

# Dynamic Multimedia Content Creation for Independent Learner: A Web Based Learning Environment

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## ABSTRACT

*This paper arose from a research project conducted to develop a prototype and framework for effective implementation of CBL (Computer Based Learning) courseware. The central objective of the research is to develop a prototype of ILC-WBLE (Independent Learner Courseware in Web Based Learning Environment) as teaching tool for learning the customised Moodle called WBLE among lecturers in Universiti Tunku Abdul Rahman (UTAR). Digital multimedia content creation with dynamic features and easy retrieval with only few clicks is integrated in the courseware to enhance profiling systems for the ease of use among teachers and students. The effectiveness of the theoretical-based multimedia courseware in the teaching and learning of customised Moodle (WBLE), compared to the conventional face to face teaching in the learning is then evaluated to determine the usability of the prototype.*

### Keywords

*Independent Learner, Moodle, Multimedia, Courseware, Computer Based Learning (CBL)*

## 1.0 INTRODUCTION

Computers and communication technologies have played an increasingly major role in our daily lives. All these technological advancement and innovations have certainly affected the way we live, work and play. There will be accelerating technology innovation and explosion of knowledge; and this will change they way we respond to new situations and challenges. The advent of the Internet and digital technologies, various applications and more sophisticated equipments are breaking through traditional physical and virtual boundaries. This has made connectivity seamless and the dissemination of information very much quicker. Furthermore, the development of application software programmes and various applications has changed the ways of teaching-learning today.

Learning institution plays vital role to take serious consideration in expanding the frontier of the learning environment for students. The available technology is a powerful enabler. The advancement of technology today plays the important role, particularly the Computer Based Learning (CBL) freed learning from time, religion, gender, paper based materials, and border constraints.

Traditional face-to-face classroom instruction has its limitation in the development of independent life-long learners due to the lack of flexibility compared to CBL. CBL environments regularly provide learners with a variety of support devices to foster learning (Clarebout & Elen, 2004). CBL enables learners to learn in their own time and at their own pace. Teaching-learning process has the potential shift from traditional face-to-face learning to independent learning with the innovation of CBL.

CBL also has its capability to promote the efficacy of life-long learning and produce quality education. In Malaysia, CBL, particularly distance learning has been successfully help a lot of working people to pursue studies. Typical examples in the implementation of CBL and distance learning to foster independent learning include Open University Malaysia (OUM), Wawasan Open University (WOU), and Asia e University (AeU).

The discussion in subsequent sections include research background, problem statement, research objectives, research scope, proposed instructional design model, and potential contributions of the research.

## 2.0 RESEARCH BACKGROUND

Baillie and Percoco (2000) claims that, new technologies allow us to increase access to more information, as well as giving us the potential to change the traditional role of teachers, who will be able to shift their educational interest from imparting knowledge to other aspects of the teaching/learning process and to new educational objectives. In the past, learning is more of an end to teaching and

teachers are committed in making learning occur. All the while, the practice of learning was to convey information and knowledge from instructors to the learners. But nowadays, it is a fact that, one learns from traditional teaching may not be sufficient to prepare him/her in facing new situations and challenges.

Learning today takes many forms; students in tertiary institution not only learn from lecturers or designated text books, there are many sources of information and knowledge which can be reached easily. Students learn from peers, electronic media, Internet, experts from other parts of the world through WWW, and so forth. The notion of teaching is not defined as conveying what we know to students but it should be viewed in wider perspective of setting up different environments for effective learning to take place. The notion of learning has changed too. Learning is not just about remembering or applying what has been learned, however, the learning experience should prepare oneself to be a more independent and self-directed learner, be able to utilise the skills to solve real life problems.

The advent of CBL is in the 1980's where computers were becoming more readily used in commercial and educational institutions. CBL is increasingly used to enhance learning experience and valuable learning for students, and providing teaching resource for instructors (Overfield & Bryan-Lluka, 2003). In the earlier stage, CBL is operated by a trained instructor for usually enrich learning in a traditional context and today it offered in an actual classroom which directed by an instructor and used by learner, meanwhile also offered through online technology (GuideToOnlineSchools.com, 2008). CBL has evolved into many different levels and forms and it is used in all levels of education from elementary to higher institution.

Web-Based Learning Environment is a CBL system corporate with online technology. With the advancement of Web technology, many instructors are becoming interested in using Web-Based Learning Environment, where the Web enhances access to experts and real-time data and enables multiple forms of communication among the learners (Herrington & Oliver, 2000). Instructors update the teaching materials, notes or assignments and learners access to the most updated information in real-time. Without any boundaries and time constraints, Web-Based Learning Environments are accessible anytime and anywhere as long there is connected to the Web.

Moodle is one of the popular course management systems to create a web-based collaborative learning environment. It is widely used in almost all higher institutions, so as Universiti Tunku Abdul Rahman (UTAR). UTAR is using Moodle to create a resource website called WBLE (Web Based

Learning Environment) which can be accessed at: <http://wble.utar.edu.my> to facilitate the teaching and learning processes since year 2005. It usually serves as the online communication tool between lecturers and students. This customised Moodle system (WBLE) can be tailored to fit lecturers' needs. It enables lecturers to upload and post related documents and announcements, implement online quizzes, and so forth. There are approximate 15 thousands users are using WBLE in UTAR across few campuses such as Kampar, Petaling Jaya, Setapak and Sungai Long. Thereby, it is vital to figure out whether lecturers have already fully utilised features embedded in the system in order to assist them in teaching and learning. Several important features integrated in WBLE are as follows:

- **Learning Materials Management:** Lecturers upload lecture notes, tutorial questions, assignments, and so forth on WBLE for students to download.
- **Announcements:** Lecturers post or update latest announcement pertaining to academic or activities in this section.
- **Grades Listing:** This is the place where students keep track their latest scoring of subjects prepared by lecturers especially when a quiz is carried out in WBLE.
- **Personal Profile and blog:** Blogging is a trend in this era; most internet users own a personal blog. For students and lecturers who like to share their thinking, this is the good place for them to put their personal thoughts.
- **Calendar:** Highlighted activities and upcoming events will be posted in this section. Submission date of assignments, presentation date, and any other academic related notification can be found in the calendar.

### 3.0 PROBLEM STATEMENT

WBLE is a course management system in UTAR. It serves as platform for lecturers and students to communicate with each other. Hence, it is essential for lecturers to fully utilise the system to achieve the best result in academic performance. WBLE is a powerful tool with plenty features; each feature is contributing to improve the quality of learning environment. A proper training or instruction in using WBLE is important; else, it will easily cause confusion during the system execution.

However, to conduct training on the use of WBLE is time consuming. In current practice, new lecturers are given approximate two-hour training session in learning how to use WBLE; it can be considered as inefficient learning due to the limited timeframe

given. In addition, without any printed handouts and support assistance on the training of using WBLE, lecturers, especially those attached to non-IT faculties are mostly not able to fully utilise the system in teaching-learning and communication with students. This is in line with the analysis of Borysowich (2005), there are 80% - 90% of learners in the face-to-face learning contexts tend to forget the information learned within two weeks.

Although some systems' administrator might consider provide an online version of system user's manual as a reference guide for users, however, it is considered not efficient enough to assist them in operating the system. According to TechFAQ (2009), the human brain learns using many senses such as sight and hearing; a teaching consists of images and animations or using interactive CD-ROMs could help learner retain information much more effectively. Hence, teaching individuals a wide range of subjects by using multimedia courseware has been extremely effective. It is to be mentioned that the implementation of interactive multimedia courseware in teaching lecturers to use WBLE is definitely a sensible decision in improving the understanding of using the system.

Time management is managing time to be used for a person's advantage and gives chance to spend most valuable resource in the way person chooses (Penn State University, 2001). Baillie and Percoco (2000) assert that information technologies can help with many learning problems and allow teachers themselves to spend more time in exploring new ways to teach their subjects, giving individual attention to student learning needs. Hence, the development of ILC-WBLE facilitates personalised learning to increase the learning efficiency. ILC-WBLE enables lecturers, especially new lecturers to learn WBLE without spending much unnecessary time in wandering around the system.

#### 4.0 RESEARCH OBJECTIVES

The main objective of the research is to develop the ILC-WBLE prototype. It also aims to:

- research on the best Instructional Design Model (ID Model) which is deemed suitable for developing an Independent Learning Courseware for Web-Based Learning Environment (ILC-WBLE).
- design a suitable Instructional Design Model (ID Model) for developing the ILC-WBLE based on instructional design approach.
- evaluate the usability of ILC-WBLE prototype as an alternative learning mode to traditional instruction.
- identify the strengths and limitations of ILC-WBLE.

- develop a framework for effective design and development of Computer Based Learning Modules.

#### 5.0 RESEARCH SCOPE

Although the quality of educational content in most of the courseware is relatively high, but the system has been unreliable with unfriendly user interfaces, and also the lack of technical support, and bugs have been legion tend to fall over unexpectedly (Riley, 1995). In current, the advancement of Graphical User Interfaces (GUI) and rich features of multimedia software such as Adobe Director (previously known as Macromedia Director), Adobe Flash (previously known as Macromedia Flash), and Microsoft Power Point have significantly increased the expectation of users. Users in general no longer tolerate the simple GUI and linear interaction implied in the system. They are expecting for the multi-interaction with attractive interfaces.

The text-intensive courseware with a little bit of graphics or animation is lack of excitement and cause learner reluctant to use it. Sometimes, designers do show some effort in making the courseware interesting by integrating various types of graphics into the system, but it is not always properly presented because graphics without any meaning included in the system are considered redundant; if there are too many graphics, these will disturb the eyesight of users. Every single graphic and illustration insert into courseware must have its own meaning, not merely for decoration purpose. For example, illustrations included should cooperate with the design layout of the system and types of graphics must suit the learning contents.

Currently, most of the interaction of existing courseware is trivialised to Object Interactivity or Linear Interactivity (Sims, 1997).

- **Object Interactivity:** Object interactivity refers to the objects in application get activated by using a mouse clicking or pointing; the responses are determined by the previous objects encountered or the previous objects encountered with the current objects or previous instructional performance.
- **Linear Interactivity:** The user is able to move forwards or backwards through a predetermined linear sequence in the application. Normally this interaction is capable in page-turning and does not provide specific responses by simply provides access to the next or previous display sequences.

Sims (1997) has categorised interactivity into 10-levels; Object and Linear Interactivities are at the first level of the category. This means that these

interactivities matched against the 10-levels of interactivity is relatively at low level only.

An effective CBL consists of variety of interactivity relevant with the content of the application in a user friendly interface and attractive graphics design; yet, the embedded feature of user access log management (profiling system) enhance the quality of application. With this profiling system included in CBL, learning can be more flexible with user controls over the learning process within a period of time assigned by learner. The continuity of learning is possible once the learner have saved before logging out from the system.

With regards to the scope of research, development of ILC-WBLE will be included with the following aspects:-

- **Enhanced Interface Design:** ILC-WBLE will be integrated with appropriate illustrations and graphics that can be incorporated with the contents of the system and design layout to facilitate teaching and learning process.
- **Variety of Interactivity:** Interaction more than just clickable object or linear sequencing interaction will be inserted into ILC-WBLE. Interaction such as answer question by drag and drop the relevant word to the particular question or perceive different responses after filled in difference answers.
- **Embedded Profiling System:** Accessed activities of learner will be stored into the system and can be retrieved anytime when user logged into the system.
- **Dynamic content creation:** Contents of developed ILC-WBLE can be altered or inserted with new information and consequently it becomes a brand new learning module for students to learn. This can be added by lecturers/administrators anytime and anywhere as long as there is access to Internet and ILC-WBLE system.

## 6.0 INSTRUCTIONAL DESIGN MODEL

An Instructional Design Model (ID Model) as shown in Figure 1 is created based on ADDIE. This ID Model is served as road map in the implementation of the research and development.

ADDIE is a generic and simple Instructional System Design (ISD) model consists of five stages which are Analysis, Design, Development, Implementation, and Evaluation (Strickland, 2006). It is a popular life cycle model for Computer-Based Learning application development (Parekh, 2006). With the employing of ADDIE model in the development of the courseware will emphasis on learner-centred

approach relatively to teacher-centred approach, it is more appropriate and significant for learners (Peterson, 2003).



Figure 1: ID Model of the research which consists of five stages (ADDIE)

### 6.1 Analysis Stage

At this stage, a thorough review will be carried out on current up-to-date researches and development of multimedia courseware for the Learning Management System (LMS) and Web Based Learning Environment (WBLE) generally and Moodle system specifically. This stage also involves the reviews of the current up-to-date researches on Moodle modules used in multimedia learning environment. These reviews focus on the determination of the limitations and weaknesses of the existing methods and the development of an efficient system based on the design of an appropriate Instructional Design Model (ID Model) for ILC-WBLE. More specifically, the reviews would also help in establishing a framework for the design and development of a CBL customised module for the learning of the customised Moodle (WBLE).

### 6.2 Design Stage

With the input from the previous stage and the synthesis carried out, an appropriate ID model (figure 1) for the development of the ILC-WBLE system will be established in this stage. The system design also emphasises on theory-approach-based multimedia elements and adopts dynamic content creation feature.

### 6.3 Development and Implementation Stage

Based on the established ID model, a prototype ILC-WBLE module will be developed. The designed module is designed with instructors (lecturers and

tutors) in higher learning institutions as the target users. Followed by the development of ILC-WBLE system will be carried out accordingly to the activities as stated below:-

- Besides text content, the system basically includes multimedia elements such as graphics, recorded video, audio and captured screen activities.
- The utilisation of recorded audio and video by using sound recorder and digital video camera as supporting elements of the module.
- It needs to be stressed that although the system relies heavily on multimedia and technology it is not the author's intention to produce just a basic Computer Based Training (CBT) courseware for routine learning. The principles of the design of the system should be well supported in instructional design theories and pedagogical principles.

The system implementation is referring to the pilot testing of the developed system. A self-test run of the system will be conducted at this stage. The scope of testing mainly focuses on bugs' detection with the purpose of refining the system.

#### **6.4 Evaluation Stage**

An experimental research will be carried out in testing on the usability of the developed system where consists of five constructs such as (i) ease of use, (ii) easy to learn, (iii) level of interactivity, (iv) presentable of interface (v) error free assessment. At the same time, the experimental research also includes with the comparison on the effectiveness learning of theory-approach-based courseware with the face-to-face teaching where participated by lecturers and students from different years, programmes and faculties.

#### **7.0 CONTRIBUTIONS**

For the past three years, The Centre for Learning and Teaching (CLT) in UTAR has been training academic staff on the use of WBLE via the CM3.1 (Part A & Part B) courses. Due to the ongoing expansion, the University has to recruit new academic staff from time to time. Training of staff on the use of WBLE requires substantial amount of money in the long term. If the use of the computer as a tutor for the learning of WBLE is feasible, then it is indeed a cost effective measure in terms of staff training. Furthermore, the success implementation of CBL for WBLE would promotes and motivates UTAR academic staffs to explore further into the potential of CBL in other subject areas as well.

Graphics generate and retain the interest of an audience by brightening up any lessons (Capron and Johnson, 2004), it is a fact that most people prefer

looking at pictures rather than reading through pages of text. ILC-WBLE system consists with attractive user interfaces and appropriate illustrations and also integrates with variety of interactions will certainly boosts up learners' interest in learning and reaches the result in retaining the attention of learner in learning.

The integration of profiling system in ILC-WBLE will be a useful assistance for learner during the whole progress of learning. History of accesses and achievements of learner can be reviewed anytime after logged in the system. It is to keep track with the latest score obtained by learner sequentially to evaluate on their learning performance to ILC-WBLE.

Nevertheless, this ILC-WBLE is a dynamic content creation multimedia courseware which content of the system can be altered. It is to benefit lecturers who would like to employ ILC-WBLE as multimedia teaching tool by re-define the content of ILC-WBLE system into other subject information for their students to learn.

#### **8.0 CONCLUSION**

Numerous studies over the years have shown that interactive multimedia learning takes less time and it is more enjoyable and increase learning process (Hick, 1997). It is believed that the development of ILC-WBLE would benefit lecturers to gain knowledge in exploiting the system, as well as improving the learning progress of students. Based on the studies on different types of existing WBLE, the vital points of building a successful WBLE will be figured out and implies in ILC-WBLE. The ultimate goal in developing ILC-WBLE is to achieve the effective profiling system, variety and relevant interactivity, attractive with user friendly system interface, and dynamic content creation feature. We believe that with the presence of ILC-WBLE, learning can be more exciting and in ease.

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