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Generic model of a web-based learning management System for teacher's training

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ABSTRACT

E-Learning has provided a new dimension approach in handling the teaching and learning of an educational institution. Web-based learning is an Internet application program, which was developed to fulfill the learning concept in the E-learning program. Educational Learning Management System is a generic model of the Web-based Learning Management System for the Teacher's Training College. The methodology used in developing is Rapid Prototyping. consists of three modules, which are the Course Registration, Course Contents and Course Activities. These modules enable accessing, planning, delivering, and managing E-Learning programs to fulfill the Smart Learning principles in order to construct an integrated learning, interactive learning and to inspire the collaborative learning in teacher's training. can be accessed via the Internet and Intranet infrastructure, and can be deployed either as an online-learning or as a supplementary medium for the face-to-face learning.

Introduction

The current and future trend in education is focus on the searching and information retrieval based on the Internet application technology. The Internet technology has offered a new dimension in the teaching and learning approach since it has the capability to provide huge and varieties of information resources using efficient search engines and directories (Sonnenreich, 1998). With the rapid development of the Internet technology, the e-learning concept has been introduced and later has presented the educational institution a new dimension approach in managing the teaching and learning. The Web-based learning management system is one of the Internet application programs that have been used widely by the computer software company and education institution. It has been used as an infrastructure for the implementation of the E-learning program. The system has growth rapidly and being used widely as an information system and database system to admin and manage all the teaching and learning activities.

Information technology and learning styles

According to Korma (1995), research of Information Technology and Communication in Education showed that the Information and Communications Technology (ICT) development and Internet technology did not provide a full impact towards education and only contribute minimal impact towards the learning process. Although the multimedia technology has been integrated in the development of the computer-based teaching resources, the application is only able to act as a decorator to the interface and did not function as the main part that could not assist in enhance the teaching. The question is that, how could this have happened? Is it the teacher who is not creative enough in planning the teaching with the technology-rich learning environment concept? or is it the teacher could not apply the strategy, technique and teaching approach in classroom to the computer-

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based teaching sources because they were not given a clear and complete guideline regarding ICT application in producing web-computer-based resources?. All the questions are more towards the development of teaching resources that could not function as expected. What about the students that involved as an object to validate the success of the learning activities? Has the teacher identified the learning level and learning style of the student? Recent research proved that the student learning style have very high influenced in learning product. According to Hossein Arshad (2002), to produce a success computer-based teaching and learning activities, the teaching resources should deliberately planned and able to create an environment that both the student and teachers actively involved in the learning process. The teaching would be dull and boring if the educator did not consider the different level of individual learning style. Carob (1986) and Campbell & Campbell (1999) stated that the student would be more motivated, initiated and able to increase their learning level, provided that if the teacher is able to deliver the teaching preach parallel with the student learning style. In a normal face to face (F2F) classroom, it is hard for the educator to identify and fulfill all the learning style practiced by each student. In order to fulfill different level of learning style, Schweitzer (1999) and Nelson (2001) suggested that ICT is used because with the application of this technology, it could boost up an effective learning opportunity.

A well-planned ICT application and usage enable to produce student with these characteristics:

(i) Student who is more responsible towards his/her learning activities.
(ii) Student that able to identify his learning resources requirements
(iii) Student is able search for information according to his/her needs, access level and knowledge.
(iv) Student that able to develop new knowledge based on information search and retrieval, two way communications and self-finding.

Self-Directed is a self-directed learning where the student will identify his/her own topic in certain discipline that he/she wishes to learn.

(ii) Self-Access is a self-access learning where the student can search and retrieve information regarding the topics to learn from various sources. References book, magazines, CD-ROM, and Internet are the sources that they utilize to get the information.

(iii) Self-Assessed is a self-assessed learning where the student can evaluate and assess himself of what topic has learned. If the achievement for certain topic met, he can then move to other topics.

(iv) Self-Paced is a self-phase by phase learning. This type of learning has provided some space for the student to monitor his self-learning. The question is how a teacher could manage his/her teaching activities to meet the smart learning goal if there is no system that could detect and identify the student learning development? Therefore, it is very important for an educational institution to have a computer-based environment and infrastructure that meet this goal.

Information technology infrastructure and infrastructure

The IT infrastructure is referred to the environmental support provided in order to enable the implementation of online computer-based teaching and learning. A complete infrastructure is required to guarantee the success of the computer-based teaching and learning. Both teacher and student need sufficient numbers of computer, complete networking system and a server that can function around the clock in order to assure e-learning process run efficiently. A student, who used a computer-based learning material, is an autonomous self-learner. He/she totally depends on the ICT facilities to access the learning materials. As for the educator, he/she needs an appropriate and easy computer software to help him/her built an electronic teaching material.

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The effectiveness of a web-based teaching refers to the capability of the students to access and learn from the materials provided through the system. Both the teacher and student are unable to experience a good teaching and learning or in other words the implementation of the e learning is failed if the ICT infrastructure is not complete and inefficient. Therefore, based on these requirements, the educational institution's Campus networking system project has been implemented since 1999. This project involved the process of supply, delivery, installation, testing, certified and documentation of hardware and software to support the ICT system. Campus networking system infrastructure included all the local area network facilities and leased line (Bahagian Pendidikan Guru, 2002). The first phase of the project witness five teacher's college has completed with the infrastructure mentioned. While the second phase, which involved several others teacher college, is still under implementation The campus-networking project will offer a new dimension for the educational system in the teacher's college especially in the e-learning process. The infrastructure provided is able to increase the effectiveness and the efficiency of the learning that based on the smart learning values. Self-directed, self-access and self-phased can be applied interactively in accessing teaching and learning materials through the web pages and training software (Bahagian Pendidikan Guru, 2002). The teaching and learning that based on Internet and Intranet need to be expanded completely and integrated in the teacher's college in order to produce ICT and E-Learning skillful teachers (BPG, 2002). Providing ICT infrastructure facilities itself would not bring out impact to the education if the teacher itself does not utilize these facilities during teaching and learning activities. In order to benefits from ICT, teachers should have the skill in designing teaching materials electronically using specific software and should know type of appropriate communications to be utilize as teaching and learning environment.

Teachers should plan an interactive learning program given that ICT offers interactive elements through certain application. According to Hossein Arshad (2002), interactive teaching is refers to the teaching approach that used the web-based materials; therefore enable to create such as an environment, which encourages maximum involvement between the students themselves and, between the student and the teacher. The approaches commonly used are idea sharing via two ways communication between the educators and student using the virtual chat room and one way communication where the student will send inquiries regarding certain subjects which is hard to understand through the bulletin board, forum discussion and e-mail. The trendy interactive approach used by most of the web-based training is one-way communication (Hossein Ashram, 2002). The production of interactive teaching materials depends on the interface design used. An effective interface design basically consists of four characteristics such as below:

(i) Teaching materials, which are easy to access.
(ii) Teaching materials should be easy to use due to lack of technical skill.
(iii) Teaching materials which can function accordingly
(iv) Teaching materials that can illustrate certain concepts or ideas.

Learning management system

An interactive teaching material prepared by educators should be organized efficiently, systematic and effectively in order to take full advantage of its usage in learning. Therefore, it is important to have a system, which is able to manage all the required teaching materials activities. The system is also known as Learning Management System (LMS). Generally, LMS software is an infrastructure utility in planning, delivering and managing E-Learning program using the existing format or can choose from potential format (Evangelist, 2002). According to the American Society for Training & Development (ASTD, 2002), LMS software should have these criteria's:

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a. System that can support varieties of learning values.
b. System that can be integrated with the Human Resources Information System.
c. System that capable of managing the teaching activities.
E-Learning Center's (eclipse, 2002) has identified 10 modules required in LMS software. The modules are as below:

(i) Course Management Module
(ii) Animation and Demonstration utilities for the on-line teaching materials.
(iii) On-line Interactive Testing and Evaluation
(iv) Forum and discussion
(v) Group Discussion Software (Groupware)
(vi) On-line meeting module (Windows NetMeeting) (vii) On-line community service utilities
(viii) Chat Room
(ix) Module to perform a collaboration learning
(x) Module to snatch the learning activities (Web logging)

There are several LMS modules that contain forum utilities, message board and chat room that have been utilized and integrated in on-line community web pages (World Crossing, 2002).

Generic model of education learning management system (ELMaS)

Vision and Mission

ELMaS is a system purposely developed to fulfill the E-Learning essential for the teacher's trainee in Teacher's College. The Learning Management System ELMaS planned accordingly with the mission, vision, goals, objectives and other values outlined by the Bahagian Pendidikan Guru in order to turn out the world-class educators through ICT integration in teaching and learning via e learning. ELMaS development is to fulfill the vision towards enhanced E-Learning in teacher's training by knowledge management integration towards an effective Learning Management System. ELMaS Development The Institute Perguruan Darulaman (IPDA)'s lecturers have developed ELMaS using the open source software. The idea for developing ELMAS is based on the latest learning trend which is E-Learning, the requirement of a system that able to manage the learning activities electronically, and the requirement of the system that able to detect the knowledge, skill and trainee's competency in Teachers' Training. IPDA has identified ELMaS as a generic model for managing the learning activities based on its function and ability as a web-based application, which is able to manage the learning activities electronically, detect the learning product, integration with the Human Resource Management System and learning resources, the development of the teaching materials to be delivered or submitted by the student, and the availability of the additional management features for evaluation towards the smart learning concepts.

ELMaS Module

ELMaS consists of 3 main modules. These modules provide facilities such as below:

i. To enable the SeDAAP values, the student are allowed to download the course materials required.
ii. The lecturers could distribute the course work using announcement facilities or through registered e-mail facilities.
iii. Course work can be submitted electronically to the lectures while the system could detect and validate the date for course work submission.

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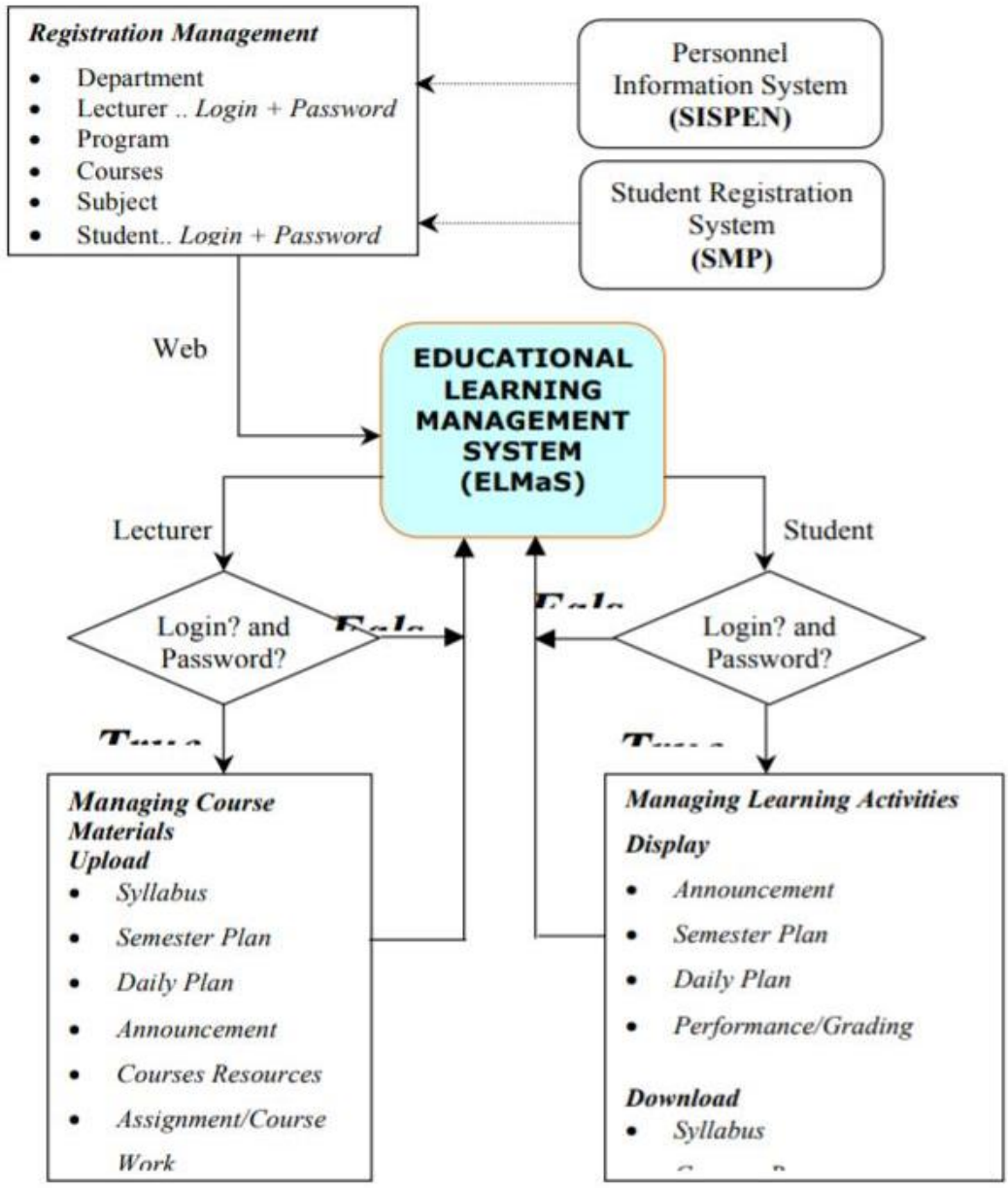
Model ELMaS Ver 1.0

Figure 1. below illustrates the data flow and the process involves in ELMaS.

Strategy in implementing ELMaS The implementation of ELMaS in Teacher's Training is based on



the Blended Learning Concept (B-Learning). Blended Learning is a combination of F2F learning, project-based learning, practicum learning and web-based learning. In the Blended Learning approach, the learning activities do not implement fully online. On the other hand, ELMaS is used during the F2F teaching.

Preliminary test for ELMaS 1.0

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The ELMaS concept has been presented to the BPG E-Learning Development Meeting. It has gone through 3 tests. The complete information regarding the test is as below: Respondent ELMaS modules have been tested, by the lecturers of Jonatan Technology Pendidikan. These lecturers registered the student for the subject offered in January 2002 intake. These subjects are for programs such as Kursus Perguruan Lepas Ijazah (KPLI) majoring in Information Technology, Multimedia Interactive and Computer Science, the Program Khas Pensiswazahan Guru (PKPG) majoring in Information Technology and education and Multimedia Interactive. Total of 247 students involved in this test. The distributions of the student are illustrated as in Table 1 below.

Program	Course	Number of Students	Total number of student
Kursus Perguruan Lepas Ijazah (KPLI)	Information Technology Computer Science Multimedia Interactive	17 40 19	76
Program Khas Pensiswazahan (PKPG)	Information Technology Multimedia Interactive	112 17	129
Kursus Sijil Perguruan Khas (KSPK)	Information Technology	16	16
Kursus Dalam Perkhidmatan 14 Minggu (KDP)	Information Technology	22	22
Total			247 student

The lecturers who involved in this preliminary test upload teaching resources, evaluation materials and teaching activities information according to the syllabus provided by Bahagian Pendidikan, university Pendidikan Sultan and University Utara. All the teaching materials have been utilized duringteaching and learning session is on. The students are able to download the teaching materials from the ELMaS server for revision apart from the official learning time. Technical Specification Three computer labs are utilized for the test. Each lab consists of 25 personal computers, which are networked link to the Internet. The ELMaS software and the resources are placed in the same server in order to make it easier to access and manage. Support resources are required to enhance the teaching and learning using the ELMaS system. The technical specifications used to implement the tests are as below:

- Personal Computers with Pentium III processors
- Main memory of 128 MB RAM or higher
- Network Interface Cards
- UTP Cable of Cat 5 to hook the station to the college networking
- Microsoft Window NT Operating System

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- Microsoft ODBC
- MySQL ODBC (Open source)
- Apache 1.3 (Open Source)
- PHP 4.0 (Open source)
- MySQL 3.2.3 or higher (Open source)
- Internet Explorer 5 Browser
- Macromedia Dream Weaver
- Microsoft FrontPage

Conclusion

The rapid development of on-line training and education required an expansion on the Learning Management System itself. In order to get into this goal, ELMaS will be updated according to the current educational requirements. To bring up B-L successfully, there are several infrastructures and info structures that have to be improved. Below are several suggestions for these purposes.

(i) It is essential to increase the amount of the learning resources, and to varieties the materials. Therefore, each lecture is required to prepare his/her own web-based teaching materials and electronically base resources. He/she shall also plan an implementation strategy for the learning activities to be implemented in F2F teaching.

(ii) On-line learning facilities such as ICT labs, research studio and high technology simulation studio shall be made available to the student and can be accessed during formal class hour.

(iii) Some additional values shall be included in ELMaS so that the usage can be expanded to the Intranet and Internet environment. The additional values such as a module to enable communication among the students and lecturers through email, bulletin board, chat room and discussion board. ELMaS shall also be integrated with the computer-based evaluation and on-line questionnaires to enable the student identify and choose their own learning requirements.

Implementation issues shall also be considered. Some of the issues commonly found in E-Learning implementation are the learning resources could not be accessed due to the computer lab and technical difficulties, the data security and secrecy, network and computer maintenance and service to the users.

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