

APPLICATION OF NANOTECHNOLOGY IN MEDICAL DIAGNOSIS

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ABSTRACT

It has been observed that the mode of distributing learning is still central even though technology on the part of learners are creating a climate that requires a more dynamic alternatives in order to have a more effective learning system and thereby get the desired and expected outcome. Nano-learning (n-learning) is an integral part of nanotechnology that is synonymous to micro learning and which deals with the development of miniaturized learning and development modules which lasts between 30 to 120 seconds. This emerging technology is gaining significant development in application to solving some existential problems. The process of n-learning engages the user or the recipient at a deep emotional level by combining imagery, reflective questions and keywords within a variety of animation sequence. The essence of this study is to look into how this learning process can be integrated into the field of medicine in order to have a better and more effective way of treating patients and thereby saving more lives from various diseases through proper diagnosis and drug delivery.

1.0 INTRODUCTION

Research in nanotechnology began with discoveries of novel physical and chemical properties of various metallic or carbon-based materials that only appear for structures at nanometer-sized dimensions. Understanding these nano-scale properties permits engineers to build new structures and use these materials in new ways. The same holds true for the biological structures inside living cells of the body. Researchers have developed powerful tools to extensively categorize the parts of cells in vivid detail. Yet, scientists have still not been able to answer questions such as “How many?” “How big?” and “How fast?” These answers must be provided to fully understand cellular structures in order to repair them or build new nano structures that can safely operate inside the body. This will lead to better diagnostic tools and engineered nanoscale structures for more specific treatments of disease and damaged tissue. Eliot Masie was probably the first to realize the potential of nano learning by reflecting on the fact that he was himself a nano learner. Today, we can find many different concepts and practices of nano learning. Some are dealing with special topics such as health care in the context of continuing education, others are referring to the communication technologies being used in the teaching and learning process e.g. Short Message Service (SMS) or e-mail. In this context, nano learning application in the field of medicine is significant in quite a number of ways. First, when n-learning is applied in the field of medicine, it will engage the medical practitioner or worker involved in a deeper emotional level by combining imagery, reflective questions and keywords within a variety of animation sequence and creates self awareness for personal development. This animation programmes acts as a catalysts for new perspectives on developing innovative solutions, problem-solving skills and achieving high performance. It reflects a unique orientation and contribution to personal development. Second, this new technology will create new perspective and effective solutions to long standing problems in the medical field. Third, it will give an ample opportunity of learning at anytime and anywhere and as such support end

user 24hours increasing flexibility of the learning process. This learning method will help medical doctor and health professionals who find it challenging to leave the office for further education due to the nature of their work to at least learn something new each day in order to be updated in their area of profession. Nano learning which is all about learning in small chunks will provide a fresh approach to accelerated learning and development. It will create a new direction for global learning through daily modules which can be accessed throughout the day.

The aim of this study is to provide a strong theoretical and practical knowledge of nano learning and especially its application in the medical field. The study is meant to broaden the critical and analytical understanding of the application of nano learning in medicine, how it can be used to solve world problems and thereby provide the needed solution. According to Eliot Masie (2007), nano learning modules can be produced as a by-product of normal e-learning materials very cost efficiently, since the material is partly ready to begin with. Efficient learning and ‘getting the message’ are ensured by using the nano-module after going through the actual e-learning. Keith Bound said, Image Dynamics are initially targeting busy senior executives who cannot afford lengthy periods out of the office, however, Image Dynamics do not see their nano-learning programmes taking over from traditional training programmes, instead, they see nano-learning as a 24/7 support tool and adding value to e-learning programmes by reinforcing learning at a deeper emotional level.

2.0 NANOLEARNING SYSTEM DESIGN

Fig 2.1 shows various activities and processes that will have take place in order to achieve learning by the medical personnel. The communication link shows the trend of event from server/database to the internet and thereafter to the mobile device of the medical personnel. The communication link shows the relationship between various entities in the cause of achieving learning.

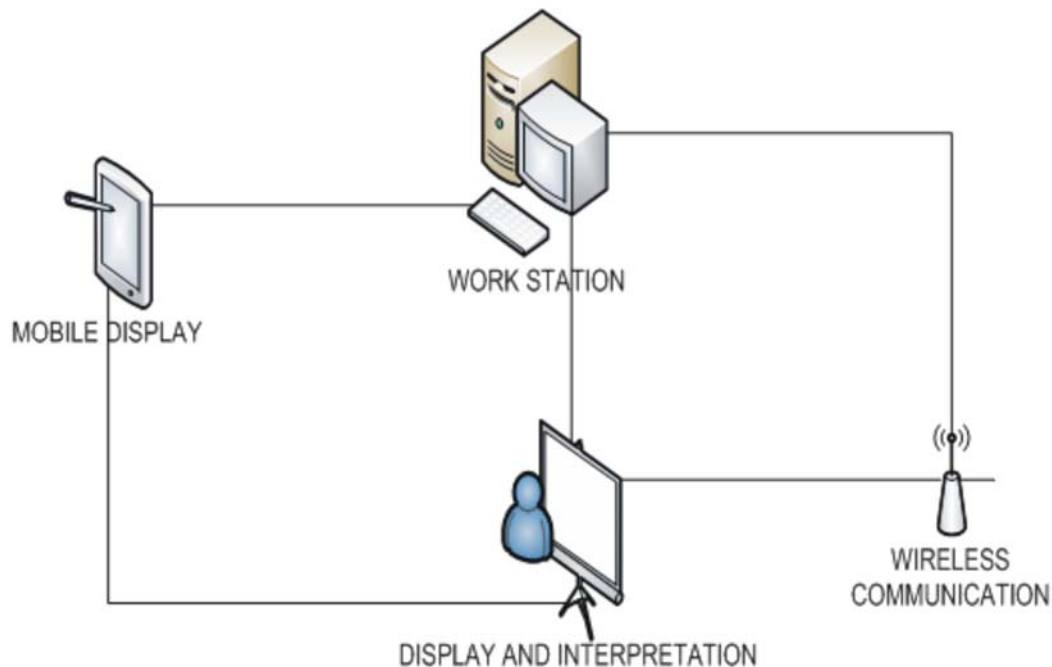


Fig 2.1: Communication Link Diagram

From fig. 2.1., the administrator works mainly at the workstation. It is at this point that the administrator does the work of user account creation uploading of nano learning resources, editing of existing contents and deletion of outdated content in the knowledge base of the system and thereafter deploy it to the end user of the content through the wireless communication link.

The display and interpretation section of the whole process does the work of interpreting the n-learning content sent over the network and ensures proper display of the contents on any mobile devices through event check list. The mobile device is the platform on which the n-learning contents are being made available to the end user. It can be a mobile phone, personal digital assistant (PDA) or any other internet enabled mobile device.

Event diagram

Event diagram is the diagram that shows the various activities that each entity performs to fulfill the needed specification and requirement this is depicted in fig 2.2. It shows the role each of the entity performs in the cause of the whole event.

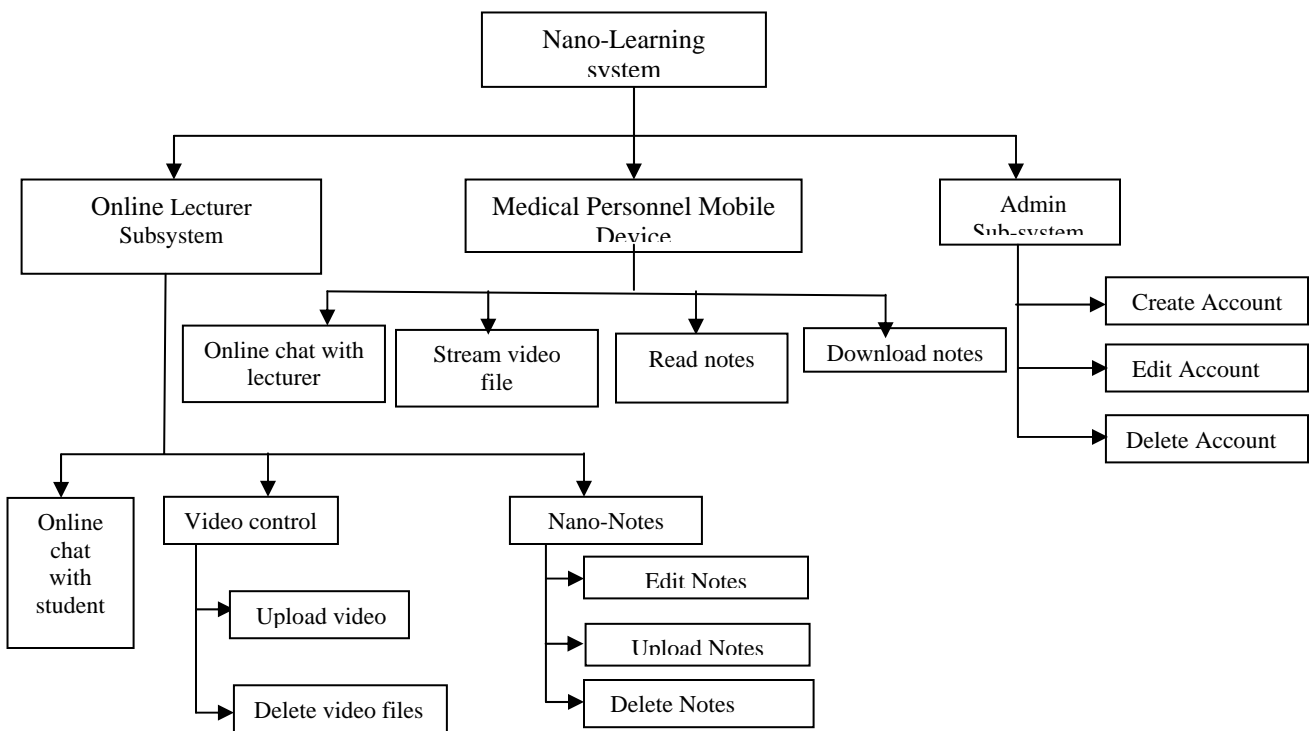


Fig 2.2: Event Diagram

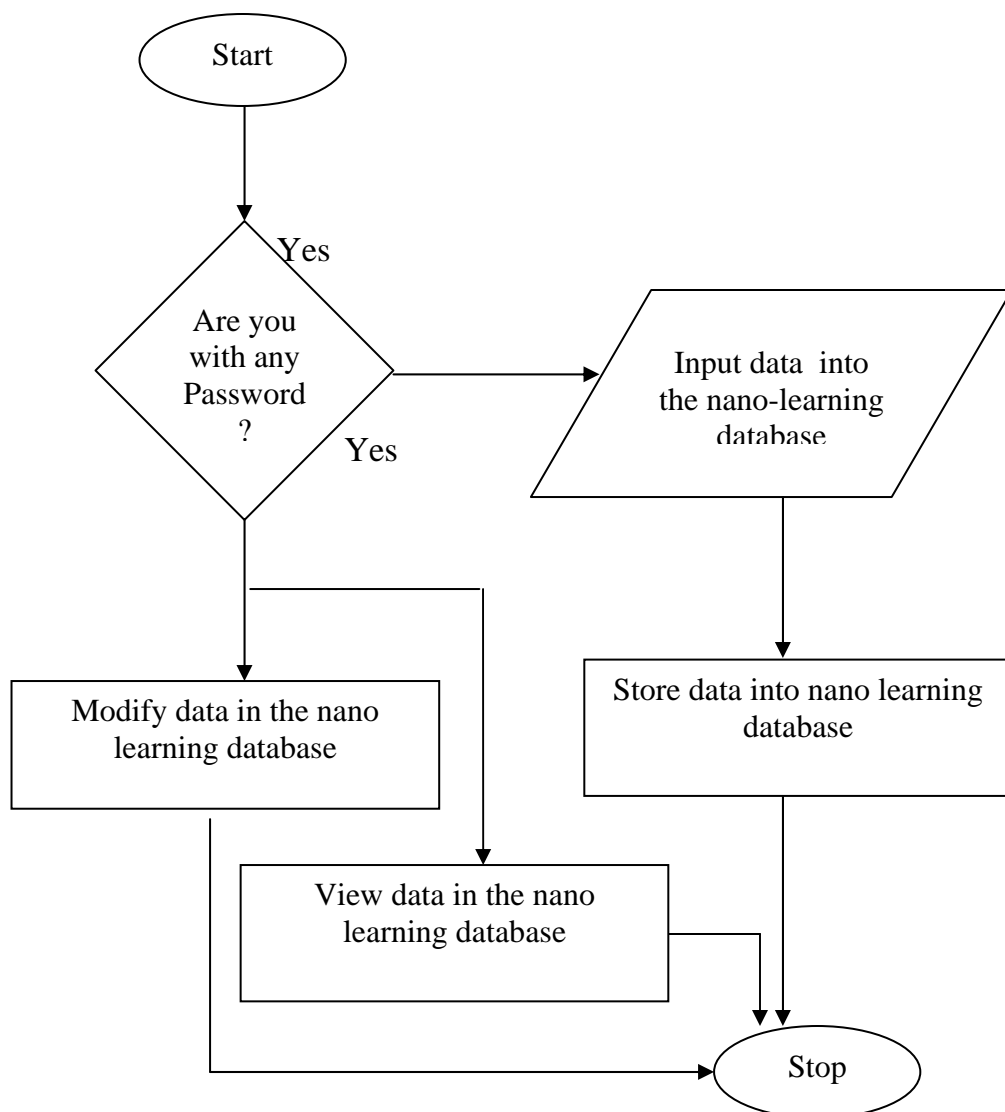
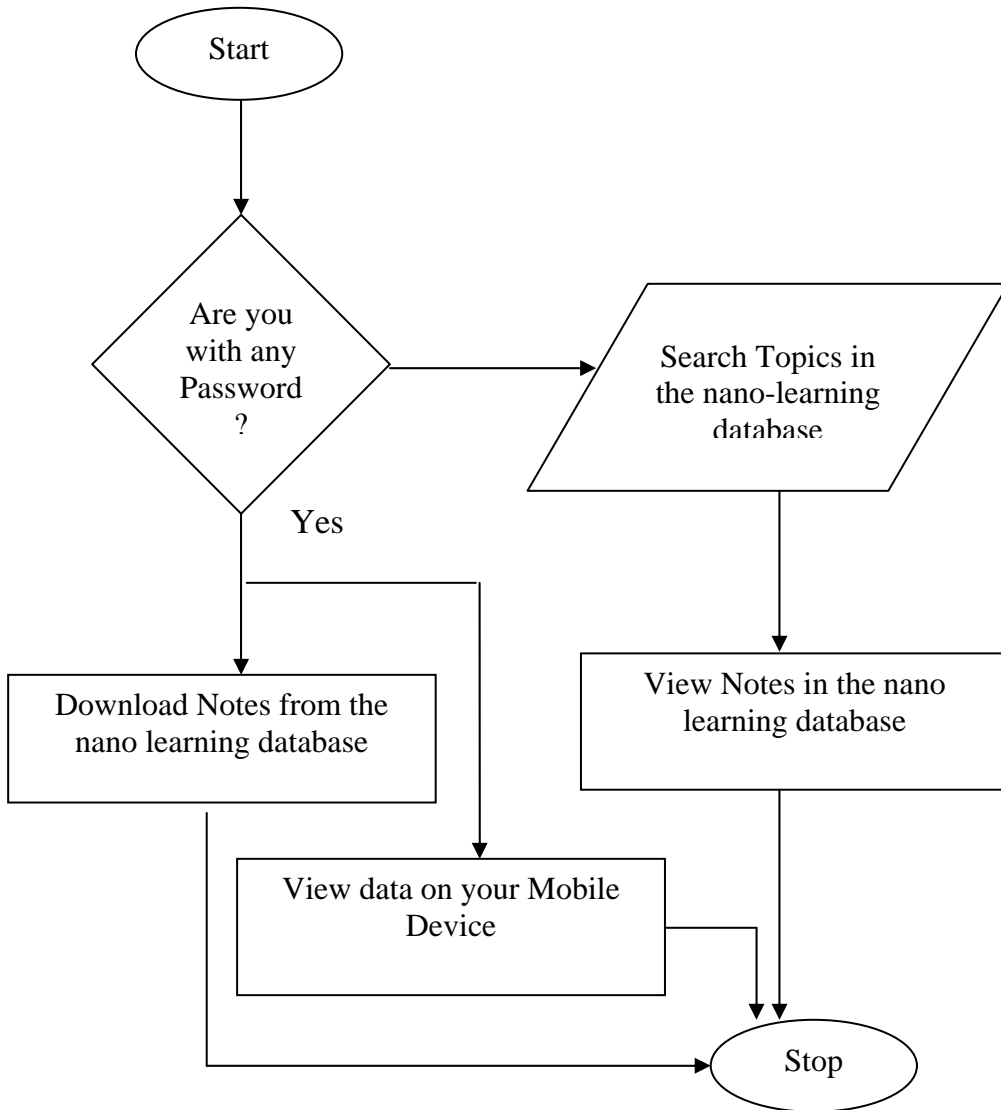


Fig. 2.3 Administrator Flow Chart

In the use of this nanotechnology for deploy of learning in medical field there is a need of an administrator that coordinates the whole activities of operations as depicted in fig 2.3.



2.4 Medical Personnel/Nano Learner Flow chart

3.0 IMPLEMENTATION

Fig 2.4 shows the graphical details of the operations of the Medical Personnel or Nano Learner in making use of nano technology for E-Learning. Event visit checklist is a mobile learning object installed on phone to facilitate engaging in nano learning activities. Event visit checklist does the work of properly arranging learning objects on the mobile device being used. Fig. 3.1 shows details of how event visit checklist works on mobile devices.

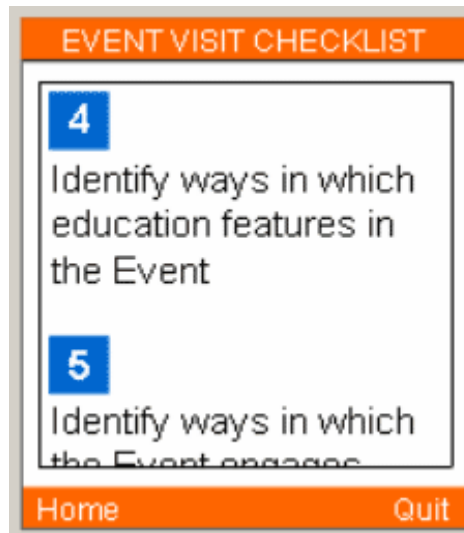


Fig. 3.1: Events Visit Checklist Screen Shot

Lifeblog

Lifeblog is mobile blogging software. There are two different 'Lifeblogs' available. One was created by Nokia and another by Mobile-worx, a mobility solutions company based in California. Lifeblog offers users the functionality to upload photos to a website using a GPRS connection. With Java ME as the core technology, lifeblog is currently supported on a wide variety of devices including Nokia, Sony Ericsson, Motorola, Samsung. Lifeblog consists of a single on device program (written for Java ME) with a server side application. Lifeblog offers a simple GUI/text based interface, vast phone support, multiple photos uploads etc. The mobile photo client captures or fetches photos and allows users to upload them to the website. Lifeblog is available for licensing and not for public use at the moment. Lifeblog is being preinstalled on phone to be used for nano learning applications as it has the ability to captures all text messages, photos and videos in a single journal.

Fig. 3.2 shows a good example of how lifeblogs software enhance good graphical user interface especially during learning process on mobile devices.

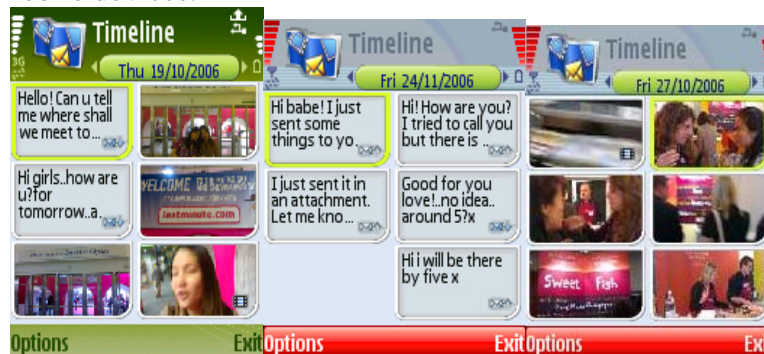


Fig 4.2: Examples of Students' Lifeblogs

Learning Resources Uploading Environment

The learning design is intended to provide an appropriate mix between constructing learners' experiences of remote informal contexts and providing formal assessment of their activities. Furthermore, the opportunity for social construction of knowledge was provided through a shared uploading environment (mediaBoard), which the students could use to take decisions collectively about which content to use in their assessed presentation. During the course of the learning, the course tutor would use mediaBoard to text 'study tips' in

the form of text messages to each team. Fig. 3.3 shows how n-learning resources are being uploaded and deployed by the administrator to various nano learners for use.



Fig 3.3: Learning Resources Uploading Environment Screenshot

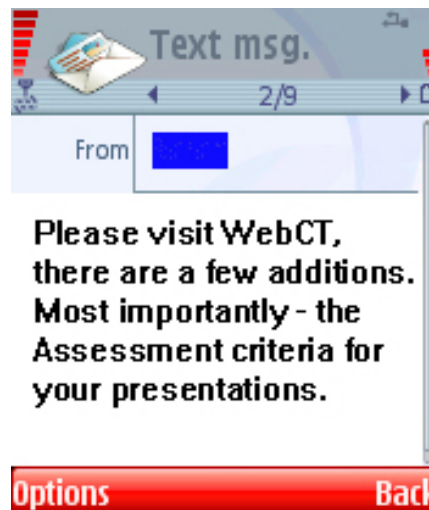


Fig.3.4: Tutor Study Tip

4.0 PERSONAL DIGITAL ASSISTANT (EMULATOR) MENU INTERFACE

A personal digital assistant (PDA), also known as a palmtop computer is a mobile device that functions as a personal information manager. Current PDAs often have the ability to connect to the Internet. A PDA has an electronic visual display, enabling it to include a web browser, but some newer models also have audio capabilities, enabling them to be used as mobile phones or portable media players. Many PDAs can access the Internet, intranets or extranets via Wi-Fi or Wireless Wide Area Networks. Many PDAs employ touchscreen technology.

A typical PDA has a touchscreen for entering data, a memory card slot for data storage, and IrDA, Bluetooth and/or Wi-Fi. However, some PDAs may not have a touch screen, using softkeys, a directional pad, and a numeric keypad or a thumb keyboard for input; this is typically seen on telephones that are incidentally PDAs.

In order to have the functions expected of a PDA, a device's software typically includes an appointment calendar, a to-do list, an address book for contacts, and some sort of memo (or "note") program. PDAs with wireless data connections also typically include an email client and a Web browser as shown in fig 4.0.



Fig. 4.0: A Typical Personal Digital Assistant (PDA)

5.0 CONCLUSION

On this basis of the study and research which has been carried out, it is observed that if n-learning is applied in the field of medicine, it will engage the medical practitioner or worker involved in a deeper emotional level by combining imagery, reflective questions and keywords within a variety of animation sequence and creates self awareness for personal development. It will give an ample opportunity of learning at anytime and anywhere and as such support end user 24hours increasing flexibility of the learning process. This learning method will help medical doctor and health professionals who find it challenging to leave the office for further education due to the nature of their work to at least learn something new each day in order to be updated in their area of profession. Also, this new approach will enhance highly specific medical intervention at the molecular scale for curing disease or repairing damaged tissue such as bone, muscle or nerve. It will help the doctor to be informed about the current pattern of diagnosing, drug prescription and delivery in order to enhance better medical treatment of patients.

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