An Analysis of Web Services and Design of Information Management on Vocational Education Websites in Thailand

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Abstract— **The objective of this research is to evaluate 233 websites of vocational education institutions in Thailand through the opinions of experts who have full range of access in web service information to gather relevant facts about the system of education associated with web service program. The standards of evaluation were categorized in four major aspects such as: design and creativity; the content; navigation; and the scripting and technical aspects. The results revealed that (1) there were 233 websites that provided web services which enabled colleges to access to web Portals and internet sites. Under the Office of Vocational Education Commission, colleges that existed throughout the country could be divided into 11 types in 403 colleges. Most websites registered for domain of ".ac.th." and the popular software language for designing vocational websites was HTML. Most websites did not identify what software package was used. Content Management System (CMS) was seldom used, and most website did not have database system and web service program. (2) The analysis of opinions of specialists in dealing with the standard criteria of website evaluation in four aspects showed that in general, most specialists agreed with the design and creativity including the content and navigation aspects. However, they disagreed with the scripting and technical aspect. (3) All in all, the study of web service information of 233 vocational colleges disclosed the essential information gathered from the following sources: Information of the institution executives , The institution committee, The academic department ,The resource management department, The planning and cooperation department., etc.**

Keywords- Web Service; Web Design; Information Management; Webmaster; Vocational Education

I. INTRODUCTION

Educational information on present websites is incapable of linking and sharing details between websites because of their different forms and formats. Therefore, the development of Web Services application must be taken into consideration, especially educational information on college websites under the Office of Vocational Education Commission. Internal bureaucratic sectors are well organized and can be used as a typical model in Web Services management on educational information. An analysis of web design enables a college's webmaster to follow the Web Services standardized guidelines in information development because the webmasters are directly responsible for the forms and contents of websites.

The problem is that the presentations of information on vocational websites are static type and using Web Authoring tools in writing program. As a result, the researchers studied and analyzed the designs created by webmasters of 404 colleges under the supervision of the Office of Vocational Education Commission. The results obtained from the analysis indicated that the information management complied with the internal administrative regulations of colleges in 4 areas as seen by the separation of information according to 4 areas.

Ministry of Education [1] regulated the dissemination of presenting educational information on the websites as a part of educational policy of information technology applications in educational administration and services. The Ministry set up a policy for all institutions to create their own websites in a form of operations center to collect educational information as a database to disseminate news and information to the public. All institutions, thus, have common objectives to create their websites primarily to publicize their own institutional news and information. The design and contents of each website are primarily served the institution's requirements, rather than the standardized forms and contents of the processes and systems in information management.

Existing vocational websites have not had any indications that they have used a Web Services system in information service and management. As a result, the analysis is based on the frameworks of the IBM Corporation for the website information services and the frameworks of the American Association of Webmasters for the website design. The analytical results will be used as standards for information service and management in vocational websites.

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II. WEB SERVICES

The Office of Computer Clustering Promotion (CCP) [2] under the National Science and Technology Development Agency (NSTDA), in cooperation with the Microsoft Thailand Ltd. set up the Web Services Architecture Center (WSAC) to promote and enhance knowledge and capability of Web Services architecture for the .NET technology and software design to Thai software developers. The Center defines Web Services as software module capable of communicating with other software modules with common tasks and functions and accessible through the internet under standards of XML (Extensible Markup Language) and SOAP (Simple Object Access Protocol).

Web Services play a major role to solve problems that websites cannot share resources between them, caused by their operating systems, programming languages used to create database systems, and different formats of information. But at present, different operating system is not a problem because information system on the internet can display on browsers in any operating systems. Programs used to implement the information may create from different language programs, such as HTML, ASP, PHP, CGI, Perl, or JSP, which are able to display the web pages. On the contrary, although different language programs are able to display on the web pages, the information and documents cannot be acquired and retrieved directly from different language programs to display on a browser. Consequently, XML is used as a medium to translate those language programs for use with other languages, providing Web Services to be applied as a common standard for information service providers in the websites [3].

III. WEB SERVICES FRAMEWORKS

Although Web Services play more significant role in every sector, educational webmasters in some parts are not aware of its benefit and importance, including how to handle it. This results in initial problems in the deployment of Web Services for educational information management. Web Services developers need to understand the conceptual principles of Web Services in 3 categories for design, creativity, and maintenance compliant with the IBM Corporation such as: service-oriented architecture, Web Services developer, and Web Services system management. The details in each category are as follows:

A. Web Services Architect

Web Sphere Application Server system management, Knowledge of Web Services using SOAP, WSDL and XML, Knowledge of general security, J2EE and Web Sphere security and WS-Security, Knowledge of Web Services management and related products, and Experience in establishing Web Services infrastructures.

B. Web Services Developer

Knowledge of SOAP, Knowledge of XML, Knowledge of UDDI, Use WSDL to describe services, Knowledge of SOA, Knowledge of UML, Perform as Lead Architect for e-business solutions, Knowledge of e-business patterns, and Knowledge of reference architectures.

C. Web Services System Management

Web Sphere Application Server system management, Web Services technologies - WSDL, UUDI, XML, SOAP, Web Services application packaging and deployment, and Experience with setting J2EE security, and using security management tools.

IV. VOCATIONAL INFORMATION

The vocational information management in Thailand's vocational colleges, which are under the Office of Vocational Education Commission, is on the same criteria, law, and regulation. These colleges are categorized in groups as Technical Colleges, Vocational Colleges, Polytechnic Colleges, Industrial and Community Colleges, College of Agricultural and Technology, Arts and Crafts colleges, and so on. Thus, information services on the vocational websites are framed under the regulation of the Office of the Vocational Education Commission's institutional administration [4] and were , classified into 4 sections are: 1) Section of resources management 2) Section of planning and cooperation 3) Section of education development and 4) Section of academic services.

The Office of the Vocational Education Commission encourages and enhances colleges to set up a Self-Access Learning Center and e-Learning development to benefit teachers and students in self-education. The Office also emphasizes all colleges to develop local ICT resources, performance appraisal IT management, supervision, and continuous on-line follow-up activities. Also included in college accountabilities are collecting data, interconnected data networking to other colleges and offices, and potential internet data networks.

Although the Ministry of Education and the Office of the Vocational Education Commission stated the policies and regulations on the information development over the internet, no rules, criteria, and standards were set for college websites about the design, data, standards, and appropriate systems when creating and implementing the websites in colleges. In the future, Web Services will be used in website techniques, webmasters should be aware of its importance and role to keep pace with its usage.

V. VOCATIONAL WEBSITE DESIGN STANDARDS

Information management on vocational education has been present on web pages in order to provide linkable data among institutions. Although the framework of information management has not been employed in a complete Web Services pattern, information management has followed the Web Services pattern in some part. An analysis of vocational websites in Thailand is beneficial for future guidelines in information management, but no standardized webpage patterns and elements are clearly stated.

The American Association of Webmasters, 2006 [5] set the judging system and criteria for web design evaluation

into 4 categories are: 1) Design and Creativity 2) Content 3) Navigation and 4) Scripting and Technical

The evaluation and scoring criteria consists of 36 questions to earn a credit, but each question has different allocated points. This judging system and scoring criteria are used to rate the web ranking and to refer as a web design criteria in accordance to the set standards. The details and elements in each category are as follows: 1) Design and Creativity 2) Content 3) Navigation and 4) Scripting and Technical.

VI. Results

Colleges under the Office of the Vocational Education Commission are divided into 11 categories with a total of 403 colleges. It was found that 233 colleges had information services websites, accounted for 57.82%. A category of technical colleges had most, accounted for 17.6%. The second were industrial and community colleges by 16.1%. Polytechnic colleges were 7.7%. Colleges of Agriculture and Technology were 6.9%. Vocational colleges were 6.7%. Commercial colleges were 1%. Arts and Craft colleges were 0.5%. Fishery colleges, Industrial and Ship Building Technical colleges, and Kanchanapisek Golden Jubilee Royal Goldsmith College were 0.2% each.

In domain and free-domain name registration, it was found that the domain name .ac.th was registered most by 66.5%. The second was a free-domain name geocities.com by 20.6%. A domain name .net was 4.3%. A domain name .com was 3.0%. A domain name .go.th was 1.7%. A free-domain name thai.net was 1.7%. A domain name .org was 0.9%. A domain name edu.th was 0.4%. A free-domain name brinkster.com was 0.4%. Others were 0.4%.

For programming language programs used in 233 vocational websites, HTML language program was the commonly used by 73.7% colleges. The second was PHP language program by 22.9%. ASP language program was 2.6%. JSP and Perl/CGI language programs were 0.4% each.

The application of package programs in vocational websites showed that unidentified package program was most by 86.3%. Dreamweaver program was 9.0%. Frontpage program was 3.4%. Flash, Namo, and Net Object package programs were 0.4%.

In Content Management System, it was found out that only 22.7% applied this program and the majority who preferred not to use this application is accounted to 77.3%. PHP Nuke program was used most by 8.6%. Mambo program was 7.3%. Others were 2.6%. Joomla program was 1.7%. Moodle program was 1.3%. Xoops was 0.9%, and Post Nuke program by 0.4%.

In Database system applications, it was found out that 24.2% used this application and 75.8% were not. The application of MySQL database was applied most by 22.9% while other databases and Access and SQL databases were accounted for 0.4%.

On Feed programs, 87.6% did not use feed program applications while feed programs users were accounted for only 12.4%. RSS feed was used most by 10.3%, CSS by 1.7% and XML by 0.4%.

The results of the specialists' opinions on criteria and standards in the website evaluation for vocational colleges in 4 categories of scoring criteria showed that they agree on three categories of design and creativity, content, and navigation, but they did not agree on scripting and technical category.

On analysis of the amount and percentage of information services on the websites, it was found that in 233 colleges the overall information services were accounted for 44.93%. The types of information were classified into information on college executives by 80.70%, college committee by 65.70%, educational services by 45.05%, resources management by 33.06%, education development by 24.45%, and planning and cooperation by 20.06%.

VII. Discussion

The researchers analyzed the design patterns and information services of 233 colleges out of 403 colleges. The analysis was performed on the opinions of the 14 specialists about evaluation standards on websites and on 4 sections of information services on vocational websites. The analysis revealed that:

1) Colleges under the Office of the Vocational Education Commission were classified into 11 categories with a total of 403 colleges, but 233 colleges had websites for information services. The registry of .ac.th domain name was most registered. HTML language was used most by 73.7 %. Most websites did not specify the package programs accounted for 86.3%. Content management system was accounted for 22.7%. No databases were accounted for 75.8%. The results obtained indicated that about a half of colleges had websites for information deployment, though the management standards specified that educational institutes had to deploy information through websites.

On website standards, it was found out that most websites did not register formally on a domain name .ac.th, which was regulated as a formal registration for educational institutes in Thailand. The language programs used in websites were not specified whether a package program or a written language program. Additionally, establishing contact with webmasters was hardly possible because the researchers communicate only by e-mail to webmasters to inquire for more information of websites, but they replied with insufficient information that the researchers couldn't cite it as a reference sources. This was an interesting problem on a service behavior of webmasters.

In a content management system, a database system, and web services application, it was found out that there was little web development. Most websites did not employ content management system even though it was a freeware program that will organize web contents. There were few websites that employed the content management system in the websites. In case websites used content management system in the development of their websites, the website databases were well organized with Web Services programs including RSS and XML. The analysis also showed that web services programs were least used, but embedded in the content management system. RSS or XML was not yet

applied for the benefits of information services as a major part of the services.

2) The analysis from the opinions of 15 specialists who supervised vocational websites and had direct long experiences showed that they agreed on standards and criteria in design and creativity, content, and navigation. But they did not agree on scripting and technical standards. The researchers provided the criteria and standards of the American Association of Webmasters to the specialists for their opinions.

The disagreement from the specialists on scripting and technical applications, initiated from its high ranking standards for Thai webmasters, did not catch special attention to study them. The disagreement did not mean that scripting and technical standards of the American Association were not suitable for website evaluation, but vocational websites did not employ scripting and technical applications to their websites. It was the same case reflecting from the above analysis about the content management system that it was not much introduced to use in web creation. Therefore, the opinions of specialists were taken into special consideration.

3) The analysis of educational information services in 11 categories, 403 colleges revealed that 233 colleges had information services not up to a half of all colleges. When considering the framework of education management of the Office of the Vocational Education Commission (2006), it was found that 4 sections of information services were not complete. The information was mainly placed on the college executives and the college committee. On the other hand, the 4 main information contents of the colleges were present at the websites not in half of the overall information: section of academic information was 45.05%, section of resource management was 33.06%, section of educational development was 24.45%, and section of planning and cooperation was 20.60%. All in all, it showed the incomplete information of web services in the vocational websites.

The analysis on the proportion of the number of websites to the number of colleges exhibited that vocational websites were not given attention by a party concerned though the government policy emphasized that educational institutions had to set up websites to deploy academic information and to set up the operation center for navigation among the ministry, departments, sections and divisions. Existing websites presented information mainly focused on executives, departments, histories, job descriptions, staff, but lacked of academic information deployment, resulting to the researchers inability to analyze the quality and validity of academic information presented on the vocational websites.

VIII. CONCLUSION

Web services are used to create information services for the vocational websites. But the components of information on the websites must be taken into consideration that scopes of contents are divided into 4 sections: resource management, planning and cooperation, educational development, and academic services. Web Services framework for webmasters include web services architect, web services developer, and web services system management. The web design should follow the criteria and standards of the American Association of Webmasters comprising design and creativity, content, navigation, and scripting and technical. When these features are employed in web creation, the benefits of information deployment will meet the standard requirement.

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