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OBEmanager: A Model of OBE Mobile Application System Management for the Academician

Rusli Haji Abdulah

Faculty of computer science and information technology
University Putra Malaysia (UPM)
Kuala Lumpur, Malaysia
rusli@upm.edu.my

Abdifatah Farah Ali

Faculty of computer science and information technology
University Putra Malaysia (UPM)
Kuala Lumpur, Malaysia
Abdifataah4u@gmail.com

Abstract— Outcome-based Education (OBE) right now is very important to the academician, especially in Higher learning Institutions (HLI) in ensuring the student will get the benefits in teaching and learning of their study. In this context, there is a lacking of the OBE system model in helping the academician to use in OBE management for mobile application system environment. Since that, the implementation of the OBE as a system model for mobile application called as OBEmanager which main objectives is to offer the academician and easy and straightforward access to general information about their courses. So that it's easy to monitor the OBE of student achievement based on Cognitive, Psychomotor and Affective (CPA). Therefore, in this paper we will be highlighting a system model of OBE for academician in HLI. The proposed model will be covering the conceptual design and its interaction as well as the system configuration in supporting the academician to use it in their teaching and learning towards effectiveness and its efficiency.

Keywords— Outcome-Based Education (OBE), Mobile Application, System Model, Higher learning institution (HLI), Teaching and Learning

I. INTRODUCTION

Outcome-Based Education (OBE) is becoming popular in teaching and learning (T&L) in order to determine whether the students achieve the curriculum design. The OBE has developed and implemented by researchers in the past, it was broken into two ways which starts from program education outcome, to course outcome called as design method, this they followed with course outcome that is beginning from course outcome goes to program outcome called assessment method. The measurement of OBE can be done through assessment method, which consists of test, assignment, project and presentation and so on. The objective of OBE is designing to support the academicians in order to achieve their educational goal as well as learning outcome, which is based on a particular input and output.

The OBE also has been developed or designed based on the scenario in T&L, which is involved the component of input, process and output for a particular program implementation onto the students particularly in Higher Learning Institution (HLI). In developing application of an OBE system model for the academician in HLI in the mobile system, there have been

limited study of OBE in mobile application. A framework has been developed and introduced to help us to understand the wide variety of educational technology applications [1] but there is no actual mobile application of OBE for an academician was been developed.

The objective of this paper is to propose a model of mobile application platform for managing of OBE in HLI. The Mobile Application model for HLI called **OBEmanager** also being developed that will allow academician to use their mobile devices in managing and evaluating a wide variety of assessment of their course also able to access the information or any other aspect of instructions at anytime and anywhere. The purpose of the OBEmanager also help the academician to determine whether the student achieve the OBE of their CPA or not. First of all, the application has to match with the requirement of OBE [2] as follow:

- i. Coming up with comprehensively designed learning outcomes which can be established prior to more progression.
- ii. Curriculum design for ensuring progress in learning outcomes.
- iii. Assessment process design that will match learning outcome for a student or group of students to guarantee success in the outcomes.
- iv. Remediation and enrichment provision for student in an appropriate manner.

The rest of this paper is structured as follows. In Section 2, an overview of some literature reviews related to the OBE research, Mobile application, and Higher learning institution. In Section 3, the research methodology is discussed related to the OBE research. In Section 4, we proposed a model that facilitates Mobile App for OBE in Higher institution, in Section 5 presents, the main development activities and their results. This paper will be concluded in Section 6. Therefore, we affirm that our Apps (Mobile Apps) for OBE principle design will be applicable and will be a good if not perfect contribution to related fields of endeavor/studies.

II. LITERATURE REVIEW

A. Outcome based education

Outcome based education (OBE) is an approach to education in which decisions about the curriculum are driven by exit learning outcomes that the students should display at the end of the course [3]. There are two major types of outcomes in OBE. Firstly emphasizes on measurement of coursework, examination results, rates of course completion and employment upon graduation, Secondly performance indicator is less tangible, commonly required the learner's to express what they have learned and capable to perform as a result of completing their education. It places greater focus on long-term outcomes leading to the future career success of the learner. OBE consists of four primary principles: expanded opportunity, high expectations, clarity of focus and design down [4].

The development of outcomes following the hierarchy of Lesson Outcomes, Unit Outcomes, Course Outcomes, Programme Outcomes and Exit Outcomes especially HLI. The assessment of the overall achievement includes a linkage to long-term educational outcome of the learner [5]. Figure 1 shows the level of outcome development.



Figure 1: The proposed linkage from top to bottom levels of outcomes development with the incorporation of long-term PEOs [5].

They proposed ICOPER project approach to allow for E-Learning outcome based education at university environments. In order to meet this aim, learner is deemed to acquire a well desired learning outcome is the starting and also pivot in the design, assessment and delivery of learning units and opportunities in universities. Furthermore, learning outcomes necessary for the workplace needs to be considered throughout the development of university learning offerings. This makes for closing the gap between the needs of the workplace and the offerings of the academia. The ICOPER project researches outcome-based learning infrastructures for higher education contexts [6].

They described SpITKom, a browser Game developed to assist the acquisition of IT Knowledge. Using a browser Game, it uses ICOPER's technical infrastructure which combines

learning object metadata reposition, learning outcome repositories, learning design repositories and learner profile repositories. The technical infrastructure of an outcome oriented learning scenario which has been developed in the course of ICOPER and then outline its transformation to the game-based learning approach [7].

Although OBE for web based offers a bright vision for education, it is not a panacea and problems may arise if an outcome-based approach is improperly implemented.

They introduce ARTS; a web based academic system for outcome based education. The main features of ARTS include rubrics management, assessment, and reporting, which are helpful to curriculum designers, teachers and students. The system provides interfaces for integrating with other existing platforms such as e-learning and administrative systems. It has been used by an academic department seamlessly for over a semester period and its reliability is satisfactory [8].

For the side of OBE in intelligent system, there is view of research in outcome based education has a positive impact for the availability of guidelines at the time of exercise sessions, this shows how a academician can take advantage of assessments of exercises with hints. They addressed two main points: the design of exercises with hints; and the evolution of concepts, exercises as well as the correlation of final students' grade with respect to the activity in the system [9].

B. Mobile Application

Mobile application commonly known as mobile apps is a software program which is designed to operate on Smart phones, tablet computers, other mobile devices and provides rich personal services for example viewing, sending emails, browsing the world web and chatting with others.

The Novelty of Mobile apps is rising continuously as patronage increase through the people using mobile apps. A Study ComScore conducted in May 2012 revealed that in the previous quarter, many subscribers of mobile uses apps in contrary to browsing web on their machines. The percentage is 51.1% versus 49.8% accordingly [10].

Generally, Mobile applications are broadly divided into two basically: native applications and mobile web application that could also be worked in learning organization collaboratively [11, 12]. The first is native applications is compiled programs which are run natively on the device, and the second which are run inside a web browser on the device. Native applications are fast and have access to all of the power of the platform they are built for and much more. But they suffer from one basic limitation: portability, if you intend to make your application accessible on several platforms, you either have to write it in many languages or use a platform abstraction layer such as Phone Gap and Titanium. The second is Mobile web applications in the other hand are generated in CSS, JavaScript, and HTML that run on web browser in mobile device. That means one code base to maintain; but mobile web

applications need to control in all variations for web browsers through the platforms. [13]

C. OBE System Management

1) Unit Outcome

Unit outcomes can be defined as the statements in a particular unit, which describes what the students should have learned or attained after they have completed the unit. These outcomes comprised both technical and non technical aspects. To ensure the unit outcome to be measurable, keyword from Bloom’s Taxonomy [14] will serve as a good guideline for writing the unit outcome. Toward the end of unit, the student’s performance can be used to measure the achievement of the unit outcome based on the final examination and coursework.

2) Assessment Outcome

The assessment outcome is based on evaluation of student’s performance in the course. The student’s performance is evaluated on the basic of their examination result and course work. The course work may comprise midterm test, assignment and project. The percentage of contribution of each component to the overall grade of the students may vary for different courses.

III. METHODOLOGY

In order to formulate and propose the model of OBE system implementation for higher learning institution as a model and its application, there are few steps that has been taken and conducted based on a series of sequences as shown in Figure 2

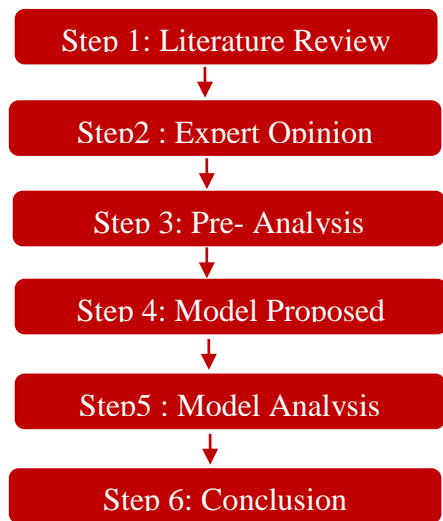


Figure 2: Steps in Proposing Model for Mobile Application System

The methodology of the research is started by performing the analysis of literature review (Step1) regarding on the OBE Mobile application and HLI then

followed by conducting a preliminary survey (Step2) through the expert opinion interviewed that based on those who are really involved in HLI such as academician (Teachers) and student.

At this stage, a pre-survey has been done in formulating the OBE system for learning institution model for mobile application also the instrument comprises two sections which are general information and dimensions of user evaluation (Step3) as proposed model which closely related to OBE environment (Step4). After that, the simple measurement of OBE for mobile application as conceptual system and its application system design model is also analyzed (Step5) in determining the best criteria of Mobile Application for android environment (Step6) as an ending stage which also including the conclusion stage.

IV. OBEMANAGER: A PROPOSED SYSTEM MODEL

Outcome based education (OBE) from mobile application enables academician to manage their own applications and services according to student activity in subject. It is consist of four fuctional component, namely OBE Repository, CPA, Mobile application and user interaction. Figure 3 shows the relationship among the component of the OBE for HLI model as shown in Figure 3.

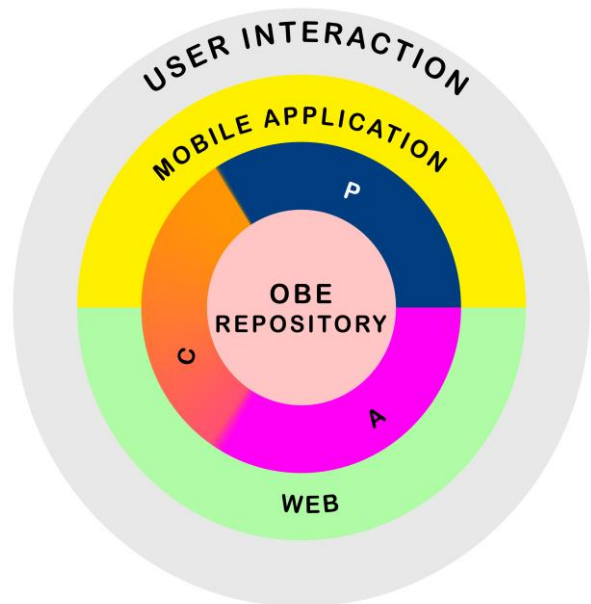


Figure 3: A Model of OBE system implementation for HLI

A. The OBE Repository

The OBE Repository is the core component of the system, is used for storing the physical data files and all data are used in the system and provides interfaces for client to invoke. The

database uses the dual module hot spare (DMHS) to improve the accuracy, speed, reliability and security of the system. Client using MYSQL database, which is cross platform, lightweight, fault tolerance and easy to migrate to improve the systems performance, especially in open source software development environment [15,16].

B. Cognitive, Psychomotor and Affective (CPA)

There are three main domain of learning and teachers should know and use them to construct lessons. These area are cognitive (Thinking), Psychomotor (physical) and Affective (feeling or emotion), Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.

- i. Cognitive domain: involves knowledge and development of intellectual skills, and also there are six main categories which are (1) Knowledge (2) comprehension (3) Application (4) Analysis (5) Synthesis (6) Evaluation.
- ii. Psychomotor domain: involves coordination, physical movement
- iii. Affective domain: this domain includes the manner in which we deal with things emotionally for example feeling, values, appreciation, enthusiasm, attitude and motivation.

C. Mobile Applications

The mobile application is a software product for mobile devices. The application provides a mobile based system for academicians to use for learning system and to develop templates that would be useful in their workplace. Successful OBEmanager mobile application, basically, running tools should be included to support the following options such as class lectures, tests, interactive quizzes, and so on. Finally, it's very important to elaborately design a mobile application that will be developed and it's to be combined with the support of OBE environment.

D. The user interaction

The user interaction is the user interface in which the academicians can obtain and upload information to the student regarding to the course activity and it is made up of the user authentication model designed for verifying a user's identity such as username and password. This system also support intelligent that provides default type of applications such as displaying information about the student, exams and course work

V. SYSTEM ARCHITECTURE

Outcome based education (OBE) for mobile application called OBEmanager consists of two components, based on

client-server architecture. As a first component, the Server is designed to store and manage all data used in the system for example user identity information and also responsible for adopting the content from different users in order to delivery to the device and controlling the different content into the system. As a second component, the client is an application installed on mobile devices that provides graphical interface to ensure that the application interacts with the OBE database server and allows transferring data to the database server through Wi-Fi or GPRS and retrieving data from the server as shown in Figure 4. The samples of OBEmanager interface are shown in Appendix A.

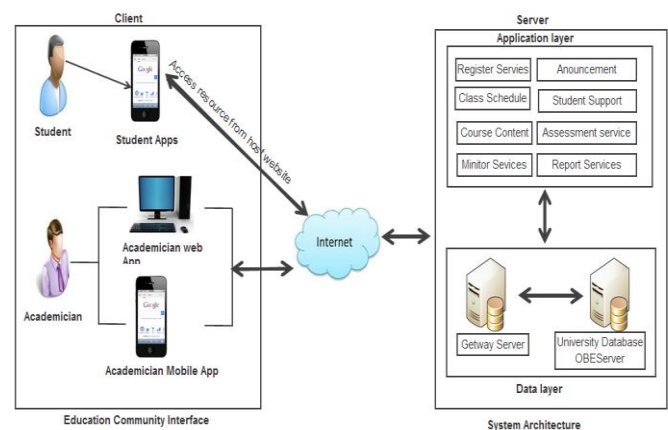


Figure 4: OBEmanager System Architecture

VI. RESULTS AND DISCUSSIONS

The evaluation was conducted to determine user's perception on the usability aspect of OBEmanager system or prototype. Usability is considered an important attribute of software quality. The proposed model in Figure 3 and its system architecture in Figure 4 are considered in making the systems easy to learn and easy to use. After the survey was developed, it was implemented politely and some minor changes were made. The instrument comprises two sections which are general information and dimensions of user evaluation as what been discussed at methodology section. General information section works as a mechanism to collect user's demographic data, users experience and knowledge with the mobile application. The instrument dimensions of adaptive user evaluation comprise six sections: System usefulness, information quality, interfaces quality, faster to work, save time and system efficiency.

The OBEmanager user evaluation was conducted on more than 40 participants who are conversant about OBE similar apps. Each of them was given a brief as pre-survey regarding the usage and user interface of the system or prototype. Each user was allocated a proper time to use and explore the content of the prototype. Once they were done, the users were given a questionnaire for user evaluation. Descriptive statistics and

reliability analysis were used in this study. Results will be discussed in the following section.

A sample of 42 randomly selected student's responses, as shown in the Table 1, 69.05% of respondents were male and 30.95% were female, 40.48% of respondents were aged between 25 and 30 years old. Those in Sciences made up the largest group of respondents (50.00%), those in Business studies were 26.19% and lastly those in art studies were only 23.81%. In terms of education level, most of respondents were in Master level (47.62%), 95.24% of the participant declared that they own smart phone and 4.76 % own a simple Hand phone. Regarding the use of mobile application, 47.26% have less than 5 years of experience; 38.10% have experience between 5 and 10 years of use. Thus, it indicates that the respondents are familiar with the subject matter and suitable for this study.

Table 1: Demographic Data and its Mobile Experience

MEASURE	ITEM	N	%	CUMULATIV E%
Gender	Male	29	69.05	69.05
	Female	13	30.95	100
Age	Below 20	4	9.52	9.52
	20-25	14	33.33	42.86
	26-30	17	40.48	83.33
	31-35	5	11.90	95.24
	36-40	2	4.76	100.00
	More than 40	0	0.00	100.00
Area	Science	21	50.00	50.00
	Business	11	26.19	76.19
	Art Studies	10	23.81	100.00
Education Level	Bachelor	15	35.71	35.71
	Master	20	47.62	83.33
	PHD	7	16.67	100.00
Mobile Devices	Smart Phone	40	95.24	95.24
	Hand Phone	2	4.76	100.00
Mobile Application Experience	< 5 Years	20	47.26	47.26
	5-10	16	38.10	85.71
	>=10 years	6	14.29	100.00

Meanwhile, Figure 5(A) and Figure 5(B) have shown that the instrument dimensions of adaptive user evaluation compares by their sections and the participants have given the system usefulness 83% that is good signed and also the quality information provided by the system around 85% as well as accepts to be used the system in their environment. In the context of the quality interface of mobile application they were given around 90%, also for the system efficiency (92%) and that is shows the participants accept of the mobile application implementation and their performing well to apply it in their teaching and learning environment.

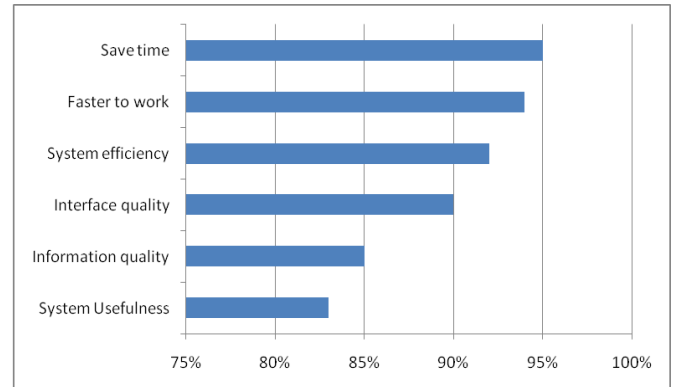


Figure 5 (A): Adaptive user evaluation

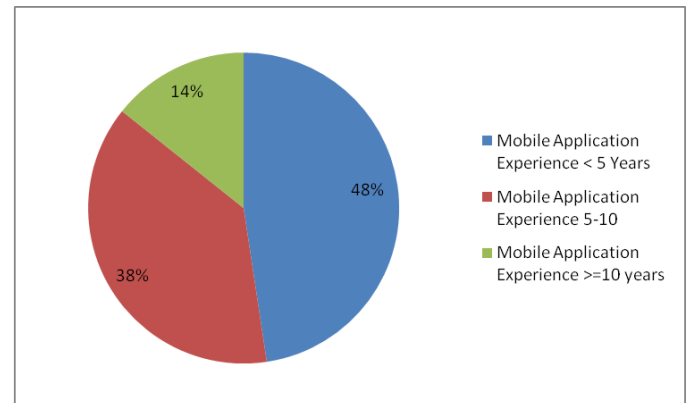


Figure 5(B) Mobile user Experience

VII. CONCLUSION AND FUTURE WORK

This paper introduces OBEmanager, a model of mobile application for outcome based education. The main features of OBEmanager include student management, assessment and reporting, which are helpful to the academicians to determine student achievement and its outcome based on CPA environment. The application provides interface for interacting with other existing platform. The system model described by this study successfully translates into functional information system. Although we are proud of the technical success of

OBEmanager, it does not mean OBEmanager solves all problems come with OBE implementation.

In the future work, we plan to extend the proposed work for developing educational infrastructure that allow for introducing new technologies while still providing designed outcomes and assessment tools for academicians. Finally, the security and privacy will be addressed in more details in the way that guarantee a secure and protected environment in exchanging the data and information among the academicians.

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Appendix A.

