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Siti Seri Delima Abdul Malak*
Tunku Intan Syafinaz School of Accounting, Universiti Utara Malaysia
*Corresponding Author: seridelima@uum.edu.my

Abstract

This paper presents a proposed design on the implementation of a co-operative learning system in the form of a buddy system in teaching an advanced accounting subject in a tertiary environment. The objective of the proposed study is to assess whether the introduction of a buddy system will improve upon teaching and learning activities of an accounting subject and also look into the perceptions of students toward a co-operative learning system. The study will be conducted on students undertaking a final year accounting subject in a Malaysian public university. The study will be divided into three cycles whereby after each cycle, an assessment would be made on the issues surrounding the implementation of the buddy system and improvements would be made in each of the following cycle. The assessment of the effectiveness of the buddy system will involve self-reflections, anonymous peer feedbacks, a questionnaire and interviews. The results of this study would give more insights on the potential issues surrounding the implementation of a student centred learning approach in an accounting subject. It will also provide evidence on its effectiveness in improving teaching and learning activities and achieving course learning outcomes.

Keywords: Co-operative Learning, Buddy System, Accounting, Education in Malaysia

Introduction

Accounting is often associated with just recording debits and credits and counting money in the bank. This perceived notion often is also brought into the classrooms by students and it reduced them to just remembering the placement of accounts and corresponding journal entries. They resort to mere 'rote learning' without understanding the reasons behind the debits and credits. Traditional teaching approaches of lectures and instructors dominating the class, contribute further to the problems. Michaelsen and Sweet (2008) offers a solution to these problems, by suggesting that

instructors change their attitude and embrace students as equal partner in the learning process, through an active pedagogical approach of co-operative learning.

Problem Statement

Johnson, Johnson and Smith (1991) in their model of co-operative learning, include five important elements that need to exist in a successful co-operative learning, namely individual accountability, mutual interdependence, face to face promotive interaction, adequate interpersonal skills and group processing out. The model promotes co-operation, rather than competition, in attaining a common goal in learning (Prince, 2004). Some of the benefits associated with co-operative learning are that it promotes higher order thinking skills (Li & Lam, 2005), students put out more efforts and learnt more (Carlsmith & Cooper, 2002), it made introduction of more complex and challenging issues possible (Michaelsen & Sweet, 2008) and improvement in final grade performance (Yamarik, 2007).

Research Questions

The first question that the research seeks to address is the issue in implementation issues of a buddy system in an accounting subject. Secondly, it will look into its effectiveness in improving the teaching and learning process. Finally, it also will examine the effectiveness in improving achievement of Course Learning Outcomes (CLOs).

Purpose of the Study

The objective of the proposed study is to assess whether the introduction of a buddy system will improve upon teaching and learning activities. It will also look into the perceptions of students towards a co-operative learning system. There has been limited research in Malaysia on the implementation of an active pedagogical approach in an accounting education. The paper proceeds by looking into the process of implementation of the co-operative learning into the accounting course. It then discusses the formation and the assessment of the buddy system. It is followed by the expected results and benefits of the research.

Research Methods

This study is a form of action research. Reason and Bradbury (2001, p. 1) defined action research as "a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities." The introduction of co-operative learning in the form of a buddy system requires the active participations of the students and instructors.

Formation and Implementation of a Buddy System

The study will be conducted on students undertaking Financial Accounting and Reporting IV (BKAF 3073), a final year and compulsory accounting subject in a public university in Malaysia. Three out of expected seven classes for BKAF 3073 would be part of this study with an expected number of students on 120. The remaining classes will be taught using traditional methods of teaching and learning, predominantly via lectures and tutorials.

At the start of the semester, students will be divided into their buddy groups, with each group limited to four students. Initially, two anchors will be identified from the weaker students. They will be assigned the tasks of leader and scriber for the group. This is to empower the weaker students to take charge of their learning. The rest of the students will then get to choose on their own which groups that already contain the anchors that they want to join. After the mid-semester test, the composition of the group may be changed based on the result of the test and also feedbacks from students.

Table 1
Matching of elements in co-operative learning and planned activities

Elements in effective co-operative learning	Planned teaching and learning activities
Individual accountability	Anonymous peer evaluation Self-reflections Individual mid semester test and final exam
Mutual interdependence	Common group quiz Common tutorial submission Jigsaw

	Group project Peer lecture
Face to face promotive interactions	Buzz session Group discussions Poster and oral presentations
Interpersonal skills	Listing of 5 good and bad traits of a buddy Poster and oral presentations
Group processing out	Group logbook Reflections Focus groups

Assessment of the Effectiveness of the Buddy System

This research adopts the Malaysian Qualifications Agency (MQA) model of continuous quality improvement (CQI) as prescribed in Area 9 of Code of Practice for Programme Accreditation (COPPA). The MQA (2008) argued that "current policies and practices should be revised based on past experience, present conditions and future possibilities". This recommendation will drive each of the cycle of this action research. The buddy system will be continuously improved throughout the research period based on the findings. Students' achievements of attaining the course learning outcomes (CLOs) would also be assessed at the end of the term. The instructors and students would reflect upon whether the buddy system has actually helped them in achieving the CLOs and how it may be improved in helping students reached all the CLOs. This is in lined with the principle of CQI.

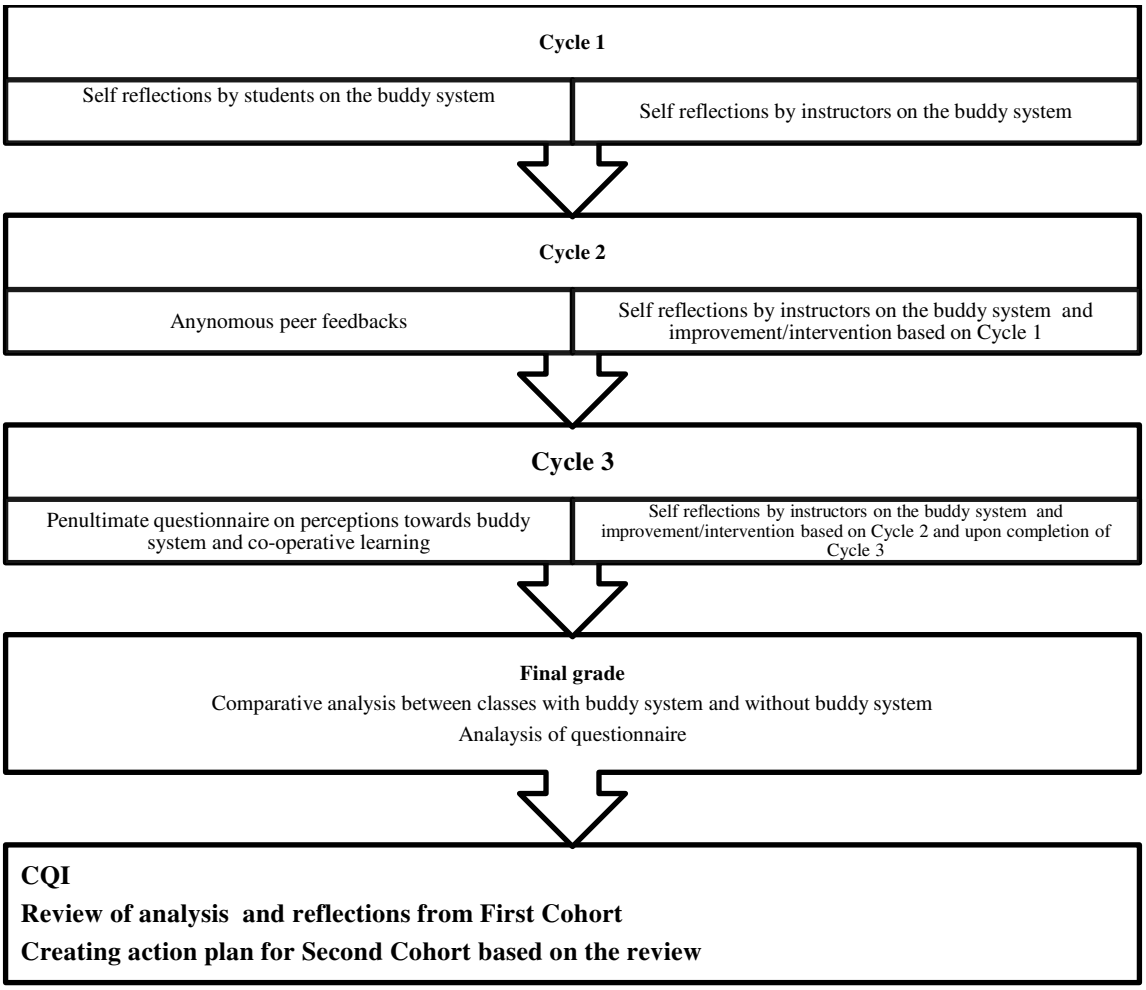

Figure 1. Proposed Research Flow

Figure 1 outlined the proposed research flow for this study. The data will be collected in three stages at the end of each cycle:

• Cycle 1: Self reflections by students and instructors

• Cycle 2: Anonymous peer assessments by students and instructors' reflections

• Cycle 3: Penultimate questionnaire on perceptions of teamwork, buddy system and expected improvement on grades

After each cycle, the information from the feedbacks will be collated and reflected upon to determine improvement that can be made in the following cycle. For example, if the buddy group is not functioning, how would it be improved? Or are the teaching activities not suitable in a group context and in achieving the course learning outcomes? If so, how will it be addressed in the next cycle? The objective of each cycle is to further improve on the buddy system and its application in the teaching and learning activities.

Finally, at the end of the third cycle, a questionnaire will be distributed to the students. It will assess the students' perceptions towards the buddy system and its perceived effect on their final grades. The questionnaire is developed from Tsay and Brady (2012), Vasan, DeFouw and Compton (2009) and Farell and Farell (2008). The data analysis for the questionnaire will be made using SPSS.

Conclusion

It is hoped that the buddy system would empower students to take control of their own learning and be more motivated in achieving the course learning outcomes. Vygotsky summed up the importance of co-operative learning aptly with his view that "what the child is able to do in collaboration today he will be able to do independently tomorrow" (Vygotski, 1987, p. 211).The results of this study would give more insights on the potential issues surrounding the implementation of a student centered learning approach in an accounting subject. It will also provide evidence on its effectiveness in improving teaching and learning activities and achieving course learning outcomes.

Acknowledgments

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Does the Blended Learning and Student Centered Learning Method Increase Student's Performance?

Fadhilah Mat Yamin[a*], Wan Hussain Wan Ishak[b]
[a]School of Technology Management & Logistics, UUM COB, Universiti Utara Malaysia, 06010 Sintok, Kedah.
[b]School of Computing, UUM CAS, Universiti Utara Malaysia, 06010 Sintok, Kedah.
*Corresponding Author: fmy@uum.edu.my

Abstract

Developments in information technology (IT) have opened a new chapter in the world of education. Many have gain benefits from IT especially lecturers and students. IT reduces the workload of the lecturers in handling and managing the teaching and learning (T&L) process. Students can benefit the IT through its flexibility and rich of applications that are useful for their learning. Blended learning is the outcome of the integration between IT applications and traditional learning method. Blended learning is also referred as e-learning as it applies Internet technology to enable T&L. E-learning is a student-centered learning method that emphasizes student as the main actor in the learning process. This paper discusses the impact of implementation of the blended learning and student-centered learning methods on students' performance. These methods have been applied on a group of student that is taking a technical course. The results were compared with the previous group of students that were experience only the traditional T&L method. The results prove that students who undergo the proposed method have a better performance in term of final exam result.

Keywords: E-Learning, Blended Learning, Student Centered Learning, Student Performance, Teaching & Learning

Introduction

Information technology (IT) is one of the key enabling technologies in teaching and learning (T&L). Information technology can give a positive impact on students, especially in terms of motivation and research and development (R&D) process (Fook & Sidhu, 2007; Razak, 2013). The use of IT makes the assignment, communication and relationships became easier. Internet technology for example, allows students to connect without the limitations of time and geography

(Deore, 2012). Through the Internet and applications built on top of it, students can also obtain teaching materials and communicate with the lecturers (Min et al., 2012). Besides students, lecturers also get the same benefits.

The use of IT can also help lecturers who handle large-sized class with the high number of students in one class (Lass et al., 2007). The technology used can assist lecturer to communicate with the students and control the teaching process better. In fact, teaching materials can be managed and shared with students in a more systematic way (Wan-Ishak & Mat-Yamin, 2016).

In addition to the communication and sharing of materials, the study also found that the use of IT will help improve student understanding and mastery of the course of study (Dori & Belcher, 2005; Darling-Hammond et al., 2014). Study by Dori & Belcher (2005) for example, found that students who use IT applications have an understanding of the concept better than those who do not use the application. Dori and Belcher study focuses on teaching the subject of electromagnetism, which through the application of IT student has managed to understand the processes and phenomena very well. In addition, weak and high risk of failing students is also encouraged to study with the support of IT (Darling-Hammond et al., 2014). This is because, IT makes learning more interactive, open a new space for students to explore and produce new knowledge, and benefit to the lecturers to manage the teaching materials and learn new things.

The blend between the IT applications with traditional learning methods are also referred to as blended learning methods (blended learning). This learning method applies Internet technology to enable online learning. This learning method is also referred to as e-learning. Through e-learning, learning can take place anywhere and at any time without physical location limitations (Vincent et al., 2005). Additionally, internet offers vast amount of information that are useful for T&L (Sian et al., 2013), yet students need to employed the best searching strategy (Mat-Yamin & Ramayah, 2012).

E-learning is a student-centered learning method. It is the latest teaching approach that emphasizes student as the main actor in the learning process (Abdullah et al., 2010). Through this concept, students are given the opportunity to explore learning materials and use the time together with the lecturers to better understand the difficult concepts. From the aspect of communication, students become more active. According to Abdullah et al (2010), this method has encouraged students to apply various directions of interaction between teacher and student, and student to

student. Active learning will improve and enhance the students' communication skills (Mohd-Zaid & Ariff, 2011; Razak, 2013).

This paper discusses the impact of implementation of the blended learning and student-centered learning methods on students' performance. Students' performance was measured based on their final exam result. This is vital as the exam measured students' performance individually after the learning process. The results were compared with the previous group of students that were experience only the traditional T&L method.

The background of this study is presented in the next section, followed by the methodology. The findings and discussion were presented afterwards. The conclusion and the future work were discussed in the last section.

Background of Study

At the second session of 2014/2015 (A142) BJIB3133 course have been taken by a total of 48 students from the School of Technology Management & Logistics (STML). The results of the final examination paper shows that 81.25% of the students got grade C- and below. Only two students get a grade A. These results show that most of the students are relatively weak and not able to master the course very well. At the second session of 2015/2016 (A152) BJIB3133 has been offered again. Studies have been conducted to improve P & P of BJIB3133 course in A152 sessions using blended learning and student-centred learning methods. This study has two main issues, namely how blended learning and student-centered learning can improve learning technical subjects among STML students?

BJIB3133 is a technically oriented subject and was considered difficult among students, especially when it involves the development of a system using Microsoft Access. Normally, the nature of the assignment is a problem solving, which is to apply the theory presented by lecturers during lecture sessions. This course consists of the coursework marks of 60% and the remaining 40% is for the final exam.

Teaching methods that have been practiced by the lecturer before this is teacher-centered or traditional methods. It is this method that has been used in the session A142. This method is passive where lecturers provide teaching materials and lecture sessions for each course. As a result, learning is carried out in one way due to lack of student involvement. Making it worse, students simply memorize the related procedures and no problem solving skills being applied.

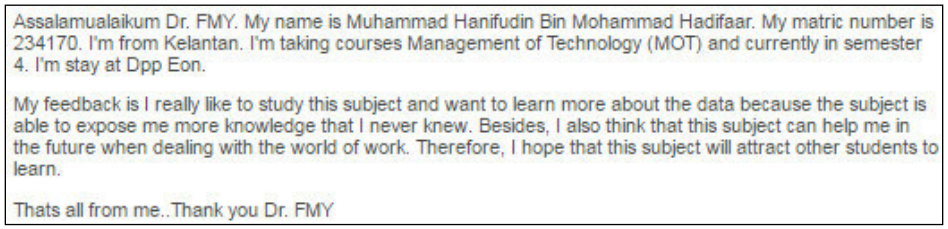
This is evident from the tasks given, where students are not able to apply the knowledge acquired during the learning session.

Feedback received from students in the session A142 shows that there are some weaknesses in the learning process. There are students who said that they "do not know where to start" when assignments are given. They take a long time to understand the given project and some of them have given up. There are also students who said that they did not know the method to study the technical subject. This is because while taking other courses, they are only exposed to the problem-oriented theories. Due to these problems, several groups of students were not able to complete the work well within a predetermined time.

Methodology

In conjunction with the students' problem and weakness, a transformation or innovation in the teaching process has been performed to promote active learning. In session A152 blended learning and student centered learning methods have been applied. Through this method, students can master the skills to solve problems better. The e-moderator method has been applied in the class using social networking messenger (WhatsApp) and university learning management system that is Online Learning. While student-centered method involves a number of activities such as brainstorming, project, learning with peers, and forming small groups.

The study involved three phases, namely; initiation of activities, activities during the study and learning transfer activities. In the initial phase of the study, the lecturer gives the explanation on the course syllabus to the students. In this session, the lecturer will inform the teaching methods to be implemented throughout the session. Interaction with students is done through the LMS application that is Online Learning. Students were instructed to convey the perception of the course through the forum tool. The use of English is encouraged among students to help them improve their confidence in using the language. Feedback shows positive results where students try to write a review even though using poor sentences and grammar (Figure 1).


Assalamualaikum Dr. FMY. My name is Muhammad Hanifudin Bin Mohammad Hadifaar. My matric number is 234170. I'm from Kelantan. I'm taking courses Management of Technology (MOT) and currently in semester 4. I'm stay at Dpp Eon.

My feedback is I really like to study this subject and want to learn more about the data because the subject is able to expose me more knowledge that I never knew. Besides, I also think that this subject can help me in the future when dealing with the world of work. Therefore, I hope that this subject will attract other students to learn.

Thats all from me..Thank you Dr. FMY

Figure 1. Example of Student's Respond

Next, the e-notes were distributed to students in stages starting from the first week to week fourteen. Students are also given the project title for the group work. The instruction and monitoring of groups are also done through Online Learning. In addition, reading materials and additional references is also distributed through the same application. This method makes Online Learning as a course central repository and student reference. This method allows students to refer the announcements, materials and information on the course without any time limit.

Figure 2. A Part of e-notes Distributed through Online Learning

Figure 3. Example of Additional References

During the study phase involve three main activities that are: 1) observing how learning and interaction occurred among students, 2) monitor the given project throughout the learning process, and 3) reflection. In this phase, besides communication through Online Learning, WhatsApp application is also activated. WhatsApp is one of Web 2.0 tools that is useful for interactive communication either among individuals or groups. Through this application, students can communicate with the lecturer and friends directly. For instance, if one student is having a problem, he or she can send a message to the WhatsApp group account. Lecturer and friends who are actively online will provide help and support. Besides communication and discussion, this application has also been used to distribute additional materials and monitoring of the project.

Figure 4. WhatsApp Application

In the third phase, students' understanding level of the taken course is evaluated. In this process, students are encouraged to assist their friend who has had problems. Through this activity, students can enhance their understanding on the terms or concepts from the subject. Besides that, students also can sharpen their problem solving skills either as individual or group.

Discussion

After going through 14 weeks of learning session, students were asked to write a reflection on their experience. The following are some of the reflections written by the students.

Student 1 "*...we often refer back to what we have been taught by lecturer Dr. Fadilah Binti Mat Yamin. We refer back to our notes while in class as a guide for information. Besides that, we also surf the internet to find out more about Microsoft Access and how to handle it. Not only that, we also ask our friends...*"

Student 2 "*...first time using Microsoft Access. But, finally we can complete the task…*"

Student 3 "*Selepas mendapat penerangan dari Dr. Fadhilah baru kami faham sedikit kehendak soalan yang dicampur dengan maklumat tambahan dari rakan-rakan yang lain*"

Student 4 "*...aktiviti atau latihan diselesaikan secara bersama-sama. Oleh itu, para pelajar tidak segan silu bertanya kepada rakan-rakan mahupun Dr FMY…"*

Student 5 "*...kami tidak faham apa itu query. Namun, kami belajar daripada youtube…"*

Student 6 "*...getting better understanding in this subject when you give a few task related to database…"*

Student 7 "*We gain new knowledge from this course. For me, this course help me a lot for my future career…"*

Student 8 "*...I faced some difficulties ... but I take it positively as new knowledge and new experience…"*

Student 9 "*… we found this assignment is hard to accomplish as we need to have a good skill in Microsoft Access and need to think outside the box ...finally we have gained some skill in handling Microsoft Access and can see the importance of database management system in daily life.*"

Reflection written by the students' shows that they are interested in the technical course, like BJIB3133 and understand it's important towards their career. Some students faced difficulties but never give up as they are were given second chance to fix their problem. Moreover the interactive features of the electronic environment give them more freedom to search for the solution. This is in line with Darling-Hammond et al (2014) who suggested that weak students are encouraged to study with IT support.

In addition, various IT tools and applications have been used by the students in order to complete this course. For example when they are facing problems at the earliest stage, discussion and communication through Online Learning and WhatsApp helped them to understand and solve the given assignment. Besides that, other Web 2.0 tools such as YouTube has been used as an additional source of reference in conjunction with the materials posted on Online Learning. This proves that Web 2.0 tools have great potential to be used in conjunction to other official e-learning

tools (Wan-Ishak et al., 2015). These actions also reflect the related studies such as Abdullah et al (2010), Mohd-Zaid & Ariff (2011) and Razak (2013) that emphasizes students were active when they were in electronic environment.

Table 1 shows a comparison of the results of the final exam for the students who take this course in session A142 and A152. The examination results showed that there are a relatively high increase in grades A, A- and B+ and the reduction of the number of students gained C- and below (Figure 5). These results demonstrate that the approach has been successfully implemented to improve student understanding and mastery of the course.

Table 1.
Comparison of Final Exam Result for A142 and A152 Session

Minimum Marks	Grade	A142		A152		Differences	
		Numbers	Percentage	Numbers	Percentage	Decrease	Increase
0	F	23	47.92	6	15.38	32.53	
34.45	D	7	14.58	2	5.13	9.46	
39.45	D+	6	12.50	2	5.13	7.37	
44.45	C-	3	6.25	2	5.13	1.12	
49.45	C	2	4.17	4	10.26		6.09
54.45	C+	2	4.17	3	7.69		3.53
59.45	B-	2	4.17	4	10.26		6.09
64.45	B	0	0.00	2	5.13		5.13
69.45	B+	1	2.08	5	12.82		10.74
74.45	A-	0	0.00	5	12.82		12.82
79.45	A	1	2.08	4	10.26		8.17
89.45	A+	1	2.08	0	0.00	2.08	
	Total	**48**		**39**			

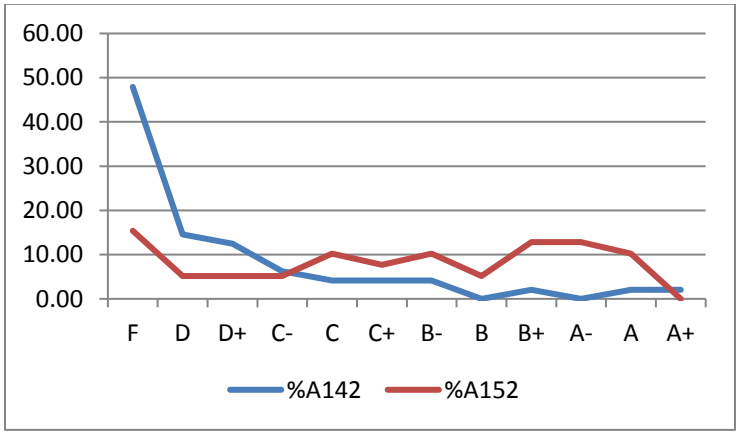


Figure 5. Comparison of Final Exam Result for A142 and A152 Session

Conclusion

Student-centered learning is a good approach to promote self-reliance and prepare students for the job market. However, this method can cause students "drift" in their world. As a result the students failed to complete the assignment. The role and injection of lecturers as a facilitator during the process of completing the task is the need to help and guide the students towards the right path. Blended learning method is an initiative that is seen to be effective to help students follow and understand the course well. This is because through the application of information technology, students can use cyberspace to support their learning. In addition, the lecturer can also monitor and interact with students even outside the classroom.

The combination of these two methods allows both lecturer and students, strengthen and increase their knowledge and experience at every learning session. From the perspective of the lecturer, a student-centered method requires extensive preparation, especially in terms of knowledge, skills and creativity. This is to realize the difference in the results obtained by the students.

As a future work, the author plan to execute the research using different methodology such as experimental approach. This approach can be used on the same group of students to study the impact of the implemented teaching strategy as a subsequent to the traditional approach. Further, the study should be expended to several other groups of students to experience the variability of students' skills and knowledge.

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Harnessing Google Facilities for a Better Teaching and Learning Experiences

Jastini Mohd Jamil*, Izwan Nizal Mohd Shaharanee, Sarah Syamimi Mohd Rodzi
School of Quantitative Sciences, Universiti Utara Malaysia, Sintok, Kedah, Malaysia
*Corresponding Author: jastini@uum.edu.my

Abstract

Nowadays, many subjects/courses require students and teachers to be in the computer lab for teaching and learning purposes. While many agree that this computer lab facilities improve student's learning activities and experiences. Yet many researchers encountered challenges in engaging computer lab facilities for their teaching and learning works. Subject/course that requires considerable computer software activities such as data mining, databases and computer programming are by nature illustrative or demonstrative in the computer lab that emphasize the acquisition of observational skills; and allow students to see the concept dealt in action and relate theory more closely to reality. However, the students' reaction towards practical work in computer lab is often negative. With the popularity of Web 2.0 as a tool for teaching and learning, it is interesting to investigate and explore how these Web 2.0 tool can be utilized for teaching and learning in computer lab. Google is a popular Web 2.0 tools that provides a lot of interesting facilities and applications that offer pedagogical, social and technological affordances. The objectives of this study are to determine the suitable Google facilities and to evaluate the effectiveness of these Google facilities for data mining subject. The results indicates that majority of the students satisfy with the Google's facilities that were introduced in the class. In particular, comparative performance is good in the areas of ease of access, perceived usefulness, communication and interaction, instruction delivery and students' satisfaction towards the Google's learning activities.

Keywords: Google Facilities, Teaching and Learning, Web 2.0

Introduction

With the advance of Web 2.0 technology many interesting application and facilities has been developed that considerable to be useful for teaching and learning purposes. Google is one

example of Web 2.0 tools that has potential for teaching and learning because of its unique built-in functions that offer pedagogical, social and technological affordances (Wang, Woo, Quek, Yang, & Liu, 2012).

Thus, with the emerging of Web 2.0 technology such as Google, Twitter and Facebook offers a promising tool for helping instructors create a more interactive, student-centered classroom, especially when teaching large courses. Google facilitates the teachers to create and organize assignments quickly, provide feedback efficiently, and communicate with their classes with ease. Google facilities helps students to organize their work in Google Drive, complete any assignments, and communicate directly with teachers and peers. Google facilities can be utilized not only for engaging students in active learning during the lecture hour but also for enhancing the overall communication within the classroom. Students will be more positive about their learning process and they can learn more during class than they would have during a traditional lecture.

Current traditional method of teaching is teacher-centered learning which a passive learning is. Lecturers use visual aids in the form of presentation slides, whiteboard and visualizer. To encourage participation, individual lecturer sometimes initiates interactive and active class activities, but the overall lessons remain teacher-centred. To improve the teaching and learning, we propose to enhance the overall teaching and learning approach by integrating the Google facilities and applications in the classroom.

Problem Statement

Learning activities in the computer lab is one of the challenging in higher education. In addition, data mining subjects is most practical activities are by nature illustrative or demonstrative in the computer lab that emphasize the acquisition of observational skills; and allow students to see the concept dealt in action and relate theory more closely to reality. It is important to think about goals, aims and objectives in the context of laboratory work. However, the students' reaction to practical work is often negative as a result they are not effective in laboratory work and this may reflect a student perception that there is lack of clear purpose for the lab hands on task.

Computer lab teaching in universities is often criticized for being prescribed, impersonal, lacking an opportunity for personal judgments and creativity due to the lack of time, for example data mining course in UUM is conducted only three hour per week. Yin (2003) identify three distinct types of practical work:

1. Experiences, which are intended to give students a 'feel' for observable fact;

2. Exercises, which are designed to develop practical skills and techniques; and

3. Investigations, which give students the opportunity to tackle more open-ended tasks like a problem-solving study case.

Some also classify practical works into four major types: exercises, experiences, demonstrations and investigations. Each of these types of practical has its own place in computer lab teaching. Field works are likely to include aspects of all these functions.

In this research, students will be selected as respondents where the classes are conducted in the computer lab. Computer lab activities involves making observations; posing questions; examining books and other sources of information to see what is already known; planning investigations; reviewing what is already known, using tools (computer software) to analyze the data and interpret data; proposing answers, explanations, and predictions; and communicating the results will be employed using google applications to increase the performance of the students.

Research Questions

Utilizing data mining software and its related application is an important component in learning data mining subject. Most of the students are weak in this topic because they are constrained by their computer competence skills in learning advance computer program software. With the advent of technology, this topic can be taught and learnt in a better way. This research intends to answer the research question of "What is the better approach in the teaching and learning of data mining software and its related application from the pedagogical perspective?" In answering this question a conceptual framework is proposed for the smooth implementation of Google applications into teaching and learning of data mining software and its related applications. A preliminary test is carried out to determine its effectiveness, and perceptions on users are sought for further improvement on the implementation.

Related Works

With the advent of computers, the landscape of teaching and learning data mining software and related applications has undergone tremendous changes. Many believe that computers bring more benefits to the teaching and learning, because through computer technology many difficult concepts can be visualized easily and this makes the learning of any kind of computer software

easier. On top of that tedious in data analysis subject can be easily handled by computer software and learners can spend more time on meaningful interpretation of results (Calder, 2010). One important aspect of introducing digital technology to school is that the emphasis is not on the technology itself but what the technology helps in your teaching and learning.

In order to integrate technology successfully into the teaching and learning, it is essential to understand the notion of technology, pedagogy, and content knowledge (TPACK) model put forward by Koehler and Mishra (2009); how to sequence the content with the integration of google classroom application into it (Clarke, Ayres & Sweller, 2005); and the understanding of Technology Acceptance Model (TAM) (Davis, 1986) in the adoption of technology into teaching and learning data mining and related applications; as well as the status of google classroom applications use by undergraduates (Lim, 2005).

Shulman (1986) initially introduced the Pedagogical Content Knowledge (PCK). In this model there are two main types of knowledge: content and pedagogy that teachers should acquire. A sound content knowledge coupled with effective delivery method will result in effective teaching. Later, with the introduction of google classroom into teaching and learning, another framework has evolved (the details of the framework will be stated in the research methodology section).

TAM was developed by Davis (1986) to explain the computer-usage behaviour. There are two important determinants of the actual system used: perceived ease of use (PEOU) and perceived usefulness (PU). The technology acceptance model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. On the context of integration of google classroom into the teaching and learning of data mining and related applications concepts, the users (teachers or students) must have perceptions that google classroom is useful in helping in the teaching and learning process, as its ease of use they will intend to use it when needs arise. The teachers uphill tasks are to make students aware of its use in future workplace, as well as to ensure students confidence that it is easy to use.

The sequencing of contents is an important component of pedagogical skill. Teachers need to introduce the subject matters based on prior knowledge of the learners; from known to unknown; concrete to abstract and easy to difficult. Clarke et al (2005) pointed out that instruction needs to

be developed in a manner that facilitates the acquisition of knowledge in long-term memory while reducing unnecessary demands on working memory to avoid cognitive overload. When integrating google classroom into teaching and learning, we should try to avoid cognitive overload, otherwise understanding google classroom will become a burden to students.

Google can be elevated to become a pedagogical/cognitive tool to help in changing the focus of the classroom from one that is teacher-centered and controlled to one that is learner-centered and open to inquiry, dialogue, and creative thinking on the part of learners as active participants. The use of google classroom in teaching and learning data mining and related applications is intended to be used as a cognitive/pedagogical tool. Traditional instruction is defined as instruction that is not supplemented with the use of computer software. Using google classroom also promotes higher order thinking skills, promotes the development of problem solving skills and supports "what if…" type questions which are more desirable in this computer age.

From the literature review, it was found that google facilities are needed in future workplace of graduates but never been used in the present usage. It is timely that it should be integrated into the teaching and learning of data mining software, not solely because it is a useful utility tool. More importantly it is pedagogical tool that will enhance the teaching and learning of data mining and related application.

Research Methods

Background and Literature Reviews

In order to determine the suitable Google applications involved in developing Google framework for teaching and learning, this research will start with extensive literature survey on Google's product development and comparison with several Web 2.0 technologies.

Determine suitable Google Facilities for Teaching and Learning

Next, investigate onto determine the recent status and development on google application related to teaching and learning will be carried out. Knowledge and understanding of teaching and learning environment and suitable google applications will be captured, in order to propose a list of google application that are suit the active learning environment. This may include Google related product such as YouTube, Drive, Maps, API, Calendar, Google+, Gmail, Scholar, Search, Forms and News.

Develop Google Classroom's Framework for Teaching and Learning

Students will learn a specific topic via Google tools/products to have better understanding about that topic. In order to promote the active learning environment, the lecturer will fully utilize all the Google facilities during teaching and learning process. For example, in class exercises, group discussion, quizzes, project presentation and lecturer notes will be prepared within the Google environment.

Evaluate the Effectiveness of Google Facilities for Teaching and Learning

Population and Sampling Design

The target population for this research are students from SQIT 3033 and SQIT 3043 classes under the School of Quantitative Sciences where both classes are taught in a computer lab. In order to have random selection method, simple random sampling had been applied when choosing the sample.

Survey Instrument

The survey included questions on demographics and five variables towards student satisfaction. Demographic questions covered gender, marital status, course, and the average on internet accessed. In order to develop the questionnaire, the Internet self-efficacy scale was developed by Eastin & Larose (2000) is used as a reference. (Eastin & LaRose, 2000) indicates that the scale is used to measured confidence level in performing certain tasks using Internet-based technology. The variables will be measured in a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The distance between the points on the scale is even, and therefore it is possible to do comprehensive analysis on these scales. The rating-interval scales used consist of balanced scales, which mean that an even number of positive and negative options are present, including a neutral point. A 5-point scale is chosen, as this number of scale options is sufficient for the analysis in this research. Furthermore, 5-point scales are easily understood by the respondents (Jensen, Moller, Knudsen, & Thorbjorn, 2006).

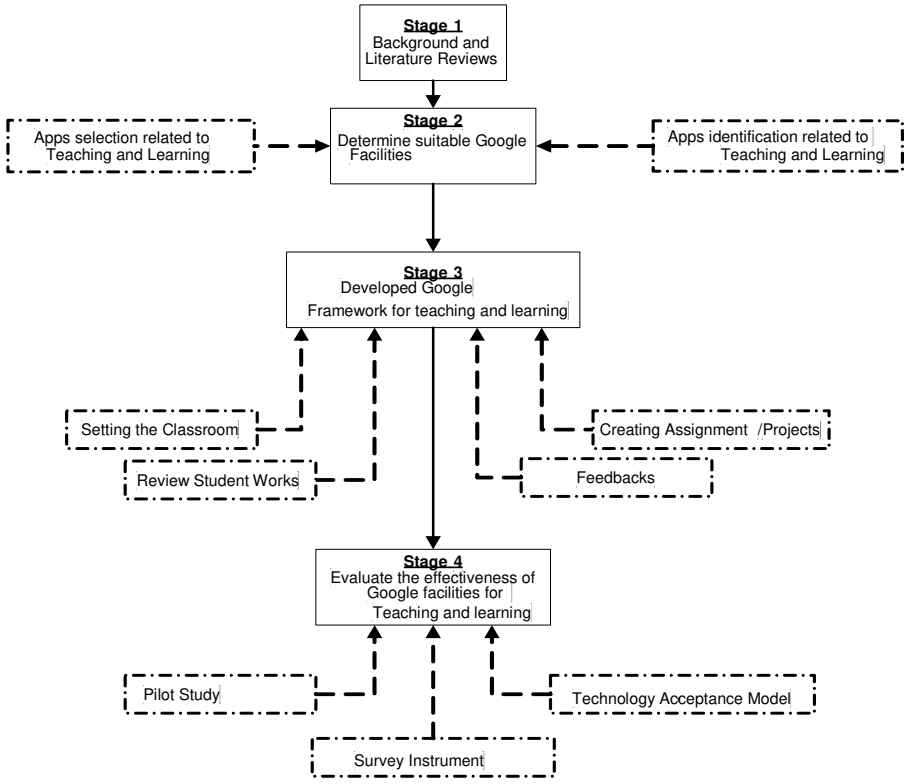

Figure 1. Research Framework

Pilot Study

The term pilot study is used in two different ways in social science research. It can refer to so-called feasibility studies which are "small scale version[s], or trial run[s], done in preparation for the major study". It involves conducting an initial test of data collection instruments and processes to detect and eliminate errors. "As a rule of thumb, a pilot study should be large enough to provide useful information about the aspects that are being assessed for feasibility" (Thabane, Ma, Chu, Ismaila, Rios & Robson, 2010). However, some sample size for the pilot study does not require specific calculation. But it is important to take note that the respondents' from sample study must have the same characteristic with the real sample from the population. Besides, it should also be within the main idea including the inclusion/exclusion of the research (Thabane et al, 2010).

Reliability and Validity Test

Reliability test refers to the consistency of scores the participants would receive on alternate forms of the same test. In order to determine the reliability of our questionnaire, Cronbach's Alpha Coefficient was calculated. Cronbach alpha between 0.7 and 0.8 is a reasonable goal, more than

0.8 is good, and more than 0.9 will be excellent. Validity refers to how well a test measures what it is supposed to. Feedback from pilot study is used to help in judging whether the questions were appropriate

Results and Findings

Respondent Demographic Profiles

A total of 33 respondents answered the survey, all respondents were given the same questionnaire on particulars. All the above figures indicant the respondent profile. Table 1 show the gender distribution of the respondents. Based on the finding, it is observed that the students in both classes are dominated by female. This is clearly visible based on the high percentage (82%) of female respondents for the survey compared to only (18%) male respondents. In fact it is a common scenario that females have been dominated the population in university. According to Table 2, (97%) of the respondents are Decision Science students and (3%) comes from Industrial Statistic background. Table 3 shows the former education of the respondents. 70% of the respondents comes from matriculation education background, while (21%) of the respondents have diploma certificate and only (9%) comes from STPM education background, and none of them have STAM qualification.

A likert type question on average of how often the internet is accessed was asked in the questionnaire to identify the level of Information and Communication Technology (ICT) usage among the respondents. Five answers option were provided which are several times a day, once a day, several times a week, once a week and never. Slightly above (80%) respondent use the internet several times a day and almost (20%) of them use internet many times a day. These imply that the entire respondents are familiar with the use of internet and web based program.

Table 1
Comparison of Respondent Profile by Gender

Item	%
Male	18%
Female	82%

Table 2

Comparison of Respondent Profile by Course Enrolled

Item	%
Decision Science	97%
Industrial Statistic	3%

Table 3

Comparison of Respondent Profile by Former Education

Item	%
Sijil Tinggi Pelajaran Malaysia (STPM)	9%
Matrikulasi	70%
Diploma	21%

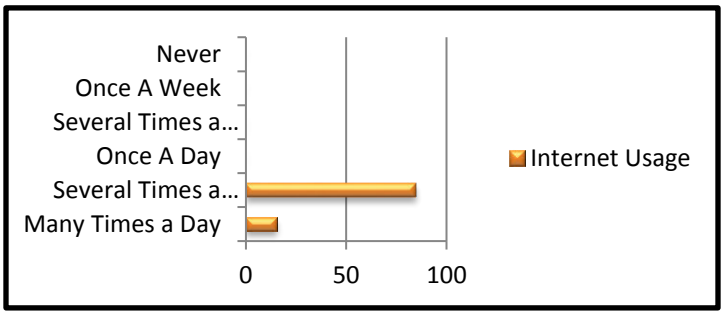

Figure 2. Internet Usage Average

Survey Analysis using Technology Acceptance Model (TAM)

Based on the result obtained from the survey, majority of the students satisfy with the Google's facilities that were introduced in the class. In particular, comparative performance is good in the areas of ease of access, perceived usefulness, communication and interaction, instruction delivery and students' satisfaction towards the Google's learning activities. Table 4 depicts the means values for each of the factors evaluated in the survey.

Table 4

Mean and Standard Deviation value for each component of Student's Satisfaction

Factor	Mean	Std. Deviation
Ease of Access	4.43	0.73
Perceive Usefulness	4.30	0.84
Communication & Interaction	4.37	0.71
Perceive Instruction Delivery	4.39	0.76
Student's satisfaction	4.29	0.81

Correlation analysis was calculated to determine relationship between each factors within the survey. The strongest correlation shown in the Table 5 is between Communication and Interaction with Perceive Instruction Delivery (r=0.9322) which has strong positive correlation. Respondent that agrees the importance of communication and interaction also likely to agree the importance of good instruction delivery, (93%) of the student's satisfaction can be explained by communication and interaction. Next, the strongest factor that correlate with Student's Satisfaction is perceived usefulness which positively correlated, value of (r=0.8741), (87%) of the student's satisfaction can be explained by perceived usefulness, respondents believe that the more useful the technology (teaching method) introduced to them, the more likely they will satisfy with it. In second place, Instructions delivery positively correlated with student's satisfaction with the value of (r=0.8527), (85%) of the student's satisfaction can be explained by perceived instruction delivery. At third place, ease of access positively correlated with students satisfaction with (r=0.8135), (81%) of the student's satisfaction can be explained by ease of access. At last place, Communication and interaction correlate with students satisfaction with (r=0.7980) only (79%) of the student's satisfaction can be explained by communication and interaction. However all the correlation value as shown in table indicates that all the variables have the correlation value above 0.7. This indicates that all of them have strong positive linear relationship.

Table 5
Correlation Analysis

	Student' Satisfaction	**Ease of Access**	**Perceived Usefulness**	**Communication & Interaction**	**Perceived Instruction Delivery**
Student' Satisfaction	1				
Ease of Access	0.8135	1			
Perceived Usefulness	0.8741	0.8896	1		
Communication & Interaction	0.7980	0.8456	0.8620	1	
Perceived Instruction Delivery	0.8527	0.8912	0.8778	0.9322	1

Regression Analysis

Multiple regression analyses were conducted to examine the relationship between student satisfaction and various potential predictors including ease of access, perceived usefulness,

communication and interaction and perceived instruction delivery. The basic regression statistics are shown in Table 6.

Table 6
Multiple Regression Analysis

Regression Statistics	
Multiple R	0.89
R Square	0.80
Adjusted R Square	0.77
Standard Error	0.39
Observations	33

	df	*F*	*Significance F*
Regression	4	27.94	0.00
Residual	28		
Total	32		

	Coefficients	*Standard Error*	*P-value*
Intercept	0.44	0.46	0.34
Ease of access	-0.04	0.24	0.86
Perceived Usefulness	0.57*	0.20	0.01
Communication and Interaction	-0.20	0.28	0.48
Perceived Instruction Deliverable	0.55*	0.29	0.05

$* \ p \leq 0.05$

Table 6 summarizes the descriptive statistics and regression analysis results. The multiple regression model with all four predictors produced $R^2 = 0.80$, $F(4, 28) = 27.94$, $p < 0.001$. The value of R square indicates that the four predictors explained 80% of the variation in Student's satisfaction to use. It means that this model is a rational model, although there are other unknown factors may impact on the student's satisfaction towards Google facilities which are not accounted in this model. As can be seen in Table 6, the Perceived Usefulness and Perceived Instruction Delivery had significant positive regression weights, indicating students with higher scores on these scales were expected to have higher satisfaction, after controlling for the other variables in the model while the Ease of Access and Communication & Interaction scale have a negative weight respectively. The final multiple regression model the predict student's satisfaction as follows:

$$\boldsymbol{Student's\ Satisfaction} = -0.04(ease\ of\ access) + 0.57(usefulness) - 0.20(communication) + 0.55(deliverable) + 0.44$$

Notice that all four predictors are in the model, even though ease of access and communication not a significant/contributing predictor.

Google Facilities for Teaching and Learning

In these research four Google facilities has been identified as a tools for teaching and learning purposes namely the Google Drive, Google Sheet, Google Docs and Google Form. This application is a user-friendly suite of online collaborative tools that come with tremendous potential for use in the classroom. Sharing and commenting provide students with opportunities to receive immediate feedback on their writing from facilitators and peers in the 24/7 classroom. Figure 2 and Figure 3 depicted examples of collaborative learning in classroom using Google Docs and Google Sheet. Student and facilitator are capable to produce immediate answers and comments from each works. This create a great opportunities towards the student to become more active and responsive in class discussion.

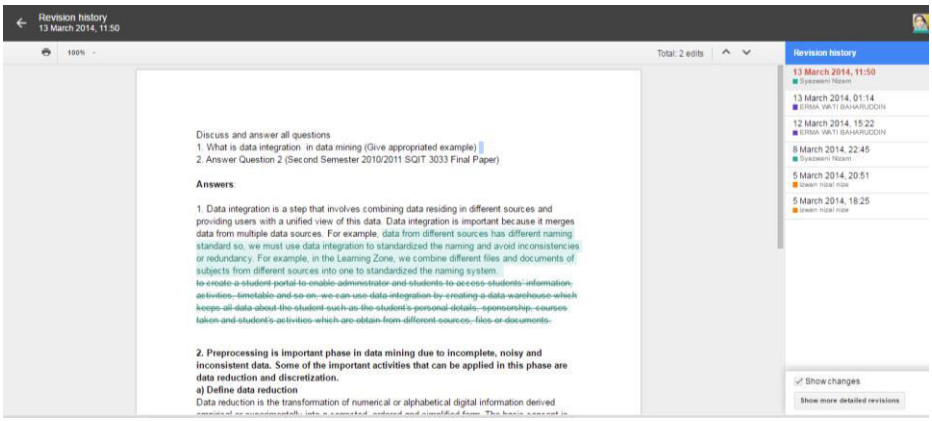

Figure 3. Collaborative Learning using Google Docs

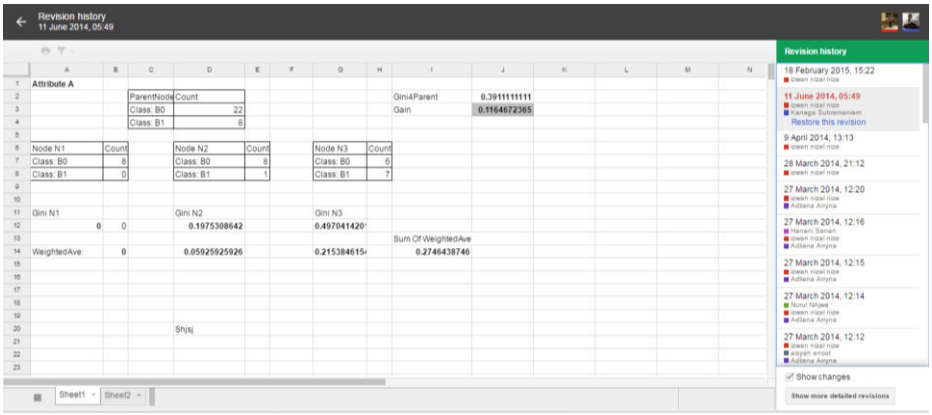

Figure 4. Collaborative Learning using Google Sheet

Additionally, Google Form has been utilized as a tool for online lab assessments and faster students' feedback. Its help facilitators quickly create deliver and grade assignments or assessments. Google Form offer facilitators to select correct answers for multiple choice and checkbox questions to reduce repetitive grading. They can also enter explanations and review materials to help students learn. Figure 3 and Figure 4 shows a snapshot of the Google Form quiz and assessments.

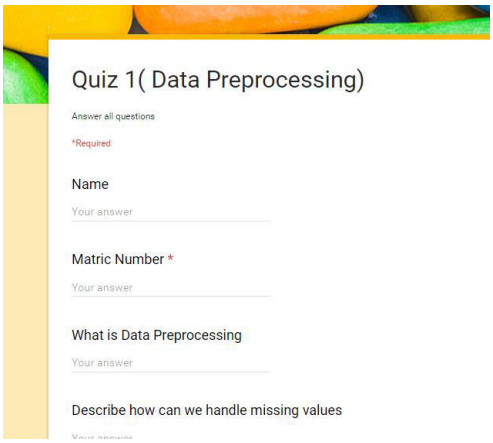

Figure 5. Quiz using Google Form

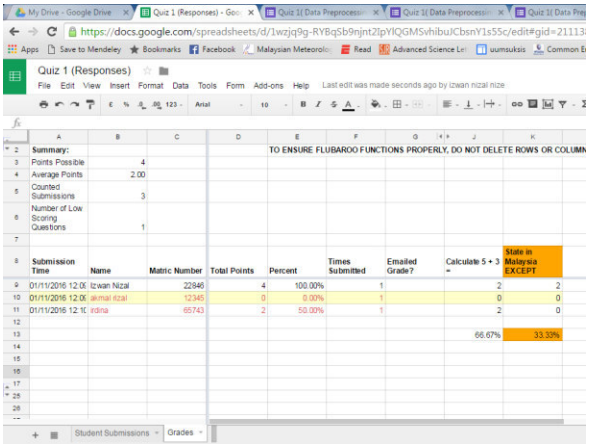

Figure 6. Student Assessment using Google Form and Google Sheet

Conclusion

This study indicates that the suitable Google facilities include submitting assignment, examine issues, evaluate new ideas, and practical, social interaction between lecturer and between students, tracks subject objective, assessment and content, grading system and feedback by lecturer. This study also found out that overall students are satisfy with of Google facilities' thus show it is effective as a tool for teaching and learning.

This research effort shows that we are constantly determine through observations, surveys, and analyses of student demography and course design to what leads to a greater student's satisfaction on method of learning. This approach, in turn, will contribute to the training of online instructors in methods and the designing of educational support programs that allow students to succeed in the online environment. As we continue to assess, improve, and therefore accumulate

knowledge of teaching and learning effectiveness in an online environment, we hope that students, too, will achieve a greater understanding of and enjoy greater benefits from this new mode of teaching and learning.

Acknowledgments

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Developing Islamic Finance Education in Nigeria Tertiary Institutions

Olorogun, L. A.*[a], Ogunbado, A. F[b], Abubakar, S. Y[b]
[a]Business Department, Abu Dhabi Men's College, Higher Colleges of Technology, Al Saadat St. Muroor Road, United Arab Emirates
[b]Islamic Business School, College of Business, Universiti Utara Malaysia Sintok, Kedah, Malaysia
*Corresponding Author: lolorogun@hct.ac.ae

Abstract

Islamic finance is set to challenge conventional financial system at the global level. Thus, continuous development of its theories and practices are vital to achieving its aims and objectives. Islamic finance educational sector must be given keen attention. However, it has been proven to be at lower level in other hub of Islamic finance such as Malaysia, United Arab Emirates etc. Nigeria is not isolated in this general lack of Islamic finance educational standardization. Thus, this study focused on the problems and solutions that probable for the development of its educational sector in Nigeria. Through inductive and deductive methods, we evaluate and vindicate pros and cons of the problems. This was followed by dedicative analysis. The results showed that state affairs of education in Nigeria needs reinvigoration in general and particularly Islamic finance education. It was recommended that Nigerian educational authorities should follow the solutions provided in this study.

Keywords: Education Development, Islamic Finance Education, Tertiary Institutions

Introduction

Education is among fundamental rights pronounced in sacred and modern secular records. The United Nation pronounced in its final adopted at its general assembly on 19 December 2011 a resolution on right to education and training. Similarly, individual scholars such as Huntington (1976), Thomas (2010), Chaudhary (2013), particularly Gildersleeve et al. (2010) on tertiary education have stressed on the vital role of education in a society and nation developments at large. From Sacred (herein referred as the Qur'an and Sunnah) point of view The Lawgiver (Allah) addresses only people of knowledge endowed with capacity to think and make inference from the stated laws or commandments. The Prophet {peace and blessings of Allah be upon him} also

emphasized that searching for knowledge is foundation of a complete civilization. Thus, he encouraged his companions to search for knowledge even as far as China even when Chinese language was not needed to observe their five-time daily "solat" (obligatory prayers). Yet an obvious message here is nothing is ever possible without knowledge and even getting rewards for one's act of faith requires sound knowledge and holistic comprehension about the Commander and the Commandments. Hence, education is an obligatory part of Islamic civilization enshrined in both Qur'an and Sunnah.

Islamic finance must thus be given a keen attention by the educational authorities around the world as it has established itself as a catalyst against global financial crises. On the contrary, several reports such as Annuar (2015a, b, c, d, e.) and Mubarak (2017) have shown that Islamic finance education is not sufficient in producing a sound graduate. The reports indicated that most of the Islamic finance graduate lacked required knowledge and as such employers are less inclined to give the jobs. Mubarak (2017) concluded that shortage of skilled talent is hampering the growth of Islamic finance industry. Undisputable, Malaysia and United Arab Emirates are among most developed Islamic finance market. Nabila's reports focused on Malaysia and United Arab Emirates graduates. It is expected a country such as Nigeria that has less manpower and educational infrastructures compare to Malaysia and UAE would produce less or no professionals in Islamic finance. Thus, this study explores the problem hindering development and standardizations of tertiary education in Nigeria particularly the new specialization of Islamic finance. Through inductive and deductive analysis which would be followed by dedicative analysis the researcher believe a template of solution could be devised. The study is arranged as follows: the next section focuses on the trend of education in Africa with Nigeria phenomenon, followed by phenomenology of Islamic finance at global and continental levels, trends in Islamic finance education calibrated in Nigeria context, and conclusion.

Trend of Education in Africa: Nigeria Perspectives

Education (so called worldly accepted educations) in Africa was inherited from the Western and Eastern explorers. The Western explorer through missionary obsession introduced the modern western educational system. Similarly, the Eastern i.e. Arab missionaries combined with trade spread the Islamic education across African countries. Nigeria as one of the populous countries in Africa particularly sub-Saharan Africa experienced versions of educational systems. The Western missionary influences were obvious in South-Western and South-Eastern Nigeria. In the same way, the Arab traders' educational influences were well recorded in the North-Northern and North-Eastern Nigeria. With the British colonization, the Islamic educational institutions reigning in the Northern part of Nigeria was relegated to local and customary affairs.

Post-colonial era marked another episode in the development of Nigeria particularly the educational sector. The colonial master's educational model was retained and somehow maintained. However, the discovery of crude oil in the 70's resulted in erosion of main institutions and infrastructures in Nigeria. Immediate consequences are abandon of developmental projects and others such as light manufacturing and agriculture etc. These virtues were replaced by hyper rise in corruption among government officeholders. Among major byproducts of endemic corruption in Nigeria is the relegation of the educational sector.

1982 in his efforts to revive Nigerian educational system Ali Baba Fafunwa the formal minister of education introduced the 6-3-3-4 system translated as 6 years in primary education, 3 years in junior secondary education, 3 years in senior secondary education, and 4 years in tertiary education. For each stage a certificate would be issue serving as an exist point for the less privilege, weak, or those without zeal to continue their education at least for the moment. These groups might later come back to continue their education. His successor Dr. Obi Ezekwesili 24 years later altered the system with 9-3-4 system which means 9 year in primary and junior secondary school, 3 years in junior secondary, and 4 years in tertiary institution. These policies were unsuccessful due to a number of reasons such as confusions about what constitute 6-3-3-4 system and 9-3-4 system, inconsistences policy applications, etc.

Despite issues highlighted above, tertiary institutions in Nigeria are obvious. There are 129 universities registered and recognized by National University Commission of which 39 were owned by state government and 40 federal universities. Additional 9 private universities were

approved by the federal government in 2015. Others tertiary institutions are polytechnics, college of educations and technical colleges of various types across the country. Agreeably, curricula at the pre-universities are contentious among policy makers. On the contrary, tertiary institutions' programs are well structured albeit poorly equipped. Thus, modernization has been one of the imperative issues that must be addressed, if new knowledge and curriculum such as Islamic finance would find a space in the less equipped, chaotic and crowded Nigerian tertiary institutions.

Islamic Finance in Global Context: Real System or a Phenomenon

Islamic finance is real in Malaysia, Saudi Arabia, United Arab Emirates, and United Kingdom (U.K) just to name few nations where it has been established they operates a dual financial systems. In the case of Pakistan the country has officially pronounced a financial system based on Islamic ethos, similar to Iran. Dual financial system however, defines a country that has run both conventional and Islamic financial institutions albeit are regulated by separate rules of laws. Notably country such as Malaysia has both Financial Services Act (FSA) and Islamic Financial Services Act (IFSA) regulations issued and implemented by the Bank Negara Malays (i.e. Malaysian Central Bank). Additionally, educational systems of these countries have evidently proven continuous development of these industries through institutional investment on research and development (R&D).

Buttressing the above premises, virtually all tertiary institutions particularly federal and state universities in Malaysia has a form Islamic finance programs running all levels of degree. For example, International Islamic University Malaysia (IIUM) has both masters and doctoral program, Universiti Utara Malaysia (UUM) run all programs such as degree, masters, and doctoral certificates just to name few. Malaysian successful story establishing sound Islamic financial programs at academic and market level were based on sound road map laid by the Malaysian authorities. Their efforts were solidified by political stability and willingness of the authorities to turn a phenomenon to reality. Evidently, they have putting in place both substances and physical infrastructures that make the system propelling. Malaysian tertiary institutions have produced and graduates numbers of professionals, lecturers, market players etc. in the world of Islamic finance. Thus, Malaysia is well-known as hub of Islamic finance.

In Europe however, U.K has poised to be the hub of Islamic finance. In fact, U.K authorities are aiming to the British Island as the hub of global Islamic financial institution. Whether this has

been achieved demands another study. Nonetheless, it is obvious that U.K is walking towards its goals as numbers of well-recognized U.K tertiary institutions have some sorts of Islamic finance programs that offer both Masters and doctoral certificates. Similarly, banks across the Island have provisions for Islamic financial products either full-fledge Islamic banks or windows at various conventional banks. Conclusively, U.K like Malaysia has established both physical and substances of Islamic finance. Indisputably, Islamic finance is real at the global level and its effects has been felt positively as financial crises immune or resistant.

Islamic Finance in Africa: Real System or a Phenomenon

Financial institutions in Africa particularly sub-Saharan African countries are generally conventional oriented. Thus, financial regulations were largely secular. It is neither religiously oriented nor penchant for custom. Islamic finance acceptance was mostly motivated by some key indicators such as: 1. Majority of the populations are Muslims. 2. Impetus to benefits from the risk free or less risky business opportunities enshrined in Islamic finance. 3. An alternative economic development compare to the conventional system which largely favored the advance nations. 4. To win back religious oriented customers specifically foreign investments from the Middle-East. 5. Most of these countries are members of Organization of Islamic Conference (OIC). Hasting to reap these opportunities a number of sub-Sahara African countries notably Nigeria embraced Islamic finance as a notion. This notion would soon hit rock of political and religious instabilities.

Nigeria a multi-language societies or communities are diverse in terms of beliefs. Thus, religious majority are largely defined by tribal or ethnicity. Among these beliefs, Islam, Christianity, and Traditional believe are most common religions. Virtually, most of these communities comprises of these three beliefs. In essence, religious co-existence is somehow obvious even when peaceful co-existence is often tested by clashes between tribes embedded in religious sentiment. In the meantime, the need of foreign investment for developmental purpose, Nigerian government realized its role in the formation of Islamic Development Bank (IDB). The Islamic Bankers' bank usually provides loans without interest in sorts of investments for its members, now willing to invest in Nigeria. However, without alterations to the Nigeria constitution establishment of such contract i.e. interest free banking system is not practicable. While the Muslims welcomed the development without resistance, the Christian societies across the nations feel threatened of been overrun by the Islamic faith. Establishment of Islamic financial system

became a battle ground between the Christian, Muslims, and the federal government who saw IDB investment intervention as an alternative to International Monetary Fund (IMF) interest bearing loans.

The contentions ended when it was obvious that Nigerians should not be left behind in the global hotcakes (economic opportunities) presented by the Islamic finance industry. From analysis viewpoint, if U.K was able to accept and broadened its financial industry with Islamic finance, why Nigerian claims to be more religious than the need of the acclaimed God's children? Finally, the house of assembly voted in favor of Islamic finance albeit the name should be non-interest bearing banking system. The Central bank quickly issued and pronounced a freaky regulations that serves as stepping stone for the new industry. Regardless of the name, existing conventional banks spore windows operation of Islamic banking system. In 2012, the first full-fledged Islamic bank entitled Jaiz Bank was established and was offered regional operating license. Thus, Jaiz Bank maintains operations at Abuja, Kaduna, and Kano. Until May 18 2016 Jaiz Bank obtained national operational license i.e. it would be able to operate in all Nigeria 36 states (Africa News 2016). Without or with little experience, professionals, and tertiary institutions to supports this new industry such as in Malaysia, U.K, U.A.E. etc. Islamic finance at both industry and educational sectors remain a phenomenon which must be address.

It is important at this junction to draw attention to the fact that current conventional educational system in Nigeria needs savior from ambiguous policy makers, wrong policy implementation, a lack standard curriculum at the pre-tertiary educational levels etc. Tertiary education where Islamic finance belongs also needs to be reinvigorated with modern infrastructures and the likes. These stated state of affairs shed light on the position of Islamic finance education in Nigeria. Of all the states and federal universities few such Ahmadu Bello University, University of Ilorin etc. have some sort of programs awarding Islamic finance certificates. Only Bayero University Kano (BUK) has an institute entitled "Institute of Islamic banking and Finance (IIBF)" dedicated to Islamic finance, making it a surrogate of IIUM's Institute of Islamic Banking & finance.

General Trends in Islamic Finance Education

Islamic financial industry has affirmed its position as an alternative to conventional financial industry at national and international level. A piece of evidence is its viability against

global financial crisis of 2008. Similarly, its educational space is well documented in Malaysia, U.K, Saudi Arabia, Bahrain etc. Nonetheless, the graduates of this profession have been reported to less attractive to employers. The major reason as reported by Annuar (2015a, 2015b); Hassan (2015); Hartanto (2016); and Mubarak (2017) was ill-equipped with market needed skills of finance. Considering that most of those graduates were mostly trained in Malaysia, U.K. etc. where its imprint undeniable. It suffices to conclude that despite efforts of Malaysian government and as well as U.K government to produce best of Islamic finance, a lot is yet to be achieved. Inability to achieve goals of producing competent graduates or professional in these two countries is an indication for lesser output in Africa particularly Nigeria.

Unlike Malaysia and U.K where there are numbers of tertiary institutions awarding various degrees in the field of Islamic finance, Nigeria has a lot to address before Nigerian tertiary institutions could realize the dream of Islamic finance education. Most of the factors hindering Islamic finance either education or market practices have been resolved or continuously developing in Malaysia and U.K. For example, Malaysia has established dual financial laws i.e. IFS and IFSA. Thus, financial institutions in Malaysia are well defined and guide by the type of services they provide. Likewise, tertiary institutions in Malaysia offering Islamic finance education have specific department dedicated to *Shari'ah* entitled "*Fiqh & Usul al-Fiq*" (Islamic jurisprudence & fundamentals of Islamic jurisprudence). Also there are experts on both finance and Islamic jurisprudent even if they are few. Furthermore, regulatory bodies of various functions are in place such as *Shari'ah* Advisory Council (SAC), Islamic Deposit Insurance Cooperation, and Security Commission etc. Hence, if Nigeria would be able to incorporate Islamic finance education at tertiary levels it must address the following problems:

Tertiary Institutions with Standard Infrastructures

Nigerian tertiary institutions need renovations from its physical and substance components. With advance level of technology institutions without common computer to train its graduates does not befit Islamic finance education. Global financial industry has moved from paper dependent to software transactional institutions. Most of Nigeria universities have no computer rooms where students can prepare their assignments, access statistical software needed of sound research outputs. The worse of all is a lack of electricity that would power other technological gadgets needed for research and development (R&D). These problems are historical contents in

Malaysia. Tertiary institutions' lecture rooms and research centers are well equipped and continuous renovated. Access to internet and computers are an impressing provisions which stimulates and motivates a willing and able to do students.

Lack of Expertise

As a new field of education, current trainers at tertiary institutions in Nigeria are conventional based scholars. It means majority of them have no capability to teach Islamic finance education. For instance, a well-equipped Islamic finance professor must master both conventional finance and Islamic jurisprudence. Currently no single Nigerian tertiary institution has department or faculty dedicated to Islamic jurisprudence and fundamental. Thus, where is the manpower needed to propagate Islamic finance education? Despite Malaysian's enshrined experience on Islamization of knowledge, bridging the gap between Islamic and western knowledge is yet to be resolved. In fact, this is the major setback in production of competent Islamic finance graduates in Malaysian tertiary institutions. Nigerian government, in its efforts to provide this service awarded scholarship for Nigeria lecturers to study Islamic finance but yet to be realized. It seems even things would not work to its perfect because majority of those obtaining scholarship are trained in Malaysia where reports indicated lack of competency of graduates. Thus, one priority of Nigerian government is to find ways to bridge the gap between the country's well-grounded western education and Islamic education. This would take a long time as Islamic education has been relegated to customary issue. In essence, current Islamic education in Nigeria is not sophisticate enough to provide needed knowledge of Islamic finance at the tertiary institutions. Furthermore, traditional teacher at the Islamic seminaries across the country have little or no knowledge of conventional finance. Logically, professors at the tertiary institutions would possess little or no knowledge of Islamic jurisprudence. Thus, Islamic finance education in Nigeria context is a phenomenon. The frontliners at the tinted available Islamic finance institutions have little or no knowledge of what they are doing. Majority of the frontliners are conventional bankers without knowledge of Islamic *Shari'ah*. Nigeria has a long way to go if globally acceptable Islamic finance education is to be realized.

Lack of Sound and Clear Regulatory Framework

Generally, financial institutions in Nigeria have suffered from standardizations for more 3 decades ago. Not until the current government under the leadership of his Excellency General

Mohammad Buhari who stood-up against corruptions in all forms and institutions, Nigeria financial regulatory bodies were redundant. Immediately none-interest banking system was approved by the Nigerian Senate, the proviso for operations is not well documented. Though the then central Bank Governor i.e. Sanusi Lamido hinted at the needed standardization but his efforts were premature as he was replaced by Godwin Emefiele. Implications of these premature changes are: Sanusi Lamido is a Muslim who work harder to establish and enshrine Islamic finance system into Nigerian secularly oriented financial system. Importantly, it is right to recall that Nigeria Christian communities are totally against this development. The Christians believed that Islamic finance is a pretext of designatiÉng Nigeria as a Muslim country in order to maltreat the Christians as minority. Therefore, Sanusi replacement by Godwin Emefiele has total negative implications to the development of Islamic finance system in Nigeria. Godwin is a Christian as such has no obligation given keen attention to further improve his predecessor's efforts. With the stagnation in the provision of regulations there could not be developments.

Formation of Islamic legal rulings is acumen for the success of Islamic finance industry. There are no established scholars at the tertiary institutions who really comprehend way forward. The same group of scholars without established Islamic jurisprudence serves multiple competing banks. Remunerations have been motivation for the scholars to participate and approve anything at the expense of innocent Muslims willing to fulfill their religious obligations. Islamic banks are expected to offer financing products in contrast to loans with interest. Paradoxically, Islamic financing in the existing so called Islamic financial institutions in Nigeria offer direct loans. This act of carelessly running over Islamic injunctions is not in isolation of the Central Bank's initiatives. As a result, there is need for a workable regulatory framework and enforcement bodies such as in Malaysia. It has negative implication on the Islamic finance educational system. How would sound professional and competent graduates of Islamic finance be built in this chaotic system? Thus, current regime/ government need to do more. The researchers understand things have been damage for about 4 decades ago. If Islamic finance would be real system then a new set of regulatory framework and their implementations must be devised.

New Educational Curricula

Islamic finance as it were is an interdisciplinary or multidisciplinary profession. This is because an Islamic finance expert must possess and qualify in Islamic jurisprudence and

conventional finance. Thus, utmost needed skills place additional responsibilities on the shoulders of an aspiring Islamic finance professional compare to his conventional counterpart. There is a need to introduce a well-diluted curricula based on the notion of Islamization of knowledge. These curricula would give the trainee both knowledge of Islamic jurisprudence on trade and transactions and as well conventional finance. Currently, Nigeria has no such competent individuals or educational system. Similarly, introduction of these curricula into tertiary institution demand clarifications. Whether it would be in undergraduate, diploma, graduates etc.? If the authorities fail to clarify the accepted procedures might lead to different institutions with multiple and lack of standardize curricula; in fact, mushroom training institutions would suffice.

In the meantime, it would be better for the government to intensify the training program i.e. for the younger educators who are willing and able across the country. Giving the current situation in the next 5-10 years Nigeria could be able to produce competent educators who would further train the next generations. Interested universities across the country should understand that Islamic finance curricula are cumbersome and heavier than its conventional counterpart. In the same light, aspiring Islamic finance trainee should understand that lots are demanded from them than their pairs in conventional finance profession.

Conclusion

Educational system in Nigeria currently demand a revisit. Additional work need to be done to incorporate Islamic finance education into the existing tertiary institutions across the country. Taking the bull by the horn, educational authorities must put in place educational enabling infrastructural amenities. This has a long way to motivate the public and convince the skeptics of Islamic finance as an economic propelling tool rather than a religio-political phenomenon. For the sake of brevity, the researchers' suggested solutions are primary or fundamental to the institutionalization of Islamic finance profession and education in Nigeria.

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Infusion of Critical Thinking in Islamic Finance Educational Curricula: A Case Study of BWSS2013 "Philosophy of Islamic Finance and Banking"

Olorogun L.A.*
Abu Dhabi Men's College, Higher Colleges of Technology, 19 al-Saadat St. Muroor Road
United Arab Emirates
*Corresponding Author: lolorogun@hct.ac.ae

Abstract

Shortage of human capital has been identified as one of the main impediments to the development of the Islamic financial industry. It is believed that the infusion of critical thinking would boost the students' level of professional field-related knowledge and provide them with the necessary confidence, the key to professional performance measurement. This study incorporates critical thinking into the curriculum of BWSS2013 "Philosophy of Islamic Finance and Banking". The class syllabus was divided into two sections, the first section comprising of traditional lecturing methods without critical thinking followed by a quiz and pilot data collection, and the second section including critical thinking added to the customary lecturing model followed by a quiz and final data collected. A semPLS was run on SmartPLS. The results showed that a lack of critical thinking in Islamic finance curricula might eventually result in a shortage of skilled professionals in the Islamic financial industry. The findings showed a great correlation between knowledge acquisition and critical thinking. The students' own perceptions also indicated that the infusion of critical thinking contributed to their increased confidence (self-assurance) in the subject matter learned in this course.

Keywords: Infusion, Education, Curricula, Critical Thinking, Islamic Finance

Introduction

The need to change how Islamic finance future practitioners are educated by concerned international stakeholders is well documented, and has questioned current methods and curricula's integrity (Annuar 2015a, 2015b, 2015c, 2015d, 2016). According to practitioners as reported in Islamic Finance News throughout 2015, there is emphasis on how effective the current curricula of Islamic finance education are? Islamic finance graduates were often viewed as ill equipped or

incompetent candidates in the job markets. The failure to address such vital issue of skills before and during graduation results in the current existing gap in the transition to the labor market. Frankly, it resulted in intellectual shortage in Islamic financial industry. This led market players hiring conventional finance's graduates to fill-in available job vacancies in the Islamic financial Institutions (IFIs).

This problem is exacerbated by factors such as compulsory need of unification of finance and Islamic jurisprudence, the lack of ready-made textbooks for this profession. Previous studies such as Karandinou (2012), Thompson (2011), as well as Lin (2014) concludes that majority of undergraduate students often lacked or possessed limited in critical thinking (CT) and communication skills. This proposition has led to successful researches that promote vital incorporation of CT in several professions such as engineering (Shuman, Besterfield-Sacre,& McGourty 2005; Dominguez et al. 2013, 2014; da Silva Nascimento 2014). CT as familiar to most educators is vital as it promotes complex problem-solving situations (Sais & Rivas 2011). Hence, Angeli and Valanides (2009) defined it as conceptualization of phenomenon based on multiple dispositions and skills. This includes reflective and proactive approaches to any situation, advance intuition and perception, critical judgement, ability to interpret information, sound inferences and assumptions which would lead to decision-making and innovative recommendations etc.

Thus, Islamic finance future practitioners need to acquire more proficiency and be able to respond quickly to ever increase customer commercial and financial needs. Combination of both Islamic jurisprudence and finance knowledge when dealing with a range of stakeholders would indicate a general financial competency that can best be learned through sound unified multidisciplinary curricula. The Islamic finance course described here was based on the process of self-assurance is an integral to the development of professionalism. As part of a Islamic finance curricula, courses that put future professionals into scenarios with incomplete information on a real life financial issue, requiring them to provide solution and deliver a result under specific time, may help them develop a greater level of swiftness, knowledge, and preparedness to handle real life and workplace issues.

This article aims to evaluate how undergraduate year 2 students responded to change in mode of lecture after infusion of critical thinking to the syllabus of BWSS2013 "Philosophy of Islamic Finance and Banking", one of the core courses for the award of BSc in Islamic Finance and Banking at the Islamic Business School, College of Business, Universiti Utara Malaysia

(UUM). Its main objective was to assess and evaluate the efficiency of the course in imparting professional knowhow to the students. The lecturing method offers multiple channels for students to connect course frameworks to directly actual finance business contexts. The researcher believed that the inculcation of CT skills would contribute to ending the acute shortage of competent professionals in the Islamic financial system. The introduction of CT skills could support in confirming such as in previous studies of Emir (2013) that graduate students of Islamic finance and banking were more competent and more assured of their competency at all levels. To provide a context for the course, the article first demonstrates the methods, follow by analysis of results and conclusion.

Methods

Material

A refined SERVQUAL questionnaire developed by Parasuraman et al. (1991) was adapted for data collection. This was considered as appropriate material as demonstrated in previous studies such as Yousapronpaiboon, (2014). The pilot study questionnaire was administered to the respondents measuring the students' expectations and perceptions of the course, the mode of lecture and the lecturer's traits that they deemed most important. They were given the questionnaire on Tuesday and were asked to return it on Thursday. However, the questionnaire was structured in the language of philosophy of Islamic banking and finance. The pilot study's reliability result for expectation was 0.85 and perception was 0.80 which was within 0.80 thresholds prescribed by Churchill (1979) as acceptable reliability. Therefore, the reliability of this study was justified.

In third phase of the study the same questionnaire was amended in terms of language clarifications and the addition of a section which measured the students' self-assurance. The modified SERVQUAL questionnaire was administered to the respondents after their mid-semester examination. The questionnaire was distributed to the respondents on 3rd November 2015 to be returned on 17th November 2015. The class representative was deputized to collect the completed questionnaires on behalf of the researcher. This was to allow the respondents to provide sincere answers to the questions without any undue influence exerted by the present lecturer. The questionnaires remained anonymous as the respondents were not asked to give their names or matriculation numbers. All distributed questionnaires were returned.

Participants

The group of respondents consisted of all 35 students who had registered for BWSS2013 "Philosophy of Islamic Finance and Banking". The average age of participants was 24 and out of the total participants 4 (11.42%) identified themselves as male and 31 (88.57%) as female. Of the total of male students, 3 (8.57%) were Asians and 1 (2.85%) from the Middle East. Similarly, of the total of female students, 1 (2.85%) an African and 34 (97.14%) were Asians.

Procedures

As discussed in the previous section, the lack of competency in Islamic finance graduates asks for the teaching critical thinking in addition of the required syllabus and for a critical assessment of the quality of services offered at institutions of higher education. The study was started at the beginning of the semester and conducted at the College of Business, Universiti Utara Malaysia in the first semester of the 2015/2016 session. The lectures for the first semester began on 6th September 2015 and ended on 19th December 2015 excluding examination and holiday periods. The process of measuring the students' expectations and perceptions of the course during the semester was divided into three phases. Phase one was conducted at the end of the third week (6th-24th September 2015), phase two between the third to the sixth week (27th September to 15th October 2015), and the last phase fell between the seventh and the ninth week (18th October to 5th November 2015) shortly before the mid-semester break.

In the first phase, normal lectures started as usual -- without the infusion of critical thinking into the syllabus. The curriculum and syllabus were adopted as designed and handed over to the researcher by the faculty management. Among the activities executed on the first day of the semester were introduction of syllabus and the requirements which needed to be fulfilled, such as attendance and the full semester calendar of scheduled quizzes and examinations as part of the assessment. Other grade requirements consisted of group research and presentation. At the end of the third week, the first quiz was conducted as scheduled. The results were disappointing and seemed to justify the reports published by Annuar (2015a, 2015b, 2015c) claiming that Islamic finance graduates were on average incompetent. The overwhelming majority of the students (60%) achieved less than 50%. Subsequently, the students were invited for consultation during their leisure periods. The results revealed that the syllabus did not prompt the students to think and reflect on the subject matter or encourage them to deepen their insight and apply their knowledge

effectively and meaningfully. There were other factors that came to light, such as the fact that nearly all the students who had come for consultation confessed that they had not been sufficiently prepared for the quiz. Furthermore, they had not been able to cope with the given questions and realized that they were unable to connect the class discussion to real life and essence of establishing i.e. the philosophy behind Islamic financial industry.

The results of the first phase thus justified the subsequent infusion of critical thinking into the syllabus in the second phase. Critical thinking was infused during discussion to test the students' understanding of the subject matter and prompt them to apply their knowledge in line with philosophy of Islamic values and laws. Questions prompting discussion and critical thinking were deliberately invoked which challenged the students to provide immediate or temporary solutions. In addition, at the end of every class students were given additional mind tickling assignments in the form of idea generation to be discussed in the next class. After three weeks of intense coaching, the second quiz was conducted as scheduled. The results showed considerable improvement, with the large majority (85%) of the students scoring above 75% and 15% of the student scored above 50%. This most encouraging result prompted further enquiry into the students' perception on their performance.

The final collected data were then analyzed by the statistical package of Smart Partial Least Square (SmartPLS). A partial least square structural equation modeling was conducted and analyzed. According to Monecke and Leisch (2012), semPLS allows researchers to avoid covariance-based Structural Equation Modelling (SEM) when data are not symmetrical. Other advantages of SmartPLS are its efficiency in measuring scales in cases where the sample size is relatively small and contains residual distributions. In this study, the data or respondents were less than 50 which made semPLS conducted by SmartPLS a perfect choice.

Analysis of Results

Table 1, the central tendency, i.e. the mean (M) and standard deviation (SD) results showed that $(expectation \rightarrow assurance)$ M = 0.538 SD = 0.0767. Similarly, $(perception \rightarrow assurance)$ M = 0.283 SD = 0.0983. The mean with only little deviation indicated those students' perceptions about the positive and significant effects of infusing critical thinking into the course, i.e. BWSS2013 "Philosophy of Islamic finance and Banking". In other words, the students benefitted

from their exposure to critical thinking and have become more capable and self-assured students of Islamic Finance.

Table 1:
Mean Perception of Infused Critical Thinking into Syllabus

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
Expection -> Assurance	0.5385	0.5465	0.0767	0.0767	7.0194
Perception -> Assurance	0.2829	0.2798	0.0983	0.0983	2.8793

The Path Analysis (PA) results shown in **Figure 1** reflect the overall relationships of the model. The relationship of the students' perceptions to assurance is positive 0.283 and significant as t = 7.0194 which falls above 1.96 at a 5% level of significance. This indicates that the students' perception of acquiring specific knowledge and other related skills were achieved with the successful infusion of critical thinking into the syllabus. Therefore, the infusion of critical thinking brought about significant positive effects on the students' level of self-assurance which is a pre-requisite for competency in a professional field, especially the one in question. Likewise, the relationship of students' expectation to assurance is 0.553 and significant as t = 2.8793 which is above 1.96 at a 5% level of significance. This indicates that the students' expectation is met what they finally gained from the infusion of the critical thinking into the syllabus.

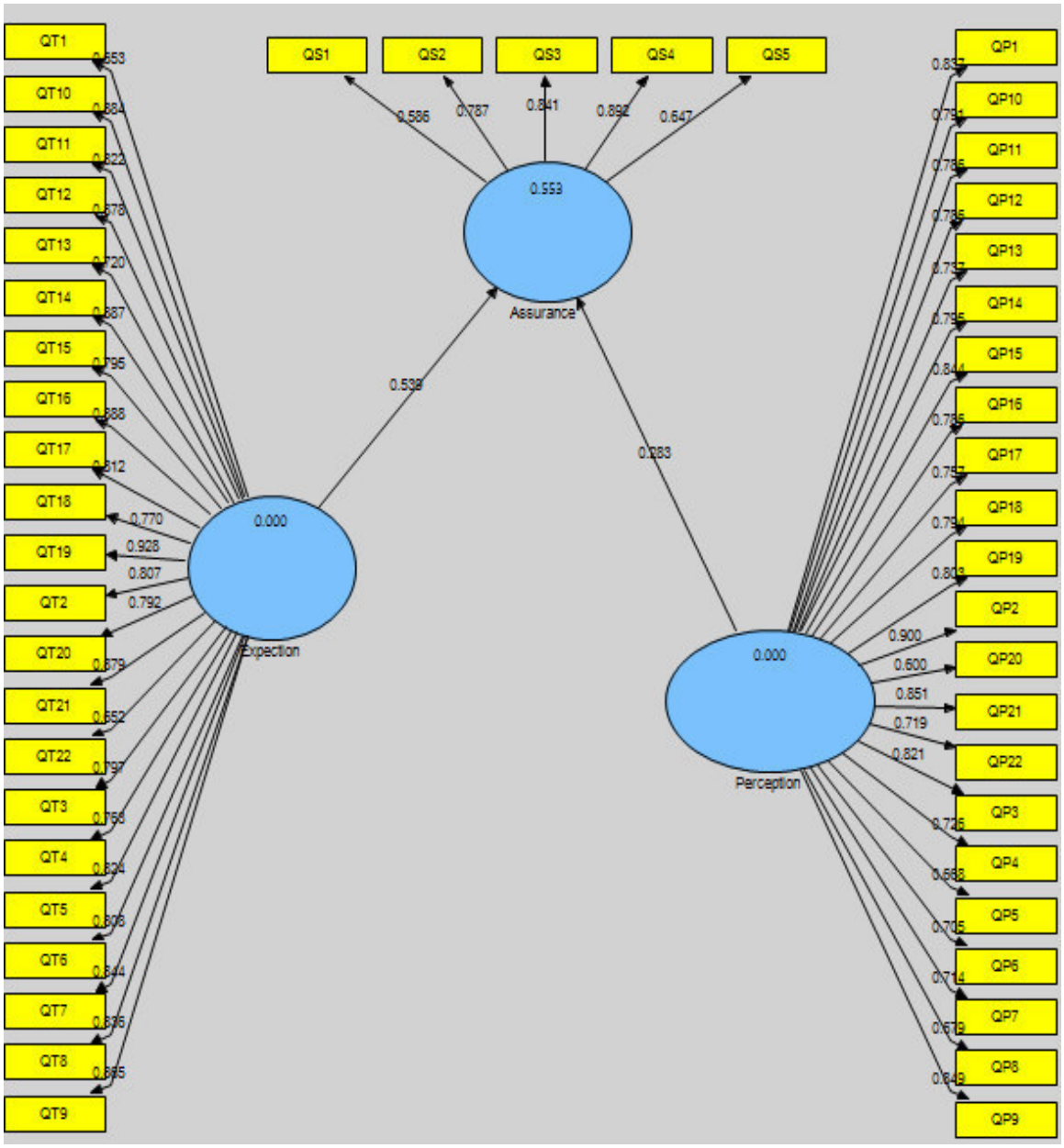

Figure 1: Perceived Student Assurance through Infusion of Critical Thinking in the Syllabus

The results further shed light on the type of leadership skill needed in the Islamic finance industry which the academic or current syllabus has not given adequate attention. Infusion of critical thinking provoked the students to communicate their individual and collective ideas resulting in self-assurance a key leadership trait. Communication has been proven to be a single and powerful managerial tool (Foote 2012). Financial industries either Islamic or conventional are customer oriented industry. Thus, dealing with various psychological issues other than financial technical matters requires ability to communicate and transforming crises into opportunities to

transform or strengthen the organization. A failure to critically articulate scenarios and learn from earlier outcomes can worsen the organization financial position. Employers are not ready to invest large amount grooming their new employees. They are after readymade personnel with little or no need for profession development.

Professional financial personnel must be able to transform words into action. **Figure 2** further supports the finding as the t values of variables measuring self-assurance are significant. Thus, articulation, communication and action are outcome of a well thought idea generation or implementation which is product of critical thinking. Competency further demands showing, agility by quickly delivering a much more complete and effective crisis response. Crisis in this context not necessarily a negative situation, even a positive condition might turn into threat for an organization if not properly handled. Therefore, the finding in-line with previous studies such as Saarmann et al. (1992), Garrison, Anderson, and Archer (2001), Lipman (2003), Ku (2009), Yang and Chung (2009), Facione (2011), Stassen (2011), Hashemi and Ghanizadeh (2012), Green (2014), Kloppers and Grosser (2014),. Belcher et al. (2015), de Noyelles and Reyes-Foster (2015), and Monroy-Licht, Collante-Padilla, and González-Hernandez (2016) showing the positive effects of inclusion of critical thinking in the educational space.

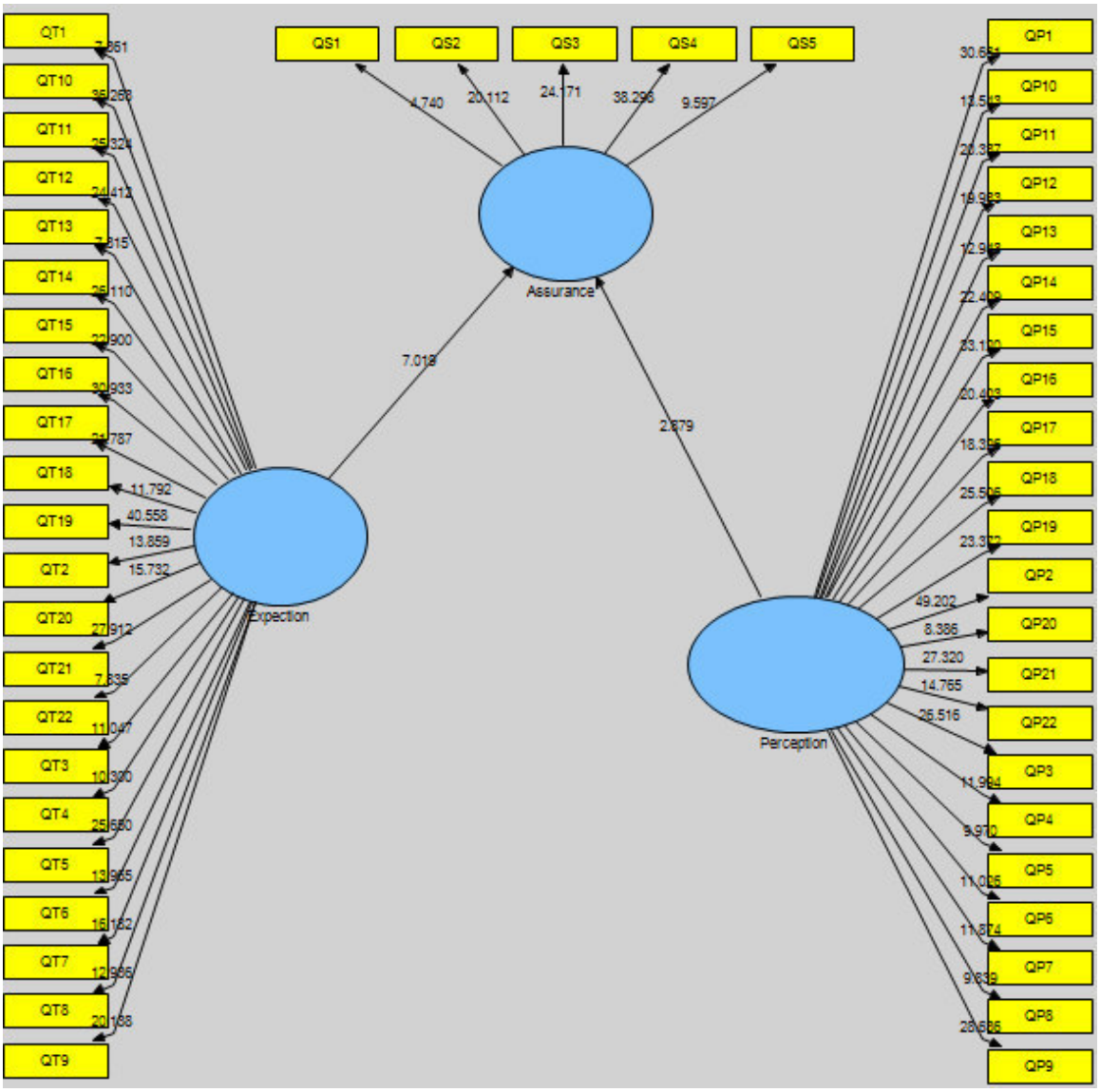

Figure 2: Perceived Student Assurance through Infusion of Critical Thinking in the Syllabus

Nations such as Malaysia, Saudi Arabia, and U.K. etc. that are currently hub of Islamic finance education must take the lead to reshape the educational sector. The researcher is well aware of Malaysian government immense investment on Islamic finance education but it is yet to be enough. Critical thinking must be embedded into its curricula at all levels if real competency is to be achieved.

Conclusion

For Islamic finance to possess competitive capacity against conventional financial industry it must have well-equipped professional. A well-equipped in this context means personnel who

would be able to synthesize both modern complex finance and Islamic juristic knowledge. Educational authorities therefore need to do more on infusion of critical thinking into Islamic finance courses. The researcher's call is not to teach critical thinking as a separate subject but to infuse it into every courses leading to the award of any degree in Islamic finance. Limitation to this study is the number of respondent which is limited to 35 students and duration of study. Hence, further study is required on a large scale and longer period of at least five years.

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The Impact of Instructional Comics towards Students' Performance in Www Programming

Farah Nadia Azman[a], Syamsul Bahrin Zaibon[b*], Norshuhada Shiratuddin[b]
[a]Universiti Teknikal Malaysia Melaka, Melaka, Malaysia,
[b*]Universiti Utara Malaysia, Malaysia,
*Corresponding Author: syamsulbahrin@uum.edu.my

Abstract

There is an emerging interest in using instructional comics as a digital storytelling medium where students' knowledge and ideas on various subjects are synthesized in a form of sequential art. In web programming course, retaining students' engagement due to the breadth and depth of web technology remains as one of the classroom challenges. Therefore, this study proposes the use of instructional comics as a motivation and reflection tool in WWW Programming subject. The findings reveal that the experimental group perform better than controlled group in overall academic performance and pretest-post test results. These outcome are presented in reflective manner in order to understand and determine a better practice of using instructional comics within classroom.

Keywords: Instructional Comic, Web Programming, Student-Centred Learning, Project-Based Learning, 21st Century Leaning

Introduction

The purpose of this research is to investigate the impact of instructional comics towards students' performance in WWW Programming of BSc. Multimedia students at School of Multimedia Technology and Communication (SMMTC), Universiti Utara Malaysia (UUM). The important issues of web programming course and instructional comics are addressed in the following section.

Theoretical Background

Overview of Web Programming Course

Web programming is a very useful skill and a rewarding career for ICT students. This is due to the increasing demand for web developers as current and future applications are stored and accessed through the World Wide Web (WWW). Hence, web application development courses have mostly become compulsory to ICT students which not only require them to master related theories, but also competence in web programming skills and problem-solving abilities (Wang & McKim, 2013). With the rapid rise of the WWW, it has become critical for decision-makers in higher education to apply effective method in teaching web development skills.

Currently, on-campus students at School of Multimedia Technology and Communication (SMMTC), Universiti Utara Malaysia (UUM) attend two hour lectures followed later in the week by a two hour practical class with computers. Different categories of web application development topics are covered consist of web programming features, methods, and skills.

Problem Background

Each week, students undertake computer-based exercises, in lectures and practical, to reinforce the material for the week. The lectures complement the online materials available in UUM eLearning portal. Online discussion is encouraged to allow further questions and explanations. Despite these efforts, students remain to find the course frustrating and demotivating. As a result, the students performed poorly in the subject (as indicated in SMMTC's grades for WWW Programming subject).

These implication is resulted by the several challenges of executing of WWW Programming course. First, the difficulty is caused by the breadth and depth of web technology itself (Dugan, 2013). In BSc. MM's WWW Programming subject, it is a requisite for students to acquire skills on several web programming languages such as HTML, SGML, JavaScript, VBScript, Active X, and Real Audio technology. With a lot of web technology materials that need to be shoe-horned into a single semester program, this lead to surface learning on modern web application development.

In contrast, web programming involves successive developmental reorganizations not only of the students' naive understanding of the scripting and programming language being learned, but also of the web application as a whole (Wang, 2006). Consequently, with lack of approach for

deep learning that incorporates students' higher order thinking skills to transfer and make connections, students convey disinterest and negative attitude to WWW Programming subject.

The second drawback is related to retaining students' engagement in WWW Programming subject. As beginner students believe that learning programming is cumbersome (Weragama & Reye, 2014), a guided reflection strategy should persuade them to deem otherwise. Although self-directed learning was previously implemented in WWW Programming course, without an approach that concerns with students' interest, they would not actively participate or reflect their comprehension meaningfully. Therefore, it is proposed that the integration of didactic visual media is a potential reflection tool in maintaining students' motivation and participation in WWW Programming class.

Proposed Solution and Motivation

To improve educational environment and engage BSc. MM students into learning process, this study proposes an approach to incorporate instructional comics as a motivation and reflection tool in WWW Programming subject. The motivation of this project originates from the advantages of instructional comics reviewed in past literatures. There are increasing volumes of comics utilized in higher education for teaching, and the related researches have been exhibited by the recent publications in academic journals (Humphrey, 2014; Azman, Zaibon, & Shiratuddin, 2017).

Besides being undoubtedly entertaining, comics have shown to instantaneously grasp students' interest to become more intellectually and aesthetically engaged. Plus, some conventional tools are unable to present particular subject matter as efficacious as comics (Juneau & Sucharov, 2010). As a result, comics are not only a vastly motivating medium for learning language, historical and literary material (Norton, 2003) but they have also been embraced in science (Norton, 2003; Spiegel, McQuillan, Halpin, Matuk, & Diamond, 2013; Cooper, 2011), mathematics (Cheesman, 2006; Metraglia & Villa, 2014), engineering (Metraglia & Villa, 2014), computer science (Cervesato, 2011), and many other areas. However, despite massive educational research on comics devoted to improving students' motivation, few have simulated the applicability of instructional comic as a student-centered approach in web programming subject.

Furthermore, recent advances in comic authoring tools (software to design and develop comics) enable ubiquitous attempts for educators and students to design their own personalized comics (Azman, Zaibon, & Shiratuddin, 2016). This opens opportunity for students to design instructional

comics without artistic restrictions. Therefore, based on the discussed rewarding evidences of instructional comics, this project intends to explore the potential of this media to improve the performance of in WWW Programming students.

Methodology

This study adopts quasi-experimental non-equivalent control group design methods. Purposive sampling is used, in which the sample is confined to the specific types of subject (Sekaran & Bougie, 2010). In the experiment, participants (total of 87 undergraduate students) are assigned into two groups as follows:

i. The experimental group that receive the treatment (instructional comic intervention).
ii. The control group act a comparison group that are not given the treatment, so that their academic achievement could be compared with the experimental group.

The experimental group (57 students) are instructed to use *BitStrips for School* comic authoring tool in producing instructional comics (see Fig.1 1). In the instructional comics, participants must present their understanding on selected topics in web programming subject. Based on what they have learned so far in official lecture and lab sessions, the participants may refer additional books and online resources to help them reflect and organize their overall idea about the topic. As reported by Engler et al. (2008), since students are unable to complete their instructional comics within the remaining class time, the composing process using *BitStrips for School* are proceeded as home assignment.

Pre-test and post-test (equal questions to assess students' comprehension on web programming content) are conducted towards to the experimental group. The purpose is to observe if there is a significant difference in their pre-test and post-test results ensued from the treatment.

Aside from that, participants' overall end semester results (Full Marks) in WWW Programming subject is also compared from both experimental group and control group. This is to detect if there is a significant difference of Full Marks between participants who take part in instructional comic intervention vice versa. Essentially, results of Full Marks and pre-test and post-test are the primary

criteria used to determine the impact of instructional comics towards students' performance in WWW Programming.

Figure 1. Examples of students' submitted instructional comics.

Data Analysis and Findings

Initially for lower than 100 sample size, it is preferable that data normality be assessed both visually and through Shapiro-Wilk test (Ghasemi & Zahediasl, 2012); where the obtained results are shown in Table 1. Since the *p* value is less than .05, it is assumed that the data are not normally distributed. Besides that, the frequency distribution for the data is graphically skewed. Therefore, non-parametric tests are used in the approaching data analysis.

Table 1
Results of Shapiro-Wilk test

Data Set	W	df	Sig.
Pre-test	.944	57	.009
Post-test	.949	57	.016
Full marks	.959	87	.044

An analysis of the findings (refer to Table 2) shows that the results of the Mann Whitney U test applied to the Full Marks scores in the experimental and control groups reveals a statistically significant difference at the level of Z=-2.717; p=.007<.05. The rank average of the Full Marks

scores of the experimental group students is 2931.50, which is higher than the students in the control group that had a Full Marks score rank average of 984.50.

Table 2
Results of Mann-Whitney U for Full Marks

	Mean Rank	Sum of Ranks
Experimental Group	49.69	2931.50
Control Group	33.95	984.50

	Full Marks
Mann-Whitney U	549.500
Wilcoxon W	984.500
Z	-2.717
Asymp. Sig. (2-tailed)	.007

In addition, findings from a Wilcoxon Signed-Ranks Test (see Table 3) demonstrates there is a significant difference between the pretest and posttest scores achieved by the participants in the experimental group (Z= -2.86, p=.004<.05). The sum of their negative ranks for the students' scores was found to be 45.50, while their sum of positive ranks is 230.50.

Table 3
Results of Wilcoxon Signed Rank for Pretest and PostTest

	N	Mean Rank	Sum of Ranks
Negative Ranks	7[a]	6.50	45.50
Positive Ranks	16[b]	14.41	230.50

Ties	36[c]
Total	59

	PostTest - PreTest
Z	-2.862[b]
Asymp. Sig. (2-tailed)	.004

Given the sum of ranks for the difference scores, the observed difference is in favor of positive ranks. Particularly, the post-test scores of the students and Full Marks achieved by the experimental group. On the basis of the results obtained, it could be argued that the use of instructional comics as a reflection tool has significantly improve students' performance in WWW programming course.

Results and Discussions

Generally, there are few interesting insights of utilizing instructional comics as a reflective tool in WWW Programming class. In this study, reflecting learning meaningfully by presenting educational material in a way that learner can extract meaning into the story in comics has exhibit an encouraging educational potential. Principally, this strategic approach of aligning web programming course by narratively framing knowledge in artefact of comics has shown positive results. These conditions suggest that further investigation should be carried out to determine precisely which feature of instructional comic development are most effective in helping students making connections for deep learning and higher order thinking.

Conclusion

The findings from the study are expected to open up new means for UUM lecturers to improve classroom engagement. Instructional comic as a reflection tool denotes that students will be

encouraged to think more deeply about the meaning of a particular topic. Hence, the outcome of this study could be hypothetically adapted into different classroom setting or disciplines.

21st Century education recognizes the critical need for developing 21st century skills, which is interdisciplinary, integrated within a project-based curriculum. Instruction comic as a reflection tool is an affiliated strategy to develop critical thinking and problem solving. By highlighting the potential of instructional comic development as a reflection tool, it may answer to several pedagogical principles, useful to teach concepts of each level of complexity and raise standards of teaching achievement more effectively.

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Create-Share-Collaborate: An Instructional Strategy for Developing Student Teacher's Critical Thinking.

Siti Nazuar Sailin*, Noor Aida Mahmor
School of Education and Modern Languages
College of Arts and Sciences
Universiti Utara Malaysia
*Corresponding Author: sitinaz@uum.edu.my

Abstract

In 21st century learning, critical thinking is one of the most crucial learning skills that student-teachers have to acquire. Student's ability to think critically would promote higher level of concentration, deeper analytical abilities, problem solving skills and creativity. One approach that can be used by educators for integrating critical thinking in the curriculum is through collaborative brainstorming. Through collaborative brainstorming, students can invent an idea, find a solution to a problem, or answer a question. One particular tool that can be used for facilitating collaborative brainstorming process is by using online mind map tool. Building a mind map is an active learning strategy that engages the learner with the subject matter. This strategy can be applied in the teaching and learning process instead of traditional lectures. Through the Scholarship of Teaching and Learning (SOTL), underpinned by meaningful and experiential learning theory, this paper discusses student-teachers' participation and engagement in collaborative brainstorming that employ *Create-Share-Collaborate* instructional strategy for developing critical thinking by using online mind mapping tool, *Popplet*.

Keywords: Critical Thinking, Collaborative Brainstorming, Experiential Learning, Online Learning, 21st Century Learning

Introduction

Studies have been conducted on the issues of what contributes to good practice in teaching (Biggs & Tang, 2007). An approach to good practice in teaching is defined as scholarship (Laksov, McGrath & Silén, 2010). Scholarship of Teaching in Learning involves investigative process in improving the quality of teaching and learning. According to McKinney (2006), Scholarship of Teaching and Learning (SoTL) "involves systematic study of teaching and/or learning and public

sharing and review of such work through presentations, performance, or publications" (p. 3). Effective SoTL practices also include partnering with students into inquiry and reflective practices (Felton, 2013). Implementing SoTL in ICT-integrated environment makes the process of reflective inquiry strong as well as enhances student learning.

This study attempts to include pre-service teachers into a novel reflective practice through the use of collaborative brainstorming strategy in order to investigate its effect on students' critical thinking. As stated in the Malaysian Education Development Blueprint (2013-2025), each student must have 21st Century learning skills which include leadership, communication and critical thinking (Ministry of Education, 2012) in order to compete with others. To effectively participate in the future, students should acquire lifelong learning skills and develop their transferable skills that will enable them to contribute meaningfully to the society.

Instructional practices serve as an opportunity to revisit topics in a manner that they are comfortable to understand. Among the methods are (1) pre-service teachers can also seek help from their peers; and (2) Internet can be valuable resource to students for understanding topics learnt. While there is enough evidence to prove that differentiated instruction greatly helps students in learning, they still need to develop further their critical and creative thinking skills to prepare them for the future. Furthermore, one of the programme learning outcomes for Bachelor of Education (IT) programme emphasizes on applying thinking skills and strategies critically and creatively. Thus, this study will provide an insight into the mechanism of its implementation among pre-service teachers and so that it can be aligned with the programme learning outcome.

The university is gearing towards streamlining its teaching and learning practices to be more diverse with more focus been given on developing students' critical and creative thinking. It has been argued that critical thinking is an important cognitive skill that needs to be integrated in the curriculum as it leads student to develop other thinking skills. Student's ability to think critically would promote higher level of concentration, deeper analytical abilities, problem solving skills and creativity (National Education Association, 2015; Partnership for 21st Century Learning, 2015). Attempts have been made to differentiate instructions in the classroom to instill critical and creative thinking among students. Among which teachers can engage students to think critically which includes assigning students with intellectual task that requires making judgment or choice. In addition, teacher may also conduct brainstorming activity because brainstorming activity is an essential part of critical thinking in which through this activity, students can generate ideas, find

solutions to a problem, or answer questions. One particular tool that we can use for facilitating brainstorming process is using a mind map or concept map. One of the problems observed by researchers from years of teaching, student teachers are struggling to demonstrate their critical thinking in their learning process, especially in class discussions, either verbally or written due to lack of ideas or knowledge of the topic discussed. Although they have the knowledge, these teacher students are unable to convey their ideas visually such as through mind map to be shared with peers and instructors. Moreover, they also are unable to think critically to support the discussion. These problems can be addressed if students are given a suitable and proper platform where they could contribute and share their ideas with others. Thus, this study proposed collaborative brainstorming strategy using online concept mapping tool in order to develop students' critical thinking.

The purpose of this paper: (i) to document the instructional strategy suitable for developing student teachers critical thinking that employ collaborative brainstorming by using online mind mapping tool; and (ii) to discus attributes of experiential learning that occur during student-teachers' participation and engagement in the collaborative brainstorming sessions based on their works and reflections.

Critical Thinking

Critical thinking is one of the important attributes for successful learning in the 21st century. Critical thinking has been defined in many ways. Case (2005) defines critical thinking as a result of higher order thinking activities such as analyzing, synthesizing and creating knowledge. Moon (2008) defines critical thinking as "a capacity to work with complex ideas whereby a person can make effective provision of evidence to justify a reasonable judgment... critical thinking can be seen as a form of learning, in that new knowledge, in the form of the judgment, is formed in the process" (p.126). Recently, the Partnership for 21st Century Learning (2015) defines critical thinking as one's ability to do the followings: (1) reason effectively by using various types of reasoning (inductive, deductive, etc.) as appropriate to the situation; (2) use systems thinking by analyzing how parts of a whole interact with each other to produce overall outcomes in complex systems; (3) Make judgments and decisions through various strategies, such as effectively analyze and evaluate evidence, arguments, claims, and beliefs; analyze and evaluate major alternative points of view; synthesize and make connections between information and arguments; interpret

information and draw conclusions based on the best analysis; reflect critically on learning experiences and processes; and solve different kinds of unfamiliar problems in both conventional and innovative ways by identifying and asking significant questions that clarify various points of view and lead to better solutions (p. 4).

It has been argued that critical thinking is an important cognitive skill that needs to be integrated in the curriculum because it helps students to develop other thinking skills. However, critical thinking is not about acquisition of skills, but abilities to collect relevant information and to come up with sound reasons, rationales, or justifications, in the course of defending one's judgment or conclusion (Mok & Yuen, 2016. Student's ability to think critically would promote higher level of concentration, deeper analytical abilities, problem solving skills and creativity (Case, 2005; Moon, 2008; National Education Association, 2015; Partnership for 21st Century Learning, 2015). A focus on critical thinking is essential in this 21st century teaching and learning practice to prepare students for more challenging future. For the student teachers, it is essential for them to apply thinking skills critically and creatively in a variety of situations, not only during their teacher preparation programme but also for their future teaching practice.

Collaborative Brainstorming Using Online Mind Mapping Tool To Cultivate Critical Thinking

There are many ways teachers can engage students to think critically. One of the ways is by involving students with intellectual task that requires judgment or choice. Case (2005) provides example on how students may involve in thinking activities that would promote critical thinking skills through webbing of ideas and paraphrasing to come up with good lesson notes. Other thinking activity that teachers may conduct is brainstorming. One essential part of critical thinking activity is brainstorming where ideas can be generated, solutions to a problem can be discovered and to find answers to questions (Gokhale, 1995; Willis & Miertschin, 2006).

One particular tool that can be used for facilitating brainstorming process is by using mind map or concept map. Concept maps refer to "graphical tools for organizing and representing knowledge. They are constructed from concepts, grouped into propositions linked by statements of relationships" (Ian, Streatfield, & Hay, 2010, pg. 3). The process of building a concept map involves active learning strategy that engages the learners with the content of the lesson which can be used during class. This method can be used to replace traditional lectures. Among the

advantages of brainstorming process by using mind map are it helps to students to develop understanding, to solve problem, to convey information, and as an assessment of students' understanding (Willis & Miertschin, 2006).

Currently, there are many technology assisted applications that can be used to support brainstorming and mind mapping creation. Jonassen (1998) coined the phrase "MindTool" to describe using computer technology in constructivist ways to engage learners in thinking critically about whatever content they are studying through concept mapping. *Mindtool* could help learners to actively participate in the learning process as they construct their own knowledge, rather than just reproducing the knowledge of their teacher (Jonassen, 1998). Willis and Miertschin (2006) emphasizes that computer-based mind maps are graphical tools that have several uses relevant to instruction and learning, a kind of visual learning that utilize the use of images and animations to enable and enhance learning.

In the recent development of Internet technology, there are many online applications for creating concept map that can be integrated in the classroom to conduct brainstorming activities. For instance, Web 2.0 technologies enable collaboration in the brainstorming process. Proponents of collaborative learning claim that the active exchange of ideas within small groups not only increases interests among the participants but also promotes critical thinking (Gokhale, 1995). Collaborative learning has many advantages. Hulbert-Williams (2010) suggest that online collaborative tools such as Wiki can be an enjoyable teaching tool. They found that students' engagement with task was high, and students could clearly perceive the benefits of participation. Students reported that they enjoy the task and they also felt that their participation in online collaborative learning was beneficial to the progress of their coursework. By engaging in collaborative learning, it could help students to create a sense of comfort and safety that in turn enabled them to learn about one another and build relationships over time. Research findings in recent years provide compelling evidence of the importance of encouraging students' control over the learning process as a whole. Siemens (2005) and Hall & Hall (2010) elaborates that within appropriate educational contexts, Web 2.0 tools can be transformed into effective task-oriented personal learning spaces by shifting control to the learners, extending formal learning into a more informal one, promoting learner autonomy and participation in social networks independently of physical, geographical and institutional boundaries.

In this study, the researchers used a Web 2.0 tool, *Popplet.* It is a kind of graphic organizer used to create mind map or concept mapping interactively. *Popplet* is multimedia enabled application. One advantage of using this multimedia based mind mapping, students include their own sketches, images or videos to illustrate a particular concept or understanding.

Experiential Learning 2.0

This study is designed within the experiential learning theory. Kolb's (1984) characteristics of experiential learning serve as the theoretical and analytical framework for this study. The following are the fundamentals of experiential learning:

- Learning is best conceived as a process, not in terms of outcomes.
- Learning is a continuous process grounded in experience.
- Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world (learning is by its very nature full of tension).
- Learning is a holistic process of adaptation to the world.
- Learning involves transactions between the person and the environment.
- Learning is the process of creating knowledge that is the result of the transaction between social knowledge and personal knowledge.

Kolb (1984) also emphasizes on experience as the source of learning and development. According to Kolb, experience can provide concrete experience (feeling) such as learning from specific experiences and relating to people; to be sensitive to other's feelings; serve as reflective observation (watching) such as observing before making a judgment by viewing the environment from different perspectives; opportunity to look for the meaning of things; allows for abstract conceptualization (thinking) such as logical analysis of ideas and acting on intellectual understanding of a situation; and finally, provides room for active experimentation (doing) such as ability to get things done by influencing people and events through action which includes risk-taking.

Authentic real experience is an important source of learning and development (Kolb, 1984). Integrating Web 2.0 tools in the teaching and learning can be considered as pedagogical innovation that adopt experiential learning strategy because it allows for knowledge construction through

content creation, collaboration and sharing. Web 2.0 tool, *Popplet* in particular, support active learning experience and could enhance student's critical thinking through active experimentation or experiential learning process / activities where students can create, share, and collaborate. Furthermore, the digital contents created and shared collaboratively by the students is a valuable data as it can serve as evidence of student's learning engagement.

Scholarship of Teaching and Learning (SoTL) Methodology

The method for this study is anchored in the principle of Scholarship of Teaching and Learning (SoTL) which encourages systematic academic inquiry into teaching and learning practices within the classrooms and sharing the findings with other academicians and practitioners for wider benefits (Felton, 2013). Scholarship of Teaching and Learning, or SoTL as it is called has been defined in several ways depending upon the person and institution's own belief. Belmont university (2006) defines SoTL practitioners as someone "…who consciously reflects on the goals, methods and strategies of teaching… and who strive continuously to refine their teaching methods and effectiveness and explore new methods" (p. 57-58). This definition of SoTL brings to its fold a wide range of methods in teaching and learning.

Huber and Hutchings (2005) coined the term 'big tent' for SoTL. They argued that there are "narrow constructionists" who emphasize that SoTL as traditional academic research allowing the practitioner to conduct local inquiry. On the other hand, there are also "broad constructionists" or "big tent advocates" who see SoTL much bigger than just a local inquiry. As a local academic inquiry, SoTL covers "a wider range of work (documentation, reflection, inquiry) in greater or lesser degrees of polish, made public in forums with nearer or farther reach". From a limited number of examples, SoTL has been understood and promoted with a wide range of understanding. From a narrowly-focused empirical research to an elaborate study which is complete with reflections, and its sharing; it is indeed has definitional variety. The variety is so intense that Kathleen McKinney, in her famous book 'Scholarship of Teaching and Learning', had to highlight and discuss whether or not SoTL is a reflection or an inquiry and/or presentation or a publication (McKinney, 2007). The present study understands SoTL as defined by Schulman in 2001 which professes SoTL as a systematic study of teaching and learning which can be critically reviewed by peers, can be built upon by others for further advancements and the findings are open to public through presentations or publications (Schulman, 2001).

Reflection is the heart and soul of SoTL and experiential learning. Therefore, this study emphasizes on the importance of reflection as a part of teaching and learning process which can be used to improve student's critical thinking. The reflective practices adopted in this study are based upon the cycle suggested by Gibbs (1988).

Figure 1: Reflective Practices Cycle (Adapted from Gibbs, 1988)

There is a wide range of methodological approaches for conducting SoTL, and it can be either quantitative or qualitative in nature, or combination of both (Hudball & Clarke, 2010). This study adopted a qualitative participatory action research to identify ways that would improve student teacher's critical thinking. The participants for this study were 30 final year student teachers from the Bachelor of Education (IT) programme, Universiti Utara Malaysia. Through the SoTL project, students were exposed to a collaborative online brainstorming tool, *Popplet*, in a 14 weeks course namely Development of Web Based Instruction, where the first author is the instructor for this course.

Instructional Design Strategy: Create-Share-Collaborate

In this study, the instructor coined the phrase 'Create-Share-Collaborate' to describe the instructional strategies, through the use of *Popplet*, invented in this SoTL project. Here, students

have the opportunities to create their own knowledge in the form of digital contents, share their content creations with their peers and work collaboratively in creating their digital contents.

This paper, however, discusses only one particular stage of a SoTL project, Intervention 1 or the 1st cycle of the action research. In this process, the researchers engaged in the planning, acting, observing and reflecting. The instructor first introduced online collaborative brainstorming tool, *Popplet*, to the students. Students were divided into small groups of 4 to 5 students based upon the number of students in the class. Each group was assigned with a sub-topic. Each group was required to collaboratively prepare an online mind map of their group's topic using online brainstorming tool. The main board or "wall" for the online mind map was prepared by the instructor. The instructor "shares" the "wall" with the students by adding "collaborators".

Students were given one week to find relevant information about the topic from the Internet and to create the mind map. A guideline was given to students. For this activity, students have to come up with a multimedia concept map which includes the following: (1) brief description about the topic; (ii) an image / illustration about the topic; and (iii) a video that describes the topic. After one week, a face-to-face session was conducted. In the session, the instructor debriefed the students about the activity and topic. The instructor also added several mind map points or branches to complete the overall topic and added resources to the online mind map to ensure the topic was fully covered. Students were given another week to "study" the topic (to read, view images and watch the videos that other group has created) to the mind map. After that, an online "quiz" was conducted as an assessment of students' learning. The instructor assessed students' creation of the mind map based upon a self-prepared rubric.

After the assessment, students were asked to reflect upon their experience of the online collaborative brainstorming activity. Following the Gibbs' (1988) reflective practices cycle, students were required to reflect upon what they have done, their feelings, discuss whether or not they have learn about the topic through the activity, come to a conclusion and suggest ways to overcome the problems they faced. In addition, the instructor also wrote her own reflection about the whole process of teaching and learning using the above mentioned strategy. The reflections collected were analysed according to thematic analysis. Hence, the results were coded and discussed based on the analytical framework of experiential learning.

Findings

Through the exploration of data from students' reflections of the learning process in this first cycle of SOTL project, triangulated with data gathered from classroom observations (student's work and presentation) and the instructor's reflection, it was found that the collaborative online brainstorming activities using *Popplet* have a positive impact towards student's critical thinking. Data from the student's reflections on the teaching and learning process using *Popplet* reveals that students were able to develop their critical thinking skills during their construction of knowledge through collaborative brainstorming. This paper discusses on one particular attribute of experiential learning process found from this study which is active experimentation, in which students were able to get things done by collaborating with other people through action or learning by doing (Kolb, 1984). This attribute emerged from the following sub-themes: adaptation of learning and participation and engagement.

Adaptation of Learning

Most students disclose that it was their first time engaging in an online collaborative brainstorming by using mind mapping tool. Initially, students were a bit apprehensive about the learning method. They were a bit uneasy and highlighted that it was difficult for them to learn through this new method. They also mentioned that they do not feel confident in using the tool and some even felt that it was a "waste of time". These can be seen from the following responses:

At first, it was a bit awkward to use Popplet because it was my first experience using it (#4) (translation)

At first, it was a bit awkward for me to use Popplet to produce mind map because it was my first time using it for learning (#15) (translation)

Initially, I thought Popplet is just a waste of time and it does not have any advantages compared to the other applications (#18) (translation)

However, their views changed after they have explored the tool and engaged in a collaborative discussion with peers. They started to like the tool and enjoyed the learning process. More importantly, they were excited to complete their mind map. It can be noticed that *Popplet* is a simple, interactive and user friendly technology assisted application. The application managed to attract students' interests. Hence, the learning experience enjoyable for students. This can be viewed from the following responses by the students:

I am excited to use Popplet because it facilitates teaching and learning. Making learning fun and exciting with colourful mind maps made by us (#10)

I am happy because Popplet is very interactive and easy to use. Popplet excites me to produce mind maps which contain multimedia elements (#18) (translation)

Through exploration and engagement in the collaborative brainstorming, students realize that *Popplet* helps them in the construction of a mind map which consequently makes the adaptation to the learning process become much easier. Students also valued the usefulness of the mind mapping tool to support the teaching and learning process:

By using Popplet, main points of the topics can be seen clearly… Popplet also helps me to remember better and facilitates teacher to monitor and check students' work better (#10) (translation)

In addition, most of the students reflected that, through this collaborative online learning process, they can understand the topic better:

I can now understand the content of the topic better with the help of the mind map. I can remember better because of the colours and patterns used in the mind maps. The mind maps are so unique because each group produces different types and patterns of mind maps. Each mind map contains comprehensive knowledge and information regarding the topics covered. It is simple and easy to understand (#1)(translation)

Thus, through exploration and engagement in the collaborative online brainstorming, students admit that *Popplet* helps them in the construction of a mind map which makes the adaptation to the learning process become much easier. They also valued the usefulness of *Popplet* as a mind mapping tool that help them to understand the topic better.

Participation and Engagement

Upon the completion of the first cycle of this SoTL project, students also reflected on their involvement in the learning process. It was found that through the collaborative brainstorming strategies by using online mind mapping tool, students actively engaged in the learning process as they learn by doing. Through this activity, students considered themselves as active learners where they take charge of their own learning. While the instructor provides guidelines and brief introduction to the tools, *Popplet*, students have to discuss and decide within their groups in order to complete the mind maps. The instructor monitors students' participation and progress.

As in Figure 2, different names can be seen on the screen as collaborators who contributes to the mind mapping development. In this 1st cycle of SoTL action research, the instructor initiates the mind map by adding assigned topic in the middle of the *Popplet* "wall" and students collaboratively work in their group to complete the mind map.

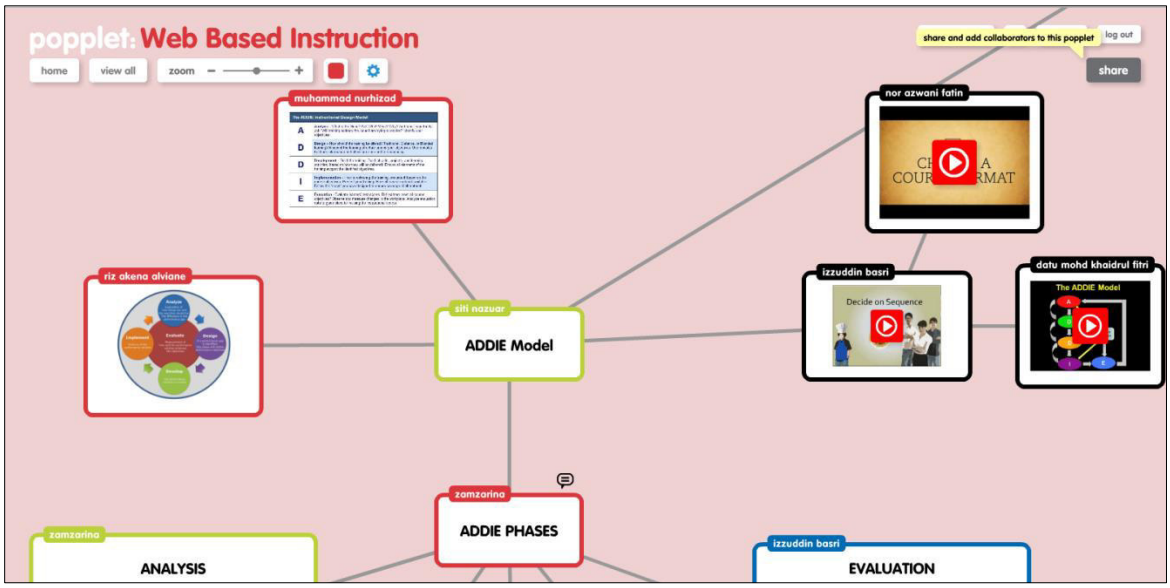

Figure 2: Collaborators in the mind map development.

Apart from that, students also reflect upon their participation in the collaborative brainstorming:

Developing mind map for ID topic using Popplet is exciting. It creates an effective and conducive learning environment because we collaborate with other group members (#20) (translation)

Based on the statement above, it is obvious that students are able to not only think critically about developing mind map but also to reflect critically on the learning process and experiences. As literature suggests, to learn is to reflect upon the learning process (Gibbs, 1988, Partnership for 21st Century Learning, 2015). Reflection is the heart and soul of SoTL and experiential learning and it is evident in this study, some of the students were also able to produce critical reflection:

When the mini mind map is transferred in to a larger mind map, it makes learning exciting because the information can be shared with others. Finding suitable sub-topics to be included in the mind map is crucial especially when the content has to be summarized in point form in order to deliver the message. By sharing ideas with friends, the mind map becomes enriching and interesting. The application is so user friendly, easy to use, easy to browse and more importantly, it is paperless and we do not have to bring papers to class (#6) (Translation)

Other student reflected on the collaborative process itself especially the task distribution:

We assign roles and task among group members. We make sure that each member can focus and find information on the topics that we have to do… we also make sure that the information gained is suitable for the topic and we ensure that the content of the information is presented concisely, precisely and easy to be understood (#8) (Translation)

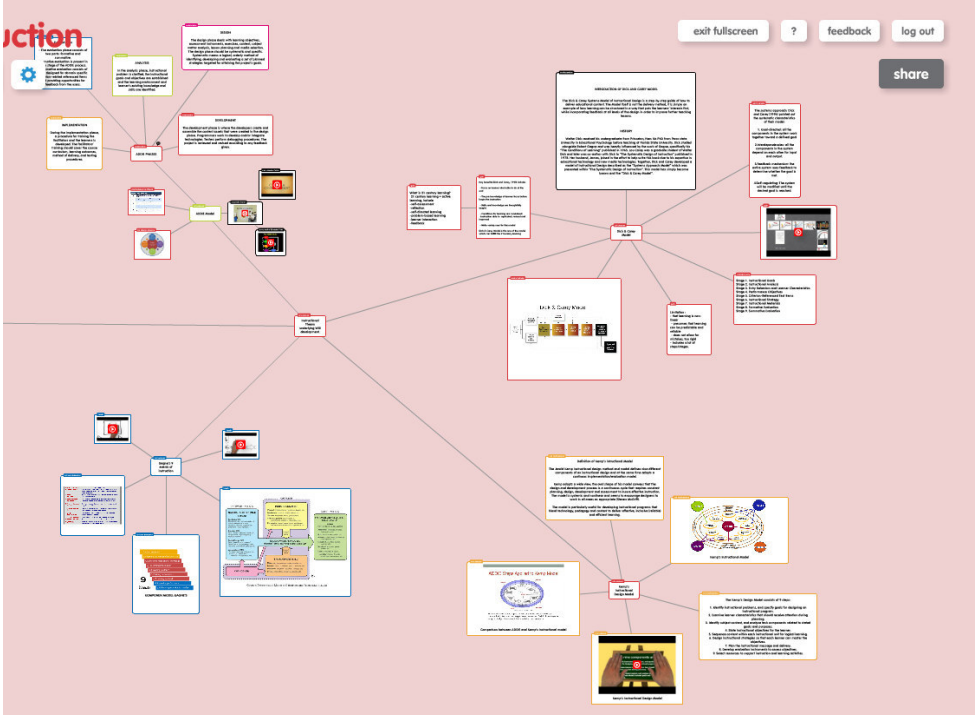

Figure 3: Mind Map produced by students

The above Figure 3 is the result of the whole online collaborative learning process from the 1st cycle. The figure shows two types of collaboration: (1) student-student collaboration; (2) student-instructor collaboration. During the collaborative brainstorming process, the instructor contributes in the development of the mind map by adding necessary points to complete the mind map. This is to avoid incomplete or missing points by the students.

Discussion

The findings of this study corresponds to the theory of experiential learning which asserts that learning is a process of knowledge construction through concrete experience, reflective observation, abstract conceptualization and active experimentation (Kolb, 1984). In this study,

students' involvement in an active experimentation through collaborative brainstorming using online mind mapping tool help students' critical thinking skills. It provides an active learning process for the students making the lesson enjoyable, less stressful and memorable. The findings of this study reveal that students actively participate in the collaborative learning process and able to think critically during the process. This process of teaching and learning relates to the metacognition, or thinking about thinking process (Hennesy, 1999).Through this collaborative learning process, students were required to think about the topics and at the same time, reflect on their engagement in the learning process. The process when students work collaboratively with peers in the development of the mind map means thinking together (Isaacs, 1999). In this SoTL project, students collaboratively respond to the instructor's questions, engage in a discussion towards producing a mind map of their topics and finally, reflect on their work. As explained by Burres & Peters (2015), the process of co-constructing new knowledge is a form of engagement. Students' participation and engagement during the online collaborative brainstorming provides room for students to think and learn in groups instead of individually.

This study corroborates with previous studies that found the used of mind mapping tool lead to a clearer understanding of content (Rosen, 2013), helps in identifying main ideas (Ellozy & Mostafa, 2010) and students able to perform various thought processes (Long & Carlson, 2011). In addition, the findings on students' participation and engagement in the collaborative learning strategy adopted in this study in also supports Hulbert-Williams (2010, p. 49) finding that "student engagement with the task was high, and students could clearly perceive the benefits of participation" in a collaborative learning environment. Nevertheless, the researcher recognizes some weaknesses during the implementation of the first cycle in which the students still produce lengthy statements/points in their mind map. Therefore, in the second cycle, the instructor will conduct an intervention to guide the students to produce short, concise and precise statements/ points to be used in the mind map.

Conclusion

In conclusion, it can be said that adaptation to the learning process as well as active participation and engagement are the primary determinants of students' active experimentation in the collaborative brainstorming process to promote critical thinking. By empowering students in their learning, the chances of promoting critical thinking is higher and it allows instructors to

improve their teaching and learning strategies. In the future, the researchers will concentrate on the other attributes of experiential learning such as concrete experience, reflective observation, and abstract conceptualization.

Acknowledgement:

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Business Intelligence Model for Analysing Blended Learning

Muhamad Shahbani*, Azman Ta'a, and Suwannit Chareen Chit
School of Computing, College of Arts and Sciences, Universiti Utara Malaysia, UUM Sintok, Kedah, Malaysia
*Corresponding Author: shahbani@uum.edu.my

Abstract

Blended Learning is the term generally applied to the practice of using both online and classroom learning experiences when teaching. This approach to educating combines face-to-face instruction with online learning and has yielded strong results since officially being researched as an education strategy. Blended learning is a word that has been thrown around quite a bit lately and brings together the best of both classrooms learning and online learning. In fact, it seems to be the ideal all-round solution as it appeals to all learning styles, circumstances, needs and demands. Furthermore, the results in online learning can be monitored, tracked, and used to ascertain that all learning requirements have been met. However, the problem of managing and monitoring learner progress is one of the challenges in Institutions of Higher Education (IHE). Keeping track of learners' progress can be the most difficult challenge to address. Facilitators or online administrators need to interact with participants to ensure that learning outcomes are understood and thus expectations are met. This task needs a systematic approach to handle the massive data in online learning platform. This requires IHE to explore of its data and devising means of how to implement best teaching and learning approach, and make more sense of the data in view of supporting decision making process for enhancing IHE education system. Therefore, it is responsible for developers to extract, transform, drill, and analysis the data produced by online learning technology implementation by using Business Intelligence and Analytics (BIA) approach. The BIA is mainly employed to improve the quality of the decision making process by combining operational data with the appropriate analytical technologies to produce information and knowledge. This paper will describe BIA approach for monitoring blended learning implementation in IHE.

Keywords: Learning Technology, Blended Learning, Business Intelligence, Data Warehouse, Data Analytic

Introduction

Institutes of Higher Education (IHE), is expectedly passionate about the actualizations of their goals and attainment of their visions to be an eminent university in this region. This undoubtedly brought a fair apprehension to the decision making process of the university, and the need to compete with other universities to achieve edge-cutting decision making abilities that have necessitated a heavy investment in human resource development, and infrastructure that included training technology (Ayodele & Sotola, 2014). According to AbdurRahman and Alan (2013), human capital development which is determined by the quality of teaching and learning delivered by the IHE should take a prominent attention because it serves as the primary metric through which the performance of the university is measured and the quality of service is ranked.

Currently, most of the IHE's interest is accompanied with appropriate college, goal, and the corresponding learning strategies. Moreover, IHE is positioned to be the engine room for national human resource development due to their capacity and capability of providing human and intellectual resources, and competencies that tally with the Malaysia Education Blueprint 2015-2025 (MOHE, 2015). Indeed, as IHE evolved to both internal and external pressures, depending on output of academic research and publication, teaching and learning, human capacity building, and innovation are topmost of their focused service delivery. This is essentially done with a high degree of well strategic planning, in a competitive environment that rewards success, and an entrepreneurial approach to attracting the resources necessary to be successful (Moyle, 2010; Altbach et al., 2009). Universiti Utara Malaysia (UUM) as one of the well-establish IHE in Malaysia continuous enhance performances through improving their teaching and learning facilities. A meta-analysis of more than 1,100 empirical studies published between 1996 and 2008 concluded that blended learning proves to be more effective than either online learning or face-to-face instruction (Means, Toyama, Murphy, Bakia, & Jones, 2009).

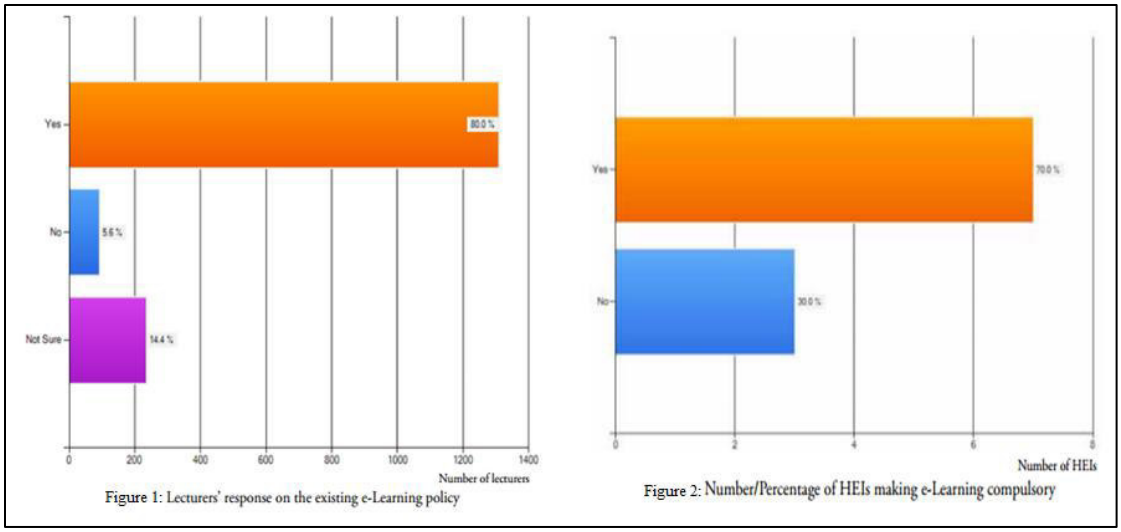

Figure 1. Blended Learning Implementation

As shown in Figure 1, 75% lecturer needs to use Blended Learning in 2025. Currently, 90% of higher education already has an e-Learning policy, and most 70% make compulsory the use of online or blended e-Learning. Since the goal of National e-Learning Policy is to have 30% of all higher education courses delivered online by 2015, and 50% by 2025, thus the university should strategically provide the facilities for blended learning, especially on software, hardware and technology.

Using an advanced technology for teaching and learning (i.e., e-Learning) is one of the UUM approaches to support the high level of educational implementation. The completed documents for teaching and learning, preparing by the lecturers is used together with the teaching technology to accomplish a blended learning implementation. However, in the university organizational structure, the success and effectiveness of the e-Learning technology was not properly analyzed. The current usage of e-Learning technology with the university's missions and goals have bring responsible for management to make a decision about the education direction (Bakar & Ta'a, 2014). This required university to explore of its data and devising means of how to implement best teaching and learning approach, and makes more sense of the data in view of supporting decision making process for enhancing UUM education system. Therefore, it is responsible for researchers to extract, transform, drill, and analysis the data produced by e-Learning technology implementation by using Business Intelligence and Analytics (BI&A) approach. The BI&A is mainly employed to improve the quality of the decision making process by combining operational data with the appropriate analytical technologies to produce information and knowledge.

Moreover, BI&A is an excellent framework for maintaining the historical data for the purpose of analysing in a very efficient way (Sidorova & Torres, 2015).

The Business Intelligence and Analytics (BI&A) approach will be used to capture, process, and analyze data of blended e-learning utilization to produce a descriptive and predictive analysis of this study. Adapting BI&A for decision-making process has increased tremendously among the university community (Canada Health Infoway, 2013; Pant, 2009). Many studies conducted by researchers and practitioners on the effect of the increasing use of the BI&A system by small, medium and larger organizations to improve decision making capabilities (Pourshahid, Richards, & Amyot, 2011). This is in line with the market survey conducted by Better Management, which showed that 84 percent of various organizations are using BI systems to support their decision making process have been included performance measurement due to their capacity to leverage analytical technologies from the operational data. The effectiveness of financial and non-financial were used by the organizations to estimate the success rate and trend of the organization in relationship with its goals (Velimirovića, Velimirović & Stankovića, 2011).

Blended Learning Technology Usage

Currently, online learning overlaps with the broader category of distance learning, which encompasses earlier technologies such as correspondence courses, educational television and video conferencing. These technologies were not significantly different from regular classroom learning in terms of effectiveness. The question of the relative efficacy of online and face-to-face learning needs to be analyzed, due to enhancement of today's online learning applications, which can take advantage of a wide range of cloud-web resources, rich multimedia contents, web and mobile-based applications and new social media collaboration technologies. These forms of online learning are more advances from the televised broadcasts, video conferencing, and traditional e-learning that characterized earlier generations of distance and self-learning education. However, particularly, in UUM, the interest in hybrid approaches that blend in-class and an online activity is increasing and compulsory for lecturers to implement it. However, the effectiveness of this blended e-learning approach is still questionable. The UUM management and lecturers want to know about the effectiveness of blended e-learning approaches and need information about the conditions under which blended e-learning is effective, especially for developing lecturers teaching competencies. By knowing this, a management can take necessary actions to improve the

e-learning services, and at the same time a lecturer can position their appropriate actions to utilize the e-learning facilities. Indeed, this research will take a pragmatic approach to evaluate the usage of blended e-learning technology, and focus on lecturer roles. Based on current planning for blended learning performance, only 30% (2015) of the courses are in blended learning as shown in Figure 2.

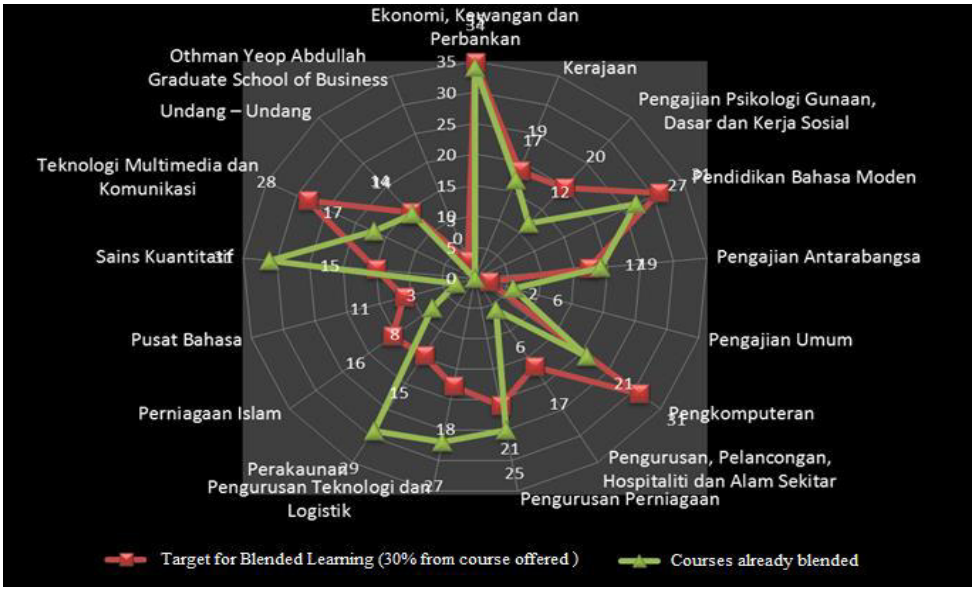

Figure 2. UUM Blended Learning Performance

According to University Teaching and Learning Center (UTLC) UUM, the problems facing by the university to implement blended learning can be identified as follows:

- Need to perform a data gathering and integration based on existing blended learning usages from several of data sources.
- The collected data will be used to analyze requirement of analytic that determined prior for performing the analyses.
- The effectiveness of this blended learning approach is still questionable.
- Less available method for analyzing the usage of blended learning approaches.
- Based on the analyses, related stakeholders can take necessary actions to improve the e-learning services and utilization.

This research will explore the usage of blended learning, especially the using of blended learning technology by the lecturer. Therefore, this research will:

- Use the Business Intelligence and Analytics (BI&A) approach to capture, process, integrate and analyze the data of blended e-learning usage.
- Perform an analysis and design the data warehouse (DW) for e-Learning technology usage. The data that produced from the DW will be further analyzed, which is important to understand the meaning of the data captured by the DW.

Specifically, factors to evaluate the extent of blended e-learning for technology usage will be based on the radar chart developed by Harding et. al (2005) as cited by Harding, Kaczynski, and Wood (2005). The radar chart contains six radials, which used to measure:

- Dynamics and Access: What is the frequency of access in the course (once per term, once per month, once per week, 2-3 times a week, daily)?
- Assessment: How much of the assessment is done online (little, almost half of it, more than half of it, most of it, all of it)?
- Communication: How much of the communication happens online (little, almost half of it, more than half of it, most of it, all of it?
- Content: How much of the course content is available online (each for books, course information, course administration, lecture notes, study objectives)?
- Richness: How many enriching components does the online part of the course have (each of the topics, slide presentations, video clips and sound clips, using media social)?
- Independence: How independent is success in the course from face-to-face contact (Fully contact lecture and tutorial driven; website an add-on, Contact lectures, but web-based tutorials or assessment, Limited regular contact, Sporadic contact, No face-to-face contact)

Regression model for each of the radar chart will be developed and analyzed by using R programming. Since R tool is freeware and independent, then the linkages with the DW need to be explored. The Research will explore on: i) what measure to be analyzed that influence the use of blended learning technology? ii) How to define the BI model for analyzing the blended learning technology usage? and iii) How to ensure the usage of blended learning technology will fulfill the University requirements? Consequently, the objective of this research is: i) to identify the measures

influencing the use of blended learning technology, ii) to develop a BI model for analyzing the blended learning technology usage, and iii) to evaluate the usage of blended learning technology. Indeed, this research aims to develop a BI model for analysing blended learning technology usage on the perspective of lecturer responsibility.

Research Methodology

This research adopts the design science approach, which describes the process used to identify, develop and evaluate the BI&A model for analyzing the effectiveness of blended e-Learning Technology used in the IHE. The results of these identifying, and developing were used for analyzing the effectiveness of blended e-Learning Technology. According to Van Aken (2005), the main goal of design science research is to develop knowledge that the professionals of the discipline in question can use to design solutions for their field problems. Kuechler and Vaishnavi (2008) states that the main purpose of design science research is achieving knowledge and understanding of a problem domain by building and application of a designed artifact. The methodology has emphasized the design science in understanding, developing, executing and evaluating information system. Therefore, this research focuses on building and evaluating the new BI&A model for analyzing the effectiveness of blended e-learning technology, which are possessed of three phases:

Phase 1 – Identify measures influencing the use of blended e-learning technology
Phase 2 – Develop a BI model for analyzing the blended e-learning technology
Phase 3 – Evaluate the usage of blended e-learning technology by using the BI model

These phases are illustrated in Figure 3.

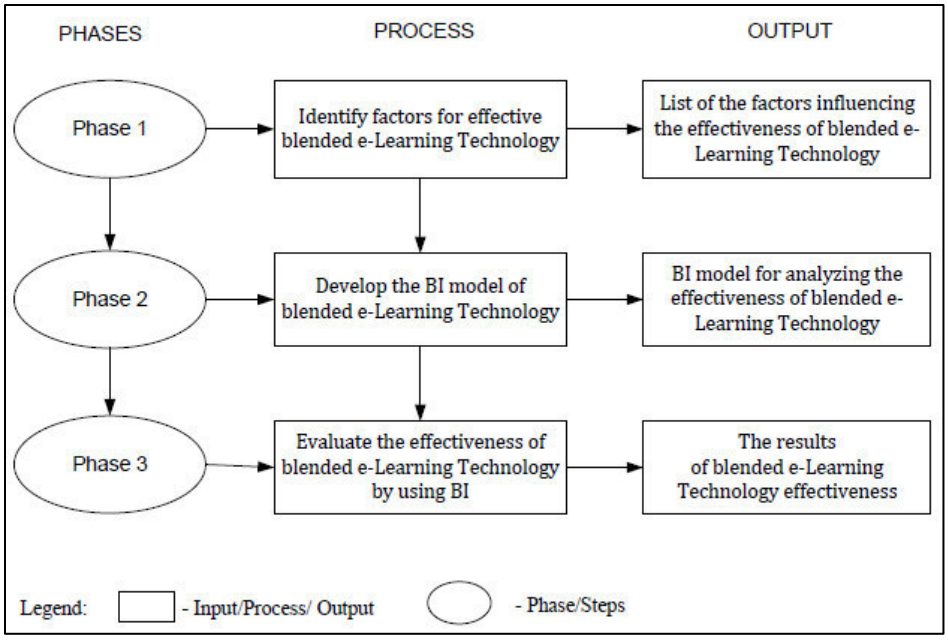

Figure 3. Research Methodology

These research activities drive the achievement of the research goal that comprises of the objectives for each of the phases. The implementation of each phase is explained as follows:

Phase 1: Identify factors influencing the use of blended e-learning technology

The measures influencing the use of blended e-learning technology will be measured by performing an analysis on the several elements in e-learning tools. These elements will be explored and identified during this phase. List of the elements will determine the BI model, especially for the structure of DW schemas. Then, the success of the objective in phase 1 will be achieved.

Phase 2: Develop a BI model for analyzing the blended e-learning technology

The identified measures for the use of blended e-learning technology in phase 1 will be used to capture, analyze, organize and used to construct the BI&A model. The initial idea of this approach is illustrated in the Figure 4.

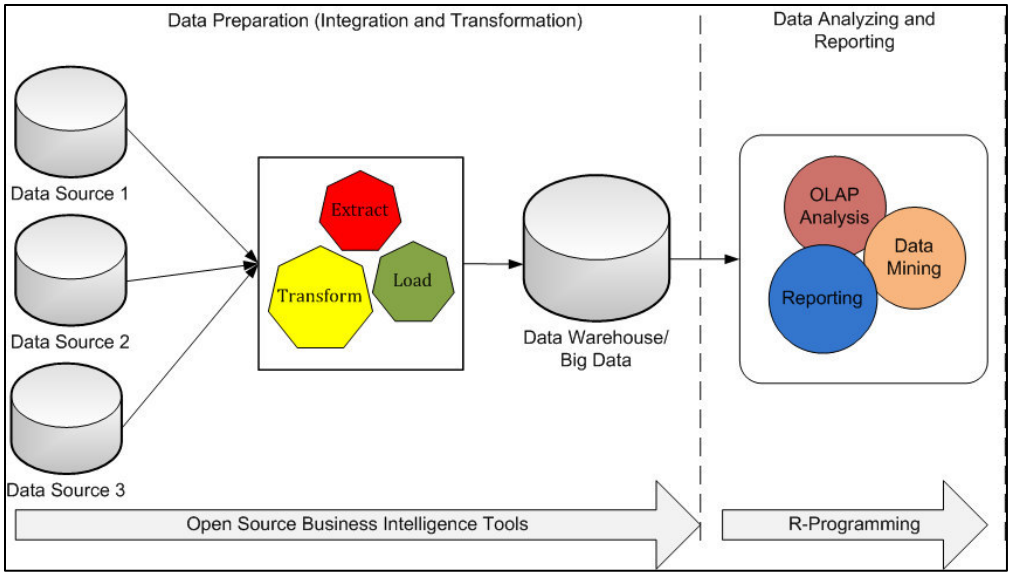

Figure 4. A BI&A Model for Blended e-Learning Technology Usage

These measures for the use of blended learning technology is based on the "Fact" or "Evidence" of learning practices in the IHE (Means et al., 2010), especially the used of e-learning technology in UUM. The success of the objective to develop a BI&A model for analyzing the usage of blended learning technology will be achieved.

Phase 3: Evaluate the usage of blended learning technology by using the BI model

The evaluation of the usage of blended learning technology by using BI&A will be carried out performing an analyzing data captured by BI&A. The analyzing task will use an appropriate tool for data capturing and organizing (e.g., MS SQL Server and Power BI), and analyzing and reporting (e.g., R programming). Therefore, the effectiveness of blended learning technology will be understood, and the BI&A approach will be appreciated.

Related Works

Current research on learning or blended learning is focused on evaluation of the effectiveness of this technology by using a survey method (Pei-Chen et al., 2006; Waleed et al., 2015). However, very few study using "evidence" based method, which is the evaluation data is taken from the form the blended learning system. This is the important approach in this research in perform an analysis

from the data captured from the system. As comparison from the previous works, Table 1 shows the summary of the research.

Table 1
Research Works on the Online Learning or Blended Learning

Researcher/Developer	Research Works	Description
Fauziah Sulaiman (2014)	Online Learning in Higher Education in Malaysia: A Case Study of Students' Future Expectations	Study concerning of Malaysian undergraduate science physics students' and pre-service science teachers' perceptions of learning through online.
Waleed Mugahed et al. (2015)	The Effectiveness of Using E-Learning in Malaysian Higher Education: A Case Study Universiti Teknologi Malaysia (UTM)	This study is centered on evaluating the e-learning effectiveness in UTM. And in this study, the critical factors affecting e-learning effectiveness were investigated through a survey conducted on students as participants.
Farahiza Zaihan Azizan (2010)	Blended Learning In Higher Education Institution In Malaysia	This paper conducts an exploratory study of blended learning in higher education institution (HEI) in Malaysia. The focus is on understanding what it means by blended learning, the implementation of blended learning at HEIs, and what benefits can be identified.
Raja Maznah Raja Hussain (2004)	e-Learning in Higher Education Institution s in Malaysia.	Study about strategic planning and implementation of e-Learning in several higher education institution (HEI) in Malaysia. The method is based on Roger Kauffman n's (1992).
Mansor Fadzil (2015)	MOOCs In Malaysia: A Preliminary Case Study	Study about the implementation of Massive open online courses (MOOCs) in Malaysia that are very recent development and progress.
Pei-Chen Sun et al. (2006)	What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction	This study developed an integrated model with six dimensions: learners, instructors, courses, technology, design, and environment. A survey was conducted to investigate the critical factors affecting learners' satisfaction in e-Learning.

Conclusion

The aim of this paper is to discuss a model BI&A for blended learning usage, and later it can be used to design and implement the analysis of blended learning usage. The approach to understand the requirement and implement the BI&A will consider the new elements of blended learning usage. The prototype of BI&A application will be developed for ensuring the BI&A model can be implemented in real teaching and learning environment. The testing and evaluation of usefulness and performances of the BI&A approach will be conducted. Elements used in blended learning that used to influence the usage of learning technology. Moreover, the BI&A model will be used for analysing blended learning technology usage and help the university, lecturer and student to utilize the blended learning technology in efficient and effective ways.

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