodolsky (1985), and both studies found consistent results that fears of Mathematics often escalate to a level termed mathematics anxiety with the effect of poor achievement in Mathematics. They concluded that individuals with poor attitudes towards mathematics are often reported to have a low self-concept and feelings of incompetence. These attitudes are manifested as self-deprecating remarks and a perpetual lack of success in Mathematics.

According to Wong (1992), mathematics achievement is closely related to self-concept and attitude towards mathematics. As in the case of the general self-esteem, more mathematically confident students have significantly higher scores on a standardized measure of mathematics computations. Osang (1990), in his study, tested the relationship between students' performance in mathematics and self-concept. He found that students' performance in mathematics depended on their mathematics self-concept. That is, their achievement in mathematics depended on what they thought of or believed about themselves, with reference to mathematics as a subject.

In a study conducted by Byrne (1984), he found that relationship between students' self-concept in Mathematics and their Mathematics Achievement is logically and inevitably connected. Byrne reported that achievement in Mathematics is highly related

to what an individual thinks of Mathematics. That is, ones Mathematics self-concept will influence ones achievement in Mathematics. Also students' self-perceptions of mathematics ability influence their mathematics achievement, and that their attitude towards mathematics during high school has positive effects on their choosing careers in science and mathematics.

METHODOLOGY

The study adopted the Correlational Research Design. The population of the study consisted of 6,478 SS3 students of the 13 state government financed post primary schools in Port Harcourt. Only the state schools were chosen (as against unity schools and private schools) to make for homogeneity: that is, to ensure the use of subjects that have similar characteristics.

The sample for this study consisted of three hundred (300) SS3 students that were chosen from 3 randomly selected schools from 13 senior secondary schools in Port Harcourt. The study employed the stratified random sampling technique, each school type (single boys, single girls and mixed schools) was considered a stratum and a senior secondary school selected at random.

All the research questions were answered using the Pearson's Product Moment Correlation Statistic, with Mathematics Self-concept as independent variable and Mathematics Achievement, General Academic Achievement and General Academic Self-concept as dependent variables. To test the null hypotheses formulated for this study, the computed Person's Product Moment Correlation Coefficients (r) were transformed to t-test using the formula,

$$t = r^2 \cdot [(n - 2)/(1 - r)]^{1/2}.$$

RESULTS

In the tables that follow, SMS = Students' Mathematics Self-concept, SMA = Students' Mathematics Achievement, GAS = General Academic Self-concept, and GAA = General Academic Achievement.

Hypothesis One: There is no significant relationship between students' Mathematics Self-concept and students' Mathematics Achievement.

Table 1: Transformed t-test on the Relationship between Students' Mathematics Self-concept and Students' Mathematics Achievement

Variables	N	Mean	SD	df	p	Cal (r)	Crit. (r)	Cal. t-test trans.	Crit. t-test trans
SMS (x)	300	31.21	10.65	298	0.05	0.767	0.139	20.55	1.960
SMA (y)		27.13	13.81						

The result in the above table indicates that there is a significant positive relationship between Mathematics Self-concept of students and students' Mathematics Achievement [calculated $t = 20.55 > \text{critical } t = 1.960$ at $p < 0.05$; $df = 298$]. This significant positive relationship implies that students with high Mathematics Self-concept will generally achieve higher in Mathematics than those with low Mathematics Self-concept.

Hypothesis Two: There is no significant relationship between students' Mathematics Self-concept and students' General Academic Achievement.

Table 2: Transformed t-test on the Relationship between Students' Mathematics Self-concept and Students' General Academic Achievement

Variables	N	Mean	SD	df	p	Cal (r)	Crit. (r)	Cal. t-test trans.	Crit. t-test trans.
SMS (x)	300	31.21	10.65	298	0.05	0.131	0.139	2.281	1.960
GAA (z)		49.63	14.46						

The data in Table 2 show that the calculated t, though low, is significant at the 5% confidence level [calculated $t = 2.281 > \text{critical } t = 1.960$ at $p < 0.05$; $df = 298$]. This implies that students with high Mathematics Self-concept can achieve highly in general school work.

Hypothesis Three: There is no significant relationship between students, Mathematics Self-concept and students' General Academic Self-concept.

Table 3: Transformed t-test on the Relationship between Students' Mathematics Self-concept and Students' General Academic Self-concept

Variables	N	Mean	SD	df	p	Cal (r)	Crit. (r)	Cal. t-test trans.	Crit. t-test trans.
SMS (x)	300	31.21	10.65	298	0.05	0.147	0.139	2.565	1.960
GAS (m)		37.89	7.23						

This result shows a significant positive relationship between Students' Mathematics Self-concept and Students' General Academic Self-concept at the 5% confidence level [calculated $t = 2.565 > \text{critical } t = 1.960$ at $p < 0.05$; $df = 298$]. The interpretation is that students with high Mathematics Self-concept have the tendency of viewing school and academics positively.

CONCLUSION

This study investigated the extent to which students' mathematics self-concept relates to students' mathematics achievement, general academic achievement and general academic self-concept. Significant positive relationships were found in all the three cases at the 0.05 level of significance. These results are supported by Marsh (1990) and Morriss and Smith (1978). This study further found that the strength of relationship between Mathematics Self-concept and Mathematics Achievement decreased as Mathematics Self-concept was compared with General Academic Achievement and General Academic Self-concept. It is clear that self-concept becomes more empirically sensitive to, and more predictive of, achievement outcomes the more specific that it is conceived and assessed.

According to Bandura (1997), self-concept beliefs influence the choices people make and the courses of action they pursue. Individuals tend to engage in tasks about which they feel competent and confident and avoid those which they do not. Self-concept also helps determine how much effort people will expend on an activity, how long they will persevere when confronting obstacles, and how resilient they will be in the face of adverse situations. The higher the self-concept, the greater the effort, persistence, and resilience an individual puts on tasks. As a consequence, self-concept exercises a powerful influence on the level of accomplishment that individuals ultimately realize. Conversely, people who doubt their capabilities may believe that things are tougher than they really are: a belief that fosters stress, depression, and a narrow vision of how best to

solve a problem. In other words, many students have difficulty in school not because they are incapable of performing successfully but because they have learned to see themselves as incapable of handling academic work. This study has shown that the more positive the self-concept of students, the higher their motivation, commitment and success in academics and other endeavours.

Thus, given the significance of self-concept in academic achievement of students, the enhancement of self-concept outcomes should be of major concern to educators, program developers, teachers, parents and counselors.

Recommendations

The self-concept beliefs of teachers are themselves related to their instructional practices and to the achievement and psychological well-being of their students. Efficacious teachers create classroom climates in which academic rigor and intellectual challenge are accompanied by the emotional support and encouragement necessary to meet the attendant challenge and achieve academic excellence (Tschannem-Moran and Woolfolk Hoy, 1998). All teachers should, therefore, do well to take seriously the responsibility of nurturing the self-concept of their students, for it is clear that these self-beliefs can have beneficial or destructive influences.

Teachers should pay as much attention to students' perception of competence as to actual competence, for it is the perception that may more accurately predict student's motivation and future academic choices. Assessing students' self-concepts can provide schools with important insights about their students' academic motivation, behaviours, and future choices. For example, unrealistically low self-concept leads to poor academic behaviours, avoidance of challenging courses and careers, and diminishing school interest and achievement.

The ultimate aim of education should be to produce competent, caring, loving, and lovable people. One needs only cast glance at the American landscape to see that attending to the personal, social, and psychological concerns of students is both a noble and necessary enterprise. Teachers can aid their students by helping them to develop the habit of excellence in scholarship, while at the same time nurturing their self-beliefs necessary to maintain that excellence throughout their adult lives.

Parents should develop positive self-concept in their children, at the early stages of their lives. This could be best done at home which is the most important social force in shaping and maintaining the child's self-concept. The home environment is the strongest agent in shaping the child's self-concept, so the earlier he is exposed to positive self-concept formation the better. Positive attitudes of the parents towards their children will boost their ego, strengthen their feeling of self-worth and act as another form of motivation to work harder. Empathy should be applied in this kind of relationship and no sign of conflict of interest should be experienced in their child's choice of subjects and career.

Counseling services should be provided in schools so that students having problems in academic subjects can be attended to through the combined efforts of the school and the home. Students, because of their sexes, should not be discouraged directly or indirectly from learning certain subjects when they are young. In other words, students should be discouraged from forming stereotyped attitudes towards certain subjects, because of their

sexes. This will boost positive competition between males and females, and enhance academic achievement and excellence.

The influence of students' self-beliefs on their achievement does not end with their schooling. Consequently, the aim of education must transcend the development of academic competence. Schools have the added responsibility of preparing self-assured and fully-functioning individuals capable of pursuing their hopes and their ambitions.

Self-concept theory is a relatively new area in the Nigerian educational scene. Thus, more researches on this field should be conducted to delve more into the self-concept patterns and how they affect vocational choices, physical appearance, problem-solving abilities and the up bringing of children by parents. These studies should be done to test the various facets of self-concept in different populations. Perhaps, it will then be hoped that educational policy statements in Nigeria would list and emphasize positive self-concept development as a central goal of education.

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EVALUATION OF FOREST RESOURCES CONSERVATION LAWS IN NIGERIA

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Abstract

This paper sets out to explore the effectiveness of forest conservation laws in Nigeria. This paper is based on a review of various government laws aimed at conserving the Nigerian forest and wildlife resources. Apart from review of literatures, visits were made to the Department of Forestry in Bayelsa State and six Local government Areas in the State to conduct semi-structured interview aimed at appraising the effectiveness of the various laws in the State. Interviews were also conducted with community members in ten randomly selected communities that are located around forest reservation areas as well as traders on forest products.

Introduction

The forest has served as a source of livelihood to people in Nigeria for many generations (Ezenwaka & Abere 2009). It is a source of income, employment, food, medicine, recreation and vital raw materials for many purposes including construction. However, many factors are threatening the sustainability of this source of people's survival (Ezenwaka 2008). Scientific approaches of conservation and or preservation has been proposed (e.g. government setting aside reservation areas through laws) but these are not yielding the anticipated results (of conserving the bio-diversity) as illegal and unsustainable hunting and harvesting of the forest resources are still observed (LENF 1998).

Methodology

This paper is based on a review of various government laws aimed at conserving the Nigerian forest and wildlife resources. Apart from review of literatures, visits were made to the Department of Forestry in Bayelsa State and six Local government Areas in the State to conduct semi-structured interview aimed at appraising the effectiveness of the various laws in the State. Interviews were also conducted with community members in ten randomly selected communities that are located around forest reservation areas as well as traders on forest products.

Bayelsa State was chosen because of its abundance in forest and wildlife resources and its location in the central Niger Delta (the Niger Delta still boasts of some pristine forest areas due to the difficult swampy terrain which is hindering loggers from freely accessing the forest resources). Bayelsa State is also known to have some endemic wildlife resources (Powell 1995).

Results and Discussion

Efforts aimed at conserving natural resources in Bayelsa State

In order to conserve bio-resources, the government has made efforts at designating certain areas as protected forests. There are six (6) gazetted forest reserves in Bayelsa State. These include:

- i. Taylor Creek Forest reserve (218.91km²)
- ii. Edumanon Forest reserve (86.76km²)
- iii. Nun River Forest reserve (97.15km²)

- iv. Apoi Creek Forest reserve (64.77km²)
- v. Igbedi Creek Forest reserve (66.32km²)
- vi. Ikibiri Creek Forest reserve (191.71km²)

According to Amoru (2000), these various government efforts are threatened by illegal human activities in the reservation areas. In many cases, the decision to create these reservation areas has been influenced by the need to preserve / conserve certain habitats or resources. Field observations and interviews reveal that not much success is achieved especially because illegal harvesting of the resources is still rampant. This happens because the local people are not involved in the decision making process that brought about the establishment of such reservation areas (LENF 1998).

An outcome of a participatory natural resources appraisal conducted in many communities of the Niger Delta by LENS (1998) revealed that natives are aware of the declining rate of their natural resource base but (at the same time) 'will not want government to take away' their forest (their source of livelihood) from them. The result of the field visit and interviews confirms the position of LENS. The people confirmed the continued scarcity of hitherto abundant forest and wildlife resources.

Existing Laws and Legislations on Natural Resources Conservation

(a) Federal Laws

Some of the federal laws that are relevant to natural resources conservation include;

- i. *The Natural Resources Conservation Act 1989*: The Natural Resources Conservation Act is the most direct existing piece of legislation on natural resources conservation. The Act establishes the Natural Resources Conservation Council, which is empowered to address soil, water, forestry, fisheries and wildlife conservation by formulating and implementing policies, programmes and projects on conservation of the country's natural resources.
- ii. *Federal Environmental Protection Agency Act (Chapter 131, Laws of the Federation, 1990)*: The Federal Environmental Protection Act was promulgated to protect the country's environment from degradation. It establishes the Federal Environmental Protection Agency (FEPA) which promotes natural resources conservation in the country through stringent environmental policy guidelines on effluent limitation, water quality and uses, management of soil and hazardous waters, as well as prevention of pollution of the air, land and the waters of Nigeria. It should, however be noted that the functions of FEPA have been subsumed by the newly established Federal Ministry of Environment.
- iii. *The Environmental Impact Assessment Act (no 86 of 1992)*: This Act requires that environmental impact assessment must first be carried out before any project likely to impact the natural environment could be undertaken. Its purpose is to protect all lands in the country from environmental effects of industrial and developmental activities.
- iv. *Endangered Species (Control of International Trade and Traffic) Act 11 of 1985*: This Act makes provision for conservation and management of the country's wildlife and protection of some of the country's rare and endangered species. The Act expressly prohibits the hunting, capture of, or trading in

any of the 91 animal species classified as endangered wildlife and listed in schedules 1 and 2 of the Act.

- v. *The National Parks Decree (Decree No 36 of 1991)*: The Act was promulgated to provide a protective sanctuary for wildlife species as well as to promote and preserve the beauty and conservation of the country's natural vegetation. Six national parks were accordingly established under the Act. It restricts hunting, fishing and destruction of trees, setting of fires in and around established parks. This has been subsumed in the National Parks Act of 1999 which created two additional national parks.

(b) Laws and Legislations in the States

The States also have some laws, which complement the federal laws on the conservation of natural resources in the respective States.

(c) Traditional / Customary Conservation Practices

The local people have very strong ties with their lands (Ezenwaka & Abere 2010). They have extensive knowledge of their lands and natural resources and have developed ancient habits, practices, and rules, which were used to directly or indirectly regulate exploitation, and thus, ensure conservation of natural resources by both indigenes and strangers. The dedication of certain resources to deities insulated them from human exploitation. Other ancient conservation practices included the restriction of exploitation of forest resources to specific days of the week or seasons of the year; the adoption of agricultural practices like shifting cultivation; the adoption and strict enforcement of customary rules concerning land rights and exploitation of natural resources; and the adoption of licensing regime (payment of a stipulated amount) for stranger elements who wished to engage in the exploitation of natural resources in communities other than theirs (ND-HERO 2006).

Effectiveness of the government policies

The study reveals that government policies on natural resources conservation has failed to produce the desired result. Amoru (2000) suggested that this could be because most of these policies had vestiges of colonial interests and did not address the conservation requirements of the local people. Further, these policies were designed and imposed from the top without any regard to the importance in sustaining the livelihoods of people and the danger of coercively preventing them from having access to their own resources located within their neighbourhood (Ezenwaka & Abere 2010). Poaching and illegal timber harvesting is still rampant within and around forest reserves. Traders still have their supplies of timber and wildlife resources from the communities. The community people believe that the much that they are able to harvest will translate to more money for them. The danger which this belief is posing is that the sustainability of the resource base is being threatened on a daily basis because the harvesting rate is greater than the rate of natural reproduction of the resource base.

Effectiveness of Traditional conservation methods

While the idea of conservation areas has been kicked against in the rural communities, these same communities have been able to sustain the conservation of forest resources in traditionally preserved areas i.e. sanctuaries. These sanctuaries are referred to as 'evil forest' or 'sacred forests' in many Nigerian communities (Amoru 2000, LENF 1998). The native laws have been successful in preserving these 'evil forests' (LENF 1998). The study reveals

that people respect the traditional laws and obeys any traditional rule which governs the harvesting of any forest and wildlife resources.

Conservationists all over the world have recognized the effectiveness and efficacy of such ancient conservation rules and practices (ND-HERO 2006). The Convention on Biodiversity to which Nigeria is a party underscores the need for nations to respect, preserve, maintain and promote the wider use of the knowledge, innovations and practices of local communities and as far as possible encourage traditional and cultural practices that are compatible with conservation and sustainable use of resources.

People Participation in managing the natural resources:

It is evident that conservation of natural resources will be achieved when all stakeholders participate in joint management of site. The participation of stakeholders can be achieved by the following steps:

- i. Identification of who the stakeholders are in the management of the natural resources
- ii. Identification of roles for stakeholders
- iii. Development of a framework which shows how stakeholders should participate in ensuring sustainable management of natural resources.

The three steps above can be achieved simply by conducting a stakeholder analysis / mapping.

Role of Local Government Councils on Natural Resources Management

The relevance of Local Government Councils lies mostly in their closeness to the local people. Local Government Councils are conveniently positioned to play significant role in the management of natural resources. Constitutionally, Local Government Councils are required to participate with the State Governments in the development of agriculture and natural resources, with the exception of minerals (Axel Stremplat, Ezenwaka Jasper, et al 2004). Though the aforesaid constitutional provision gives the Local Government Councils some authority to make appropriate policy decisions and byelaws regarding the exploitation and sustainable use of natural resources located within their domain, it is obvious that they cannot make any meaningful contributions because of the several limitations placed on their finances, status, powers and scope.

Land Tenure and Natural Resources Ownership

- i. *Indigenous land tenure system:* Before the promulgation of the Land Use Decree in 1978, the land tenure system in Nigeria was communal (ND-HERO 2006). Under the communal system, land and its resources were communally owned and therefore, held in exclusive community or family holdings. Where a community owns the land, title to such land belongs to the entire members of the community. Individual members of the community do not have separate or exclusive personal rights in community land. Every member of the community has equal right of access to the community's land for his purpose. The administration of community land is vested in the traditional rulers of the community as trustees and they are required to manage such community land beneficially on behalf of the entire community. As trustees, they cannot make or enter into any transactions with any portion of community land and resources without the consent of other paramount chiefs and or elders representing the constituent families of the community (ND-HERO 2006). The

requirement of consent (approval to exploit) is to protect and safeguard the interest of the community against any dealings in community land that may be against the economic, social and spiritual well being of the entire community and her resources.

Under the indigenous tenure system, land, could also be owned by the family (Ezenwaka & Abere 2010). Where a family owns land, the absolute title to the land is vested in the family as a corporate entity and not in any single individual member of the family no matter his position or status in the family. However every member of the family has a right to be allotted a portion of family land for building and other lawful purposes. The control and management of family land is vested in the family head. The family head is required to manage such family land in consultation with other principal members of family.

Basically, under the indigenous land tenure system, the local people had well defined ownership rights to land and natural resources and the administration of such lands and resources was institutionally well streamlined and structured. Legal and administrative duties and obligations relating to the protection and sustainable use of resources were integrated into the cultural and traditional lifestyles of the people (Axel Strempllat, Ezenwaka Jasper, et al 2004). The administrative process was collective and consultative. Every member of a land owning community or family believed in the fundamental relevance of the land and its resources to their individual and collective livelihood and accordingly took appropriate measures at all times to prevent or protect family land and resources from unlawful interference, encroachment, exploitation and degradation.

- ii. *The Land Use Decree, 1978 (reviewed in 1998)*: The Land Use Decree, promulgated in 1978, radically changed and undermined the indigenous land tenure system (ND-HERO 2006). It not only vested authority over all lands within the territory of each state on the Governor of the State, but also gave the State Governor and Local Government Councils ultimate power of control and management of all lands located in urban and non-urban areas respectively. It further tied the peoples' land ownership rights to a mere right of occupancy, which they can alienate or transfer, only with the consent of the Governor. Though at the federal government level, the Land Use Decree is seen as capable of enhancing land resources conservation by controlling and preventing the wasteful and destructive use of land and land-based resources, it has failed to receive willing acceptance from the indigenous people who regard it as an obnoxious piece of legislation that has unjustly deprived them of their traditional and legitimate ownership, control and unhindered access rights to their natural heritage (lands) and its associated renewable natural resources (ND-HERO 2006). A review of the Land Use Decree to address the issue of ownership, control and access to natural resources is necessary if conservation efforts are to yield desired fruits.

Conclusion

Importance of conservation and sustainable use of resources need not be overemphasized, particularly, given the fact that the oil and gas era would certainly come to an end and people would have no choice but to fall back on these natural resources for sustenance. This paper has shown that existing policies and legal regime relating to management of

renewable natural resources are certainly inadequate and ineffective; a more proactive approach will yield better result.

It is the opinion of this paper that a participatory approach whereby local people are involved in the decision making process (as relates to the sustainable management of natural resources in their environment) will achieve conservation of natural resources.

This paper also buttresses the point that forest conservation laws can be effective if the people are involved from the conceptual stages and are carried along through the stages of implementation and management. Sustainability in natural resources conservation cannot be achieved except the primary custodians are involved in the process (Ezenwaka & Abere 2010).

There are more proposed forest reserves in Bayelsa State which are yet to be gazetted (Amoru 2000); it will be beneficial to adopt a bottom-up approach (Ezenwaka & Abere 2010) in order to achieve the desired results. It is against this background that a departure from the “top-down” approach to a more holistic “bottom-up” or participatory approach (Ezenwaka 2008) that integrates all the traditional conservation practices with modern policies would be necessary for conservation efforts in Nigeria to achieve the desired result.

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