DEVELOPING A CONSTRUCTION INDUSTRY WEB-BASED LEARNING SYSTEM IN CONSTRUCTION MANAGEMENT EDUCATION

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To my beloved father, mother and brother

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ABSTRACT

This research is dealing with the development of a web-based learning system for the post graduate candidates and the short courses participants in order to provide a medium, in learning and gaining knowledge in the field of construction management. The computer enhanced training and e-learning approaches are used to assist in the education of construction management especially in fighting the attack of viruses in the Universiti Teknologi Malaysia (UTM) campus recently. Thus, the integration between the newly developed e-learning with the Construction Technology and Management Centre (CTMC) existing web portal is essential. Hence, the first objective of the study is to identify the current state of the art regarding the types of teaching methods in the field of Construction Management studies. Secondly, the research is also intended to identify the information regarding the current syllabuses of the Master of Science in Construction Management education and suitable materials for the short courses. Eventually, a web-based learning system for the post graduate candidates in construction management program and the short courses participants is developed by utilizing the Dokeos open source e-learning software. The research methodologies used include the knowledge acquisition technique, documentary analysis and the web portal development model. This research will be directly focused on the Construction Technology and Management Centre (CTMC) needs through a problem solving basis. It is believed that the developed e-learning web portal, therefore, is an approach to facilitate and enhance learning for personnel involved in construction through computer and communication technology.

ABSTRAK

Penyelidikan ini berkaitan dengan pembangunan sistem pembelajaran berasaskan web dan elektronik untuk pelajar pasca ijazah serta peserta kursus pendek bagi menyediakan suatu perantaraan, dalam mempelajari dan mendapatkan pengetahuan khususnya dalam pengurusan pembinaan. Latihan dan pembelajaran berbentukkan komputer diaplikasikan bagi membantu dalam pendidikan pengurusan pembinaan khasnya dalam usaha untuk menangani serangan virus yang melanda Universiti Teknologi Malaysia (UTM) baru-baru ini. Oleh itu, integrasi antara pembangunan sistem pembelajaran berbentuk web dan elektronik yang baru dihasilkan ini dengan laman web Pusat Teknologi dan Pengurusan Pembinaan sedia ada adalah penting. Objektif pertama penyelidikan ialah untuk mengenalpasti kaedah-kaedah pengajaran terkini dalam bidang pendidikan pengurusan pembinaan. Objektif kedua ialah untuk mengenalpasti maklumat yang berkaitan dengan silabus Sarjana Sains Pengurusan Pembinaan dan bahan-bahan pengajaran yang bersesuaian bagi kursus-kursus pendek tersebut. Akhir sekali, sistem pembelajaran berasaskan web dan berelektronik bagi pelajar-pelajar pasca ijazah serta peserta dalam kursus pendek telah dihasilkan dengan mengaplikasikan perisian pembelajaran berelektronik sumber terbuka Dokeos. Kaedah-kaedah penyelidikan yang digunakan termasuklah kajian literatur, analisis dokumen dan model pembangunan web. Kajian ini turut memfokuskan secara langsung ke atas keperluan Pusat Teknologi dan Pengurusan Pembinaan dengan tujuan untuk menyelesaikan masalah yang dihadapinya. Diharap dengan penghasilan sistem pembelajaran berelektronik ini, ia dapat memudahkan pembelajaran bagi mereka yang terlibat dalam pembinaan melalui teknologi komputer dan komunikasi.

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LIST OF ABBREVIATIONS

AIA	-	American Institute of Architects
AIG	-	Associated General Contractors
CBT	-	Computer-based Training
CMS	-	Content Management System
CSV	-	Computerized System Validation
CTMC	-	Construction Technology and Management Centre
CTRL	-	Control
FKA	-	Faculty of Civil Engineering
FTP	-	File Transfer Protocol
GNU	-	General Public License
GPL	-	General Public License
HTML	-	Hypertext Markup Language
IMS	-	Instructional Management System
IT	-	Information Technology
LAS	-	Learning Administration System
LCMS	-	Learning Content Management System
LMS	-	Learning Management System
MSc	-	Master of Science
OSD	-	Open Source Definition
OSHA	-	Occupational Safety and Health Administration
OSI	-	Open Source Initiative
PhD	-	Doctor of Philosophy
PHP	-	Hypertext Preprocessor
REIT	-	Real Estate Investment Trust
RLO	-	Reusable Learning Object

RSS	-	Really Simple Syndication
SCORM	-	Sharable Courseware Object Reference Model
SPACE	-	School of Professional and Continuing Education
US	-	United States
UTM	-	Universiti Teknologi Malaysia
VLE	-	Virtual Learning Environment
WBT	-	Web-based Training
XML	-	Extensible Markup Language

CHAPTER 1

INTRODUCTION

1.1 Introduction

Two major factors impacted the construction industry during the last few years. The first was an increase in computer ownership by professionals and the availability of share packages. The second was increased competition in the industry. This competition compelled companies to use advanced technologies to reduce costs and time, while maintaining project quality. During the same period, construction industry became more diversified and fragmented. As projects became more complex, more design firms, contractors, subcontractors, suppliers and associated specialists were needed to guide the project through the feasibility study, planning, design, construction and operation phases (Li and Young, 1996). Information is a key element that drives these processes and holds all the activities together. Because the amount of information is considerable, its effective management and control becomes challenging. Therefore, the construction industry applies information technologies (IT) to cope with these demands. Moreover, study of this information management systems show that they can boost the industry productivity. For instance, computer aided design, construction automation, and decision support packages have helped the industry respond quickly to design changes; keep down construction costs; and make efficient decisions.

Today's society faces an immense proliferation of all aspects of knowledge. In order to keep curricula from becoming dated, current research results and applications to "real life" must be incorporated into today's classrooms. This integration implies a need for instructor awareness of the latest advances in engineering education. More and more students wish to obtain higher education. Technology is moving fast in some areas so educators need additional training every few years. Both of the above lead to a deficit of available educational resources too. Additionally, adult and part-time learners are becoming important consumers of higher education, requiring methods of educational delivery addressing space and time separation and student diversity (Vouk et al. 1999).

1.2 Issues and Problem Statements

Viruses have infected more than 6,000 computers at two campuses of Universiti Teknologi Malaysia (UTM) in recent months. The campus in Skudai, near here, is believed to have suffered the bulk of the virus attacks. The spate of virus attacks that began in February caused many students to lose their assignments, course notes and information. UTM Centre for ICT director Prof Zamri Mohamad said the virus attacks were widespread on the campus, with 30% affecting computers belonging to administration staff. Prof Zamri advised students to be aware of the problem and to avoid visiting websites that were not secure. "Most of the viruses come from the exchange of software and information using pen drives, disks and e-mail," he said (Vijayan, 2006). UTM was also looking towards moving its entire software system from Windows to Open Source as there were fewer viruses created for it (Vijayan, 2006). Meanwhile, UTM e-learning system has been developed for the past few years to ease the undergraduates and lecturers in uploading and downloading the lecture notes but, there isn't any collocation for the postgraduates. The same also goes to the UTM Construction Technology and Management Centre (CTMC) website where it is developed to promote regarding the center's operations, aims and services offered instead.

1.3 Research Objectives

1.3.1 To identify the current state of the art regarding the types of teaching methods in the field of Construction Management studies.

1.3.2 To identify the information regarding on the current syllabuses of the Master of Science in Construction Management education and suitable materials for the short courses to be used in the e-learning system.

1.3.3 To develop a web-based learning system for the post graduate candidates and the short courses participants in order to provide a medium, to learn and gain knowledge in the field of Construction Management.

1.4 Research Scopes and Limitations

Basically, this research project focuses on reviewing the current syllabuses of the Master of Science in Construction Management education which are conducted at the Universiti Teknologi Malaysia, Skudai, Johor. Furthermore, several Construction Technology and Management Centre (CTMC) of the Universiti Teknologi Malaysia related short courses and subjects will be selected as required and so have to be converted to the digital, electronic and portable document format in order to be adapted into the CTMC web portal at the following stage. Most probably, these short courses are being provided as the training modules for relevant local authority, government's agencies, contractors, suppliers and others independent interested group of public. Hence, integration with the CTMC existing web portal is essential. The web-based learning system or e-learning created would be also a contribution towards improving the current methodologies in teaching and transferring the relevant knowledge to the learners particularly in the field of Construction Management education and for the sake of the Construction Industry generally.

1.5 Research Justifications

With its vast potential and global reach, the Internet places increasing demands for our nation's educators. Some suggest the Internet will bridge the gap between school and home and increasing numbers of teachers have already incorporated web-based resources into their curriculum to expand instruction time beyond the typical classroom day. Web-based tools can genuinely support the teachers, collect and disseminate real-time information, eliminate technology problems, extend learning opportunities, and prepare their students for tests. Spearheading this revolution is a new generation of administrators and teachers who will utilize web-based learning tools to help students prepare for the information age we now live in (Valerie Chernek, 2006).

Additionally, synchronous e-learning is self-paced. Advanced learners are allowed to speed through or bypass instruction that is redundant while novices slow their own progress through content, eliminating frustration with themselves, their fellow learners, and the course. In these ways, e-learning is inclusive of a maximum number of participants with a maximum range of learning styles, preferences, and needs. Some of the most outstanding advantages to the trainer or organization are such as reducing the overall cost is the single most influential factor in adapting e-learning. The elimination of costs associated with instructor's salaries, meeting room rentals, and student travel, lodging, and meals are directly quantifiable. The reduction of time spent away from the job by employees may be the most positive offshoot.

Besides that, the learning times reduced, an average of 40 to 60 percent, as found by Brandon Hall (Web-based Training Cookbook, 1997, pp. 108). Moreover, the increased retention and application to the job averages an increase of 25 percent over traditional methods, according to an independent study by Fletcher (Multimedia Review, Spring 1991, pp. 33-42) is also one of the benefits discussed. Consistent delivery of content is possible with a synchronous and self-paced e-learning (Kevin Kruse, 2006). On the other hand, the online web-based and e-learning sessions are especially easy to keep up to date because the updated materials are simply uploaded to a server in fact (Obringer, 2006).

1.6 Chapters Organization

The write-up in this research comprises of five (5) main chapters including the introduction, literature review, research methodology, web-portal development and lastly the conclusion and suggestion. These chapters are arranged and organized in such a way so that they are inter-related consequentially among each of the topics stated as above (Glatthorn, 1998). Chapter 1: Introduction, discusses on the matters which are relevant to the fundamentals of research such as topic introduction, issues and problem statement, research aims and objectives, research scopes, research justification and the chapters organization. The first chapter is significant in determining the “4 WH 1 H” concept representing what, when, where, who and how.

Later on, the second chapter focuses on the literature review. Chapter 2: Literature Review is written as to explain, review and gather the information related to the current state of the art regarding the types of teaching methods in the field of Construction Management studies. Besides that, this chapter would also touch in detail about information regarding the current syllabuses of the Master of Science in Construction Management education and suitable materials for the short courses. Meanwhile, this information might resource from reference books, articles and journals either in hardcopy format or online web-resources as well. Accordingly, Chapter 3: Research Methodology emphasize on the methods used in collecting data, including the secondary data through articles, books and journal reviews.

It also deals with how study is designed and performed to gain understanding towards designing a web-based learning system for the post graduate candidates and the short courses participants in order to provide a medium, to learn and gain knowledge in the field of Construction Management. As a result, Chapter 4: Web-Based Learning System Development would discuss on the developed web portal for e-learning in detail including the guidelines to utilize the web correctly and effectively. Then, Chapter 5: Conclusion and Recommendation are written to draw conclusions which have achieved. A section is also devoted to limitations in this study output where there is a need for possible areas to further research in the vast field of web-based learning system in construction management applications.

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