DEVELOPMENT AND EVALUATION OF A FIBRE OPTIC WEB-BASED LEARNING MODULE FOR TECHNOLOGY-BASED LEARNERS

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PTTA UTHM PERPUSTAKAAN TUNKU TUN AMINAH

For my beloved Parents, Sisters and little Brother

PTTA UTHM
PERPUSTAKAAN TUNKU TUN AMINAH

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ABSTRACT

Web-based learning module provide integrated environments of various technologies to support and enhance learners learning process via the Internet. Therefore it was the interest of the researcher to develop a 'Fibre Optics Web-Based Learning' (FOWBL) module and evaluate its effectiveness. An instructional design model, ADDIE was followed throughout the development of the web-based learning module. Furthermore, design factors such as multimedia, which facilitate the web-based learning program were discussed. This paper reported the result from the research, which study the effectiveness of web-based learning module for technology-based learners. A sample of 24 respondents, which comprised of 12 Telekom Malaysia learners and 12 Kolej Latihan Telekom staff were selected. The findings were discussed based on the best design factors via-online web learning program, user-friendliness, satisfaction in learning strategies, content satisfaction, learners' ability of understanding the content, motivation, skill and knowledge enhancement and to investigate whether there is any significant differences in the learners' understanding among the beginner, intermediate and advanced learners. The learners' satisfaction towards the developed FOWBL module was highly rated through the overall mean scores obtained for this research and there was a significant difference between the learners' online quiz performance with their knowledge levels when accessing the learning program. This research was a survey research. The researcher implemented both qualitative and quantitative research. Therefore the questionnaires created utilized the Likert scale for valid statistical analysis. Furthermore, interview and online quiz were developed to support the research findings. The data collected pinpoint the weaknesses and strengths of the developed FOWBL program. The research closed with recommendations for the development and use of web-based learning tools that take into account the importance of usability issues in the choice of web-based learning tools and recognition of the situation of learners and educators within real life contexts.

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ABSTRAK

Program pembelajaran berasaskan web membekalkan persekitaran yang dipenuhi pelbagai teknologi untuk menyokong serta meningkatkan proses pembelajaran melalui Internet. Justeru itu, pengkaji berminat untuk membangunkan satu modul, '*Fibre Optics Web-Based Learning*' (FOWBL) serta menilai keberkesanannya. Satu model rekabentuk pengajaran, ADDIE telah dirujuk sepanjang pembangunan modul pembelajaran berasaskan web. Di samping itu, faktor-faktor rekabentuk, yakni multimedia, turut dibincangkan. Kajian ini melaporkan keputusan yang mengkaji keberkesanan modul pembelajaran berasaskan web terhadap pelajar yang berasaskan teknologi. Satu sampel, 24 responden yang terdiri daripada 12 pelajar dari Telekom Malaysia serta 12 kakitangan Kolej Latihan Telekom (KLT) telah dipilih. Item yang dikaji adalah faktor-faktor penting dalam pembangunan halaman web pembelajaran, mesra pengguna, kepuasan dalam strategi pembelajaran, kepuasan dalam maklumat yang disampaikan, kefahaman responden terhadap isi kandungan, motivasi, pengukuhan kemahiran and pengetahuan, serta mengkaji sama ada terdapat perbezaan dalam keputusan kuiz '*online*' responden dengan pengetahuan mereka semasa mengakses kepada FOWBL yang telah dibangunkan. Kajian menunjukkan bahawa responden berpuas hati terhadap FOWBL yang dibangunkan secara keseluruhannya berdasarkan skor min yang didapati, serta terdapat perbezaan dalam keputusan kuiz '*online*' responden dengan pengetahuan mereka. Kajian ini ialah sebuah kajian tinjauan yang melibatkan kedua-dua kaedah kualitatif serta kuantitatif. Oleh yang demikian, soalan-soalan yang dibentuk bagi tujuan pengedaran soal selidik adalah berdasarkan Skala Likert yang sesuai untuk analisis diskriptif statistik. Selain itu, kaedah temubual serta kuiz 'online' dibangunkan untuk memantapkan lagi hasil kajian. Hasil kajian turut memfokus kepada kelemahan serta kebaikan FOWBL yang telah dibangunkan. Kajian ini diakhiri dengan cadangan untuk pembangunan serta penggunaan web pada masa akan datang

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LIST OF TERMINOLOGY USED IN THIS TEXT

ADDIE	-	Analyze, Design, Develop, Implement & Evaluate
CD	-	Compact Disc
FAQ	-	Frequently Asked Question
FOWBL	-	Fibre Optics Web-Based Learning
HTML	-	Hypertext Markup Language
HTTP	-	Hypertext Transfer Protocol
ISP	-	Internet Service Provider
OEQ	-	Open-Ended Question
PC	-	Personal Computer
R	-	Respondent
SPSS	-	Statistical Package for Social Science
URL	-	Uniform Resource Location
VRML	-	Virtual Reality Modelling Language
WWW	-	World Wide Web

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CHAPTER I

Introduction

Today, most people think of the World Wide Web as an ideal environment for information publishers. Why use the web? "The Internet is a network that links together computer situated across the world. This is introduced as a development in computer network technology." (Eaglestone & Ridley, 2001, pg. 20) Driscoll (2002) strongly mentioned that studies suggest that web-based training will be central to the design and delivery of workplace learning in the 21st century. "The harsh reality for the 21st century if you don't have access to PCs and the Internet, you won't participate in communication, education, entertainment and commerce." (Einstein, 1998, quoting Mark Benioff, senior vice president at Oracle in Beer, 2002). Benioff's comment is a call to action for educators to implement web-based learning environment to the traditional learning environment. Universities used it to disseminate administrative and marketing information to faculty, students and alumni. Commercial used of the WWW is growing phenomenally as companies, large and small marketing their products and services.

But the WWW, in combination with other Internet tools such as Usenet Newsgroups, Email and Telnet, can be an interactive learning environment as well. And the creative implementation of these tools makes the WWW and ideal environment for distributed learning and provides individualized self-paced learning. It promises dramatic changes in the way we learn and teach, the way we interact as a society. In higher education, most students have access to Internet resources. In organization, Internet is used as a medium to deliver training and learning sources to staff. Although on-line learning is not actually new – it has been around since the 1960s. It is the Internet's user-friendly interface, coupled with improved technology, that has brought the Web into the mainstream of current culture. (Stone

& Koskinen, 2002) We cannot deny that Internet is a fast emerging as one of a teacher's most important tools, with the World Wide Web (WWW) emerging as the easiest and most popular way to access the Internet. Lowery in Franklin & Strenski (2000) points out "The focus of teaching and learning is slowly changing from being teacher-focused and teacher-controlled to a situation where the teacher acts as facilitator and learning is less individual and more collaborative." Technology can support this changing paradigm in the learning scenario by providing tools that manage information, enable fast and efficient electronic communication, and make collaboration over distance readily manageable.

With the growth of the WWW, teacher, instructors, professors, learners, tutors, and others, have all been trying to place education online. The goal is to use the web for effective teaching. Effective teaching refers to the same quality of instruction demonstrated in the traditional classroom. The WWW is predicted to provide the equivalent of a traditional classroom education with additional advantages, such as self-paced learning. Furthermore, according to van Weert & van der Wal in Franklin & Strenski (2000), Information Communication Technology (ICT) such as Internet is not an isolated technological development, but must be seen in the light of its contribution to new form of education and preparation for Lifelong Learning. Furthermore, according to Stone & Koskinen (2002), the constraints of Web-Based Training are diminishing and options are increasing as the Web becomes increasingly easy to use and technology becomes better and less expensive. It has also been recognized as reducing training costs, improving return-on-investment, and delivering just-in-time training. As the ease of execution increases, corporations and learning institutions discovering the benefits of delivering training and learning environment via the web.

The Web concepts can be introduced as Hypermedia, Hypertext Markup Language (HTML), Uniform Resource Location (URL), Hypertext Transfer Protocol (HTTP) and Gateways. Hypermedia and multimedia have begun to change the way faculties teach and students learn. Although these technologies have not reached the stage where they can be used to teach any learner, interactive multimedia can provide additional support and resources for learners and instructors in traditional classes.

The WWW and the Internet have enticed faculty with promises of access, interactivity, ease of use, and a potential universal presence in the lives of learners and instructors.

Furthermore, technology and education seem ready for the next big step in learning from a far, with a big push from the Internet, (Sanoff, 1999) as learners feel they have to upgrade their skills and learn new technologies to keep current in a world of ever-changing technology.

As the web is becoming a potential new technologies in teaching and learning environment, therefore, in this project, the researcher would developed an interactive yet informative web based learning program for technology-based learners.

1.1 Research Background

In the past, the technology in delivering education materials includes the use of mainframe computers, floppy diskettes, multimedia CD-ROMs, and interactive video disks Kruse & Keil (2000). But nowadays, the demand for flexible delivery in higher education and organization is increasing (Graham, McNeil & Pettiford, 2000). How do we create flexible learning environment to the learners? According to Doube in Franklin & Strenski (2000), use of electronic technology can foster such learning environment, adding that "The Internet is a rich information, communication and research resource for all those involved in education and training." (Bannan & Milheim, Crossman, Eklund, Patel & Hobbs, Reeves & Reeves, Stein, Watson & Rossestt in Graham, McNeil & Pettiford, 2000, pg. 23) According to Lynch (2002), the Internet is transforming the way of communication and learning, and has already demonstrated a far-reaching impact in the field of education. With the Internet technology, the passive classroom lectures can be transformed into student-centred, interactive learning and the perception of students as "customers", with increased control over the learning process (Aggarwal & Bento in Khosrowpour, 2002).

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Nowadays, the Internet is becoming a popular and demanding medium to deliver information. As the world moves online, pressure increases for example, in Australia, enrolment of foreign students was the country's eight largest export earner during 1997/8 earning A$3.1 billion for the coal (A$9.5b), tourism (A$3.2b), transport (A$6.7b), gold (A$6.2b), iron (A$3.7b), wheat ($3.6b) and aluminium (A$3.2) (AVCC, 2000, Marshall & Gregor in Khosrowpour, 2002). Because of the Internet, Australia must compete with other countries' universities for example, Oxford University and University of Connecticut offering online programs to students in their own countries. Furthermore, in Malaysia, Multimedia University has taken the challenge of developing and conducting web-based learning program in its distance-learning program beginning June 1998 to provide high quality distance education to meet the needs of the aspiring graduates from all corners of the world at any time.

"Universiti Tun Abdul Razak (UNITAR) is the region's first MSC-status virtual university where education is delivered through the pervasive use of e-learning technology like the Internet, web-based or CD-based courseware and facilitator-based tutorials or academic meetings." (Adapted from http://www.unitar.edu.my/main.html) Recently, UNITAR had obtained the approval from SIRIM on 8 August 2003 and the scope of certification is for provision of e-learning services at Kelana Jaya Study Centre which is the main campus of UNITAR (Datuk Dr. Syed Othman Alhabshi, President & Chief Executive Office, UNITAR, 2003).

Universiti Terbuka Malaysia (UNITEM) has taken the step to offer distance education for adult students who wished to renew their teacher professionalism in their own homes and mainly in their own time. According to Raghavan (2002), a lecturer at school of Business & Management, in terms of lifelong education, all methods of learning are worth consideration and experimentation. Therefore with the development of distance learning, student support services have become more important than ever. Support may be provided through various means, including phone lines, email, faxes, face-to-face meets and most important Internet.

> "The only thing that gives an organization a competitive edge…is what it knows, how it uses what it knows, and how fast it can know something new."
>
> (Prusak in Rosenberg 2001, p. 9)

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Each day, the world is changing tremendously beyond technology. The learning environment also is not exempted. Organizations are not only investing in corporate universities, but also elevating learning to the highest levels of the firm. According to Peter Senge in Rosenberg (2001), organizations should continually expand their capacity to create their future. It is the essential definition of "learning organization". This phenomena also applied to corporate sectors such as Shell, Petronas and Telekom Malaysia where they provide training and continuing education to their staff and outsiders to keep up with the technology. Related to this, the corporate sectors continuing education have become crucial in their human resource development. As the corporate sectors human resource cannot afford to provide all the trainings and continuous education by courses, Internet is the new and best tool to create an environment that encourages knowledge generation and sharing among people who are so dispersed and so busy at workplace. Besides, with Internet, education is provided right on the learners' table. Furthermore, as technologies continue to play an increasing and important role in organization, especially Telekom Malaysia, business and everyday life, technology-based learners should be exposed to the knowledge and advancement. With technologies continue to grow each day, the instructional style in learning environment also change in order to keep in pace with the world technology.

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1.2 Problem Statement

One of the biggest telecommunication provider in Malaysia, Telekom Malaysia Sdn Bhd plays an important role as a leading telecommunication organization. Besides providing telecommunication infrastructures and services to Malaysia, the organization also provides telecommunication education to its staff, outsiders and contractors through the Kolej Latihan Telekom. This is because the telecommunication industry is a fast emerging and changing at the same time as the technology (Hecht, 2002). Therefore, telecommunication-based learners should update themselves in this changing world. Besides providing traditional classrooms to

learners, they also provide web-based learning program to create self-paced learning environment to the learners. From the learning program need analysis carried by the researcher it was found that there is a need to develop a Fibre Optic Web-Based Learning program (FOWBL),

Since learning is such an important factor in what it meant, a greater understanding of the learning process would help to increase his self-knowledge. Thus, it was the interest of the researcher to develop and evaluate a FOWBL program to cater the needs of the organization to provide knowledgeable and interactive learning environment to its learners and staff. Evaluation of FOWBL will be in the aspects of user-friendliness, learning strategies satisfaction, content satisfaction, learners' ability in understanding the content of the developed FOWBL, motivation and knowledge and skill enhancement.

1.3 Research Questions

There were 8 research questions addressed in guiding this research:

1. What design factors best facilitate via on-line web-based learning program ?
2. To what extend is the user-friendliness of the developed FOWBL ?
3. To what extend do the learning strategies of the developed FOWBL satisfy the learners ?
4. To what extend does the content of the developed FOWBL satisfies the learners ?
5. How well are the learners' ability in understanding the content of the web-based learning program that is developed ?
6. To what extend does the developed FOWBL motivates the learners ?
7. To what extend does the developed FOWBL enhances the learners' knowledge and skill ?
8. Is there any significant differences in the learners' understanding level of the FOWBL content among the beginner, intermediate and advanced learners ?

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