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Impact of Visual Learning Environment (VLE): A Case Study on Students' Academic Performance by Subject

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ABSTRACT

Education in the 21st century has created demands for new tools to better accommodate theteaching and learning processes at various levels of education; all with the objective of improving the understanding of students and as such, will be reflected through improved academic performances. This in turn creates opportunity to study the impact of such modern learning platforms on the academic performances of students as a group or as an individual. The magnitude of such impact also varies depending on the types of subjects. In this study,the comparison is done between technical and non-technical based courses. Sampling conditions were also identified so as to ensure a fair treatment of data used in the analysis. Factors such as whether a particular subject is being taught by the same lecturer across aperiod of three consecutive semesters and the number of activities done in a Visual Learning Environment (VLE) for aparticular subject as were taken into consideration. Results of the analysis were presented graphically where trending attributes were highlighted and discussed. Suggestions to improvethe study, to increase the positive effects of VLE activities on the overall academic performances of students as well as the proposed initiatives that can be taken to increase the number activities in a subject's VLE were also elaborated in the paper.

Keywords: *e-Learning, VLE, Academic performance, Non-technical, Technical.*

INTRODUCTION

The correlation between academic performances of students and Teaching and Learning (T&L) techniques and technologies has long been debated and discussed especially within the academia fraternity as students' academic achievements have direct impact to the public image of any learned institutions. Richardson et al. (2012) linked such performance to students' psychological factors, specifically self-efficacy as the main contributor. A study by Rovai (2007) stipulated that students undertaking e-learning course are more intrinsically motivated as compared to their counterparts undertaking the same course conventionally.

The general notion is that there are many contributing factors both tangible and non-tangible that play a role towards the academic achievement of any student of any education level. These factors vary in terms of their impact and can differ from one student to the next. As such, there are hundreds if not thousands of studies being conducted all around the world to define the extent of impact of such factors. Tangible factors include access to and availability of educational resources, physical learning environment and access to ICT have been previously studied. Sivapalan (2005) reported that students who demonstrated an active participation in online activities scored better marks and Alavi (2005) had also suggested that such active participation has positively influence their satisfaction and retention rates. Non-tangible factors especially the psychological factors such as personality traits, self-efficacy and even psychosocial contexts were also previously researched. Chamorro (2003) concluded that students exhibiting significant conscientiousness attribute in their personality traits performed better academically and those showing significant neuroticism fared less.

Towards contributing to the past and existing researches done on such topic that has been linked to such a wide spectrum of contributing factors, this study aims to methodically link the tangible factor i.e. the learning environment to students' academic performance. This paper highlights the impacts of Virtual Learning Environment (VLE) on students' academic performance based on two (2) subject categories, technical and non-technical. This is deliberated and discussed based on data accumulated for three (3) consecutive academic semesters commencing January 2016 up to January 2017. Specific sampling conditions were identified to ensure data

consistency and this was highlighted in the research methodology section of this paper. Analysis were presented graphically where trending attributes were highlighted and discussed. Suggestions to improve the study as well as ways to increase the positive impacts that VLE activities have on overall academic performances of students aswell as the proposed initiatives that can be taken to increase the number activities in asubject's VLE were also elaborated in the discussion section of this paper.

METHODOLOGY

The aim of this study is to determine the change in students' performance in selected subjects under the categories of technical and non-technical after the implementation of VLE as part of the teaching and learning environment from January 2016 at UniKL MIMET. In order to carry out the analysis, relevant data and records were sourced from UniKL e-CITIEsystem, UniKL VLE Management Systems and UniKL Learning Outcome and AttainmentManagement System (LOAMS) for the said period. The determined subjects for each category are as follows:

Table 1: Subjects under Technical and Non-Technical Categories

LGB10203	ENGINEERING SCIENCE	Technical Foundation Subjects	Technical Subjects
LGB11803	THERMODYNAMICS 1		
LGB21203	SHIP MATERIALS		
LGB21503	APPLIED DYNAMICS		
LGB31503	THERMODYNAMICS		
LEB10102	MARINE ELECTRO-TECHNOLOGY	Discipline Core Subjects	
LEB10603	ANALOGUE ELECTRONICS		
LEB30103	POWER ELECTRONICS		
LEB30303	ELECTRO-TECHNIQUE 2		
LGB20703	E-COMMERCE & INFORMATION SYSTEMS	Non-Technical Subjects	
LGB21602	INTRODUCTION TO PROGRAMMING		
LGB30503	MARKETING		
LOB20203	MARITIME & ADMIRALTY LAW		
LOB30403	MARITIME TRANSPORT OPERATIONS		

The study involves the extraction of data of students' performance for three (3) consecutive semesters specifically January 2016, September 2016 and January 2017. The courses for each of the category were selected based

on the present of VLE activities as monitored by UniKL VLE Management Systems. For 2016 semesters, as the system was atan early stage then, the data on VLE activities recorded were simplistic and were merely recorded as present or not present. Therefore the determination of number and types ofactivities would have to be done manually through consultation with the concerned lecturers themselves. The determining criteria in such cases would be to ensure that such VLE activities were constantly conducted throughout the three (3) semesters. Data for January 2017 semester were sourced directly from the system as the VLE management system was updated that year. The number and types of VLE activities were be obtained directly from the system.

The other aspect of data compilation involves the grouping of academic grades to summarize the band of students' academic performance. The academic grades were divided into two (2) bands. Band 1 is designated as Good to Excellent performing students who scored grade A, A-, B+, B, or B- for each of the determined subjects. Meanwhile Band 2 is designated as Marginal to Satisfactory performing students who scored grade C+, C, C- or D for each subject. The improvement of students' performance for three (3) consecutive semesters were analyzed and its correlation with VLE approach were highlighted and discussed. Note that data were only analyzed for students passing the concerned subjects as those who did notwere considered to have not been utilizing the VLE thus its effectiveness can't be intrinsically determined.

RESULTS AND ANALYSIS

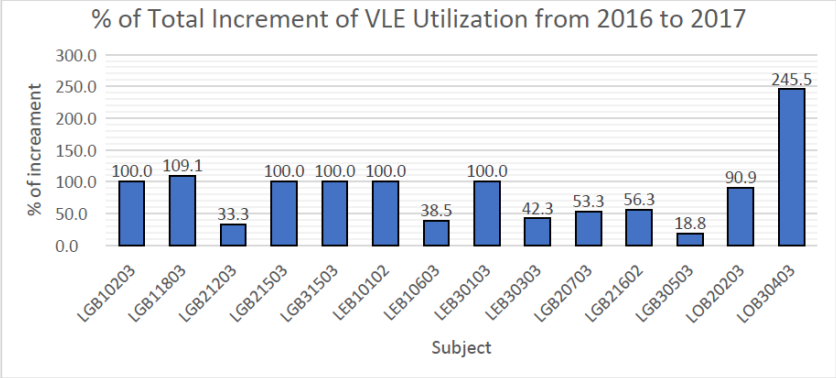

Figure 1: Percentage of Total Increment of VLE Utilization

Figure 1 shows the percentage of total increment of VLE utilization of January 2016, September 2016 and January 2017 semesters. The increment percentage was measured on selected technical and non-technical subjects specifically by considering the number of resources and teaching materials used. One of the compulsory criteria in selecting these subjects is that they are being taught by the same lecturer throughout the three (3) consecutive semesters. The name of the subjects is listed in Table 1. The percentage indicates the increment of VLE utilisation by the lecturers of the concerned subjects in their teaching and learning (T&L) activities across the three (3) semesters. In other words, the percentage indicates the increase in the amount of teaching materials uploaded (includes conventional notes, presentation slides and videos) and the number forums/chats as well as online assessments conducted. The trend shows increment ranging from 19% to a massive 245% on the VLE utilization from 2016 to 2017. To highlight, more VLE activities were recorded in January 2017 semester as lecturers are made compulsory to utilize VLE through activities such as forums, tutorials, discussions as well as their own video contents as additional learning resources for the students as part of their key performance index (KPI) under theUniversity blended learning requirement. Such trend gives a good indicator in supporting the increase in student performance in the listed subjects, as shown in Figure 2 to Figure 7. For this study, the measurement of student performance was clustered into two (2) categories; Band 1 and

Band 2. Band 1 gives an indication from good to excellent grades, ranging from B-, B, B+, A- to A. Band 2 represents marginal to satisfactory grades, ranging from D, C-, C to C+.

Figure 2 illustrates the Band 1 percentage score for three (3) consecutive semesters for Technical Foundation subjects from January 2016 to January 2017. It can clearly be seen that there has been a large increase of students attaining Band 1 performance in several subjects specifically Thermo dynamics 1, Engineering Science and Applied Dynamics with approximately 40%, 30% and 29% respectively. The other two (2) subjects only show a slight growth of under 20%.

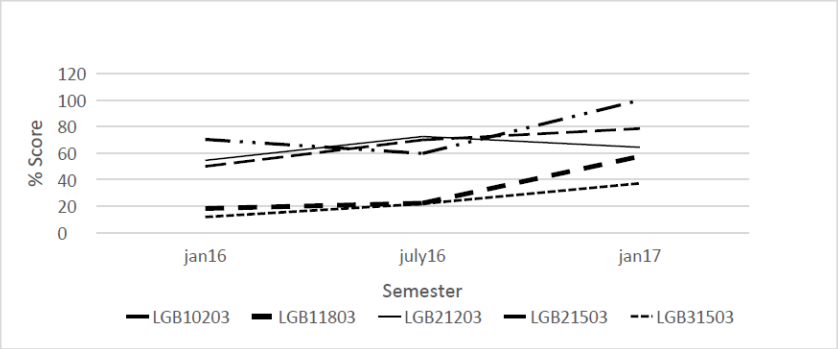

Figure 2: Band 1 Percentage Score in Three (3) Consecutive Semesters for Technical Foundation Subjects

Figure 3 shows the Band 2 percentage score in three consecutive semesters for technical foundation subject for semesters January 2016 to January 2017. The percentage for Engineering Science and Applied Dynamics subjects have declined considerably over this time period. The maximum decrease recorded is approximately 30%. For Engineering Science subject, the percentage rose to 10% in July 2016 semester and then dropped dramatically to 0% in the following semester. Three (3) subjects namely Thermodynamics, Thermodynamics 1 and Applied Dynamics, experienced a steady decrease of about 5% to 15% per semester since the introduction of VLE.

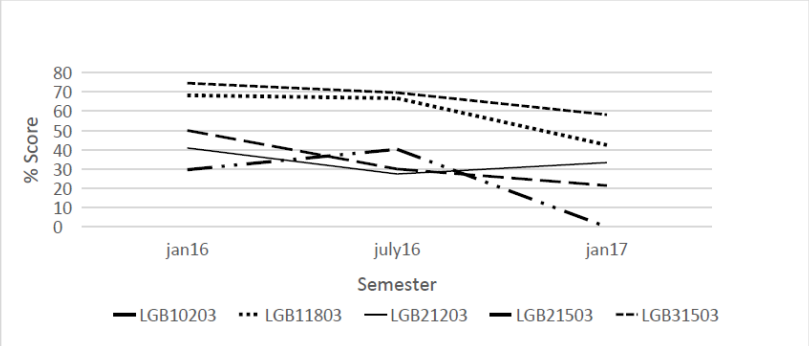

Figure 3: Band 2 Percentage Score in Three (3) Consecutive Semesters for Technical Foundation Subjects

Figure 4 shows the Band 1 percentage score in three consecutive semesters for Discipline Core subjects for semesters January 2016 to January 2017. The Band 1 score percentage for all subjects grew steadily within these three (3) semesters. The percentage for Marine Electro-Technology subject rose moderately for about 15% each semester while the percentage for Electro-Technique 2 subject went up slightly by 6% in July 2016 semester and by another 4% in January 2017 semester. For Power Electronics subject, the percentage increased gradually in the first semester but showed a rapid increase of 30% in January 2017 semester. Percentage for Analogue Electronics subject exhibit a similar trend as Power Electronics subject with gradual increase in July 2016 semester and the percentage increased sharply in January 2017 semester.

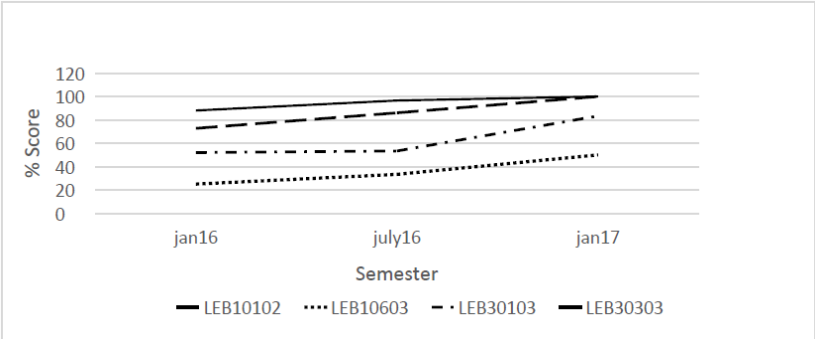

Figure 4: Band 1 Percentage Score in Three (3) Consecutive Semesters for Discipline Core Subjects

Figure 5 shows the Band 2 percentage score in three (3) consecutive semesters for Discipline Core subjects for semesters January 2016 to January 2017. Two (2) subjects experienced a steady declination of percentage namely Marine Electro-Technology and Electro-Technique 2. The other two (2) subjects, Analogue Electronics and Power Electronics, showed a different pattern during this period. Analogue Electronics fell substantially for 17% during the first semester but rose by 17 % in the last semester thus its percentage remained fixed at 50%. For Power Electronics subject, the percentage grew slightly from 2% to 46% but dropped rapidly by 30% to 16%.

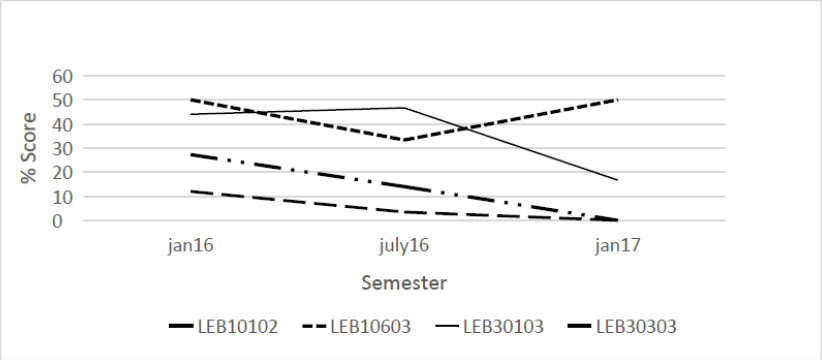

Figure 5: Band 2 Percentage Score in Three (3) Consecutive Semesters for Discipline Core Subjects

Figure 6 illustrates the Band 1 percentage score in three (3) consecutive semesters for Non-Technical subjects for semesters January 2016 to January 2017. All four (4) chosen subjects showed different results but overall it indicated a strong rise of percentage. The percentage of three (3) subjects namely E-Commerce & Information System, Introduction to Programming and Maritime Transport Operation went up in July 2016 semester but fell slightly in January 2017 semester. Only the percentage for Marketing subject increased gradually from 49% in January 2016 semester to 89 % in January 2017semester.

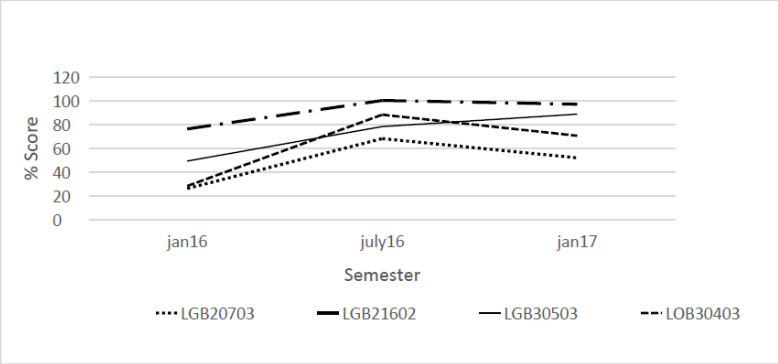

Figure 6: Band 1 Percentage Score in Three (3) Consecutive Semesters for Non-Technical Subjects

Figure 7 illustrates the Band 2 percentage score in three (3) consecutive semesters for Non - Technical subjects for semesters from January 2016 to January 2017. This graph illustrates an opposing trend to that of Figure 5. Three (3) subjects experienced a drastic drop in percentage in the first semester of VLE introduction but showed a slight increase in January 2017 semester. Only Marketing subject's percentage decreases almost constantly within this period. It fell gradually from 48% in January 2016 semester to 11% in January 2017 semester.

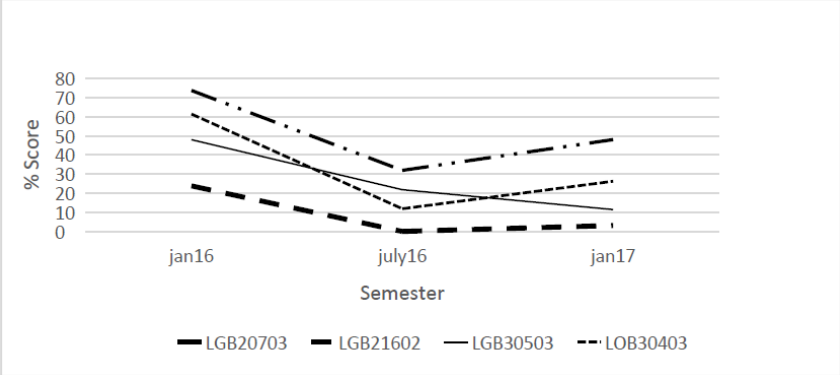

Figure 7: Band 2 Percentage Score in Three (3) Consecutive Semesters for Non-Technical Subjects

Overall, it can be seen that there was a definitive upwards trend in Band 1 of the academic performance for all subjects under both technical and non-technical categories. Although the increment percentage differs from one subject to the other under both categories but the general trend can be certainly determined as gradually increasing for Band 1 performers. As the percentage for Band 1 increases, the percentage of Band 2 achieversdecreased gradually as well as expected.

DISCUSSION

From the results obtained analysis conducted, Discipline Core subjects achieved the best outcomes since three (3) of the subjects achieved a percentage increase of above 80% with two (2) subjects recording a 100% of Band 1 achievers. As a result, these two (2) subjects namely Marine Electro-Technology and Electro-Techniques achieved 0% Band 2 achievers.

Based on the analysis, it was also deduced that subjects from the Non-Technical category produced the best improvement in terms of Band 1 percentage since the introduction of VLE in 2016. The Band 1 percentage of its two (2) subjects rose drastically to 50% in just one (1) semester.

Technical Foundation subjects have also performed considerably well. Engineering Science subject recorded 100% of Band 1 achievers in January 2017. The Band 1 percentage for the other two (2) subjects, Thermodynamics 1 and Thermodynamics also increased steadily to nearly 40% and 60% and as such the percentage of Band 2 achievers decreased. As these subjects have been listed as high failure subjects prior to January 2016 semester, the percentage decrease in Band 2 achievers gives a positive indication to the improvement in the academic performance of students undertaking these subjects throughout the study period.

In January 2017 semester, UniKL MIMET introduces a new semester system. This new semester system extends the duration of each semester from 14 weeks of T&L to 17 weeks. The academic year in 2017 now has only two (2) semesters instead of three (3) in the previous years. With this new academic calendar, a longer duration of delivery period for each subject was now possible. This gave ample time to lecturers to better plan and

familiarize themselves in using VLE. With the additional three (3) weeks of T&L, lecturers and students has sufficient time explore and utilize this T&L platform. This is a contributing factor towards the sharp increase in VLE utilization and consecutively the general increase of Band 1 achievers in 2017.

In addition to the above, under the 10th Malaysia Plan (2011-2015) development budget, UniKL MIMET was granted with RM13 milion and some portion of it was used to improve its computer facilities. This budget was used to buy 50 new PCs and set up two (2) new computer laboratories. With these laboratories, it became more convenient for lecturers and students in undertaking live online assessments. It also created more avenues for students to access online materials and utilize the VLE. In 2015, the total number of computer laboratories were five (5) with 140 number of PC and these has increased to seven (7) laboratories with 196 PCs.

Malaysia's average internet connection speed in 2016 was 6.4 Mbps. This value increase to 8.9 Mbps in 2017. UniKL MIMET reacts positively to this with an introduction of new internet facility development packages. These development packages improve the internet connection speed up to 1.0 Gbps in 2017 and provided wider and faster Wi-Fi services at strategic places around the campus. This enables better access for all users to VLE and hence contributed to the much-improved utilization of VLE in 2017 and percentage of Band 1 achievers especially in 2017.

In addition to this, the inclusion of specific KPI on blended learning in 2017 for all lecturers also contributed to the upwards trend in the utilization of VLE platform by lecturers. The compulsory VLE activities are: to upload at least seven (7) teaching materials, conduct three (3) forum/ chat sessions, organize at least two (2) online assessments and upload at least one (1) OBE teaching document. This is evident through Figure 1 in which it clearly indicates that the VLE usage increases to more than 50% for most of the subjects.

As all of the sampled subjects were based on subjects being taught by the same lecturers throughout the three (3) three semesters, it can be deduced that the respective lecturers have sufficient time and resources to improve their teaching techniques across the semesters thus the possibility of unsuitable approaches and delivery could be minimized. This resulted in creating a higher number of Band 1 achievers in the following semesters.

Based on Figure 2 to Figure 7, a slight disturbance to the general trend could be identified specifically during July 2016 semester. One of the potential contributing factors is due to the increase in the number of students in that period. This created pulling factors such as the reduced students' accessibility to personal computers, reduction in the effects of closely monitored class activities and reduction in the impact of face-to-face facilitation by lecturers during the assessments session gave negative impact to grades achieved by students.

It was also deduced that there is no clear demarcation in trends between both technical and non-technical courses. Overall trend is the same in which percentage of Band 1 achievers for both categories of subjects were the same which is increasing across the semesters. However, it is worth to note that the Discipline Core Subjects showed a more consistent increase of the period as compared to Technical Foundation and Non-Technical courses. This may due to several reasons namely, the monitoring of VLE activities by the respective Heads of Section, the teaching loads of the lecturers respective to each section, the number of student per class for each of the subjects as well as the nature of assessments conducted in each of the subjects.

As the study is ongoing, several recommendations for improvements in analyzing of data and sampling criteria should be considered. Factors such as number of students per class could be an influencing factor to the overall academic performance due to reasons as mentioned in the previous two (2) paragraphs. The types of assessments conducted for each of the subjects should also be considered as this has direct influence on the level of difficulty and preferred assessment type experienced by students. The teaching load of lecturers concerned should also be taken into consideration as this also has direct bearing on the quality of the VLE activities conducted as well as the time taken to prepare the materials for each of the VLE activities. The monitoring by Heads of Section on their respective lecturers also plays an

important role on the number of VLE activities conducted as well as the quality of the uploaded materials.

CONCLUSION

The study on the impact of VLE on students' academic performance was done on sampled subjects of Discipline Core, Technical Foundation and Non-Technical types. These subjects were chosen based on stipulated sampling criteria concerning the presence of VLEactivities and consistency of lecturers assigned to the respective subjects across a period of three consecutive semesters from January 2016. From the results, it was deduced that the increased in the number of VLE activities across the semesters has increased the percentage of students in Band 1 of the academic performance and subsequently reduced those in Band 2 category. Other factors that may have contributed to this such as good ICT infrastructure, close monitoring of VLE activities, consistency of lecturers teaching the subjects and lengthened semester period were also discussed.

In moving forward, UniKL MIMET is currently working in collaboration with nine (9) other universities on a project that is co-funded by Erasmus+ programme of the European Union. The objective of this project called InMotion is to incorporate Open Modelling and Simulation Environment (OMSE) platform through integration, harmonization and aggregation of various types of quality-controlled e-Learning components. This will in turn creates a more adaptive learning environment both meeting the needs of today and oriented towards technologies of tomorrow. Existing VLE for identified subjects will be embedded with Computer Modelling and Simulation in Engineering (CMSE) elements and is aimed at helping students to better visualize the dynamics of an engineering system. This initiative is expected to enhance the learning experience of students, theutilization of VLE platform by lecturers as well as improving the academic performance of students. Further study will be carried out at the end of the InMotion project to study the extent of the positive impacts that this will bring to the T&L activities of the University.

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Investigating the Effects of the Teaching and Learning Process in Using the Blended Learning Approach on theBlended Courses Performance: A Case Study of UniversitiTeknologi Mara Cawangan Melaka

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ABSTRACT

The aims of this study was to investigate whether there are positive effects in the teaching and learning process with the blended learning approach by looking at the performances of the blended courses from the lecturers' perspectives. The study was conducted on 81 lecturers teaching diploma and bachelor degree levels in UniversitiTeknologi MARA Cawangan Melaka. Lecturers were asked for their perceived responses on the students' level of activeness, either active, less active or inactive, in the blended approach when conducting classes. An independent sample t-test was administered to determine significant differences in the perceived responses on the students' level of activeness in the process of teaching and learning with the blended approach. Lecturers' characteristics; gender group, age group, level of study taught, years of experience using blended learning approach and status of blended course conducted were emphasized. An independent t-test was also

conducted to examine the significant differences in lecturers' perceptions between active and less active users in the blended learning approach. Finally, an Analysis of Variance (ANOVA) was used to investigate the positive effects of actual utilization of the blended approach by looking at the level of activeness for each blended learning component; content, forum and assessment on the performance of the blended courses. Results revealed that male and female lecturers were equally active in the use of blended learning approach. However, younger lecturers were more active but not significant compared to middle age lecturers who have more experience. It was revealed that lecturers teaching bachelor degree were significantly more active using the blended learning approach than those teaching diploma level and lecturers of 3 years and more in teaching experience were significantly more active than those lecturers with teaching experience of less than 3 years by using the blended learning approach. The study had also discovered that lecturers conducting classes with the compulsory blended courses were significantly more active than those lecturers who were teaching not compulsory blended courses in class. Flexibility of the blended learning approach to both lecturers and students showed that blended learning approach was deemed as an effective method compared to traditional face-to-face teaching method. Blended learning approach was seen to boost students' learning outcomes, to stimulate learning interests among students and students were more independent using the blended learning approach were significantly agreed amongst active users compared to less active users in the blended learning approach.

Keywords: *Blended learning approach, Blended course performance, Perceived blended learning level of activeness*

INTRODUCTION

In this millennial era, internet is a global communication network that is very important to many people to accomplish daily tasks or to execute work responsibilities successfully. Without this global communication network, the daily tasks or work responsibilities become slow or dull. The importance of this global networking is deeply felt by educators and students in the classroom teaching and learning activities. According to Singh (2003), blended learning was originally associated with simply linking traditional

classroom activities to e-learning activities. Traditional classroom takes place in a closed system within a confined place whereas e-learning takes place in an open system. In an open system, it extends the boundaries of learning to an open and flexible space where learners decide where and when they want to learn. With the blended learning mode in the teaching method, both lecturers and students do not have to spend their time entirely in classroom solely but they could also be in other places to interact and communicate to complete the teaching and learning process. Lecturers can interact with their students andstudents can communicate with their lecturers at any places discussing topics of learning without face-to-face interaction provided that they must have access to internet.

In UiTM, trainings using blended learning mode in the process of teaching and learning was run by i-Learn Centre since year 2005 to 2016. However, it was then abolished and replaced by iNED on the 1st of December 2016. Particularly, in UiTMCawangan Melaka (UiTMCM), the methods of teaching and learning using blended learning mode have started since year 2012. Since then, blended learning mode in the teaching and learning process has been increasing every semester in UiTMCM. Improvement of ICT should also be in line to cater to the increasing use of blended learning mode in the process of teaching and learning. Faculties have been given directives for identified courses to be taught using the blended learning approach. Lecturers who are teaching courses which are compulsory to use blended learning mode are required to register withi-Learn Centre through i-Learn portal at the beginning of the semester. This is to facilitatei-Learn portal by tracking a lecturer's level of activeness using the components of blended learning mode for a course. The components consist of content, forum and assessment. With the existing environment in UiTMCM, it is necessary to study if blended learning mode in the teaching and learning process is able to assist in enhancing academic quality or the excellence of the blended courses performance. The main purpose of this study is to investigate whether the blended learning approach in the teaching and learning process helps in improving academic quality or the excellence of blended courses performance.

RESEARCH QUESTIONS

To meet the purpose of study, the following research questions are as stated below:

1. Do lecturers' characteristics (gender, age group, level of study taught, years of blended learning experience and status of blended courses conducted) differ significantly in the level of activeness using the blended learning approach in the teaching and learning process?

2. Do lecturers' perceptions towards blended learning approach differ significantly across the perceived responses of blended level of activeness?

3. Are there significant differences in the blended courses performance between the actual blended learning levels of activeness for each blended learning component?

RESEARCH OBJECTIVES

From the research questions, the following research objectives are formulated:

1. To determine lecturers' characteristics (gender, age group, level of study taught, years of blended learning experience and status of blended courses) that differ significantly in the level of activeness using blended learning approach in the teaching and learning process.

2. To examine significant differences in lecturers' perceptions using blended learning across level of activeness.

3. To investigate significant differences in blended courses performance between actual blended learning levels of activeness for each blended learning component.

4. To give recommendations for effective blended learning environment.

LITERATURE REVIEW

Blended learning arises from the concept of blending and it is not a new concept according to Zhang and Han (2012). Grapragasem, Krishnan and Mansor (2014) stated that blended learning, virtual classroom and e-learning have become the delivery mode of teaching and learning in institutions of higher learning in Malaysia. There are approximately 50% of the courses offered in 11 institutions of higher learning in Malaysia are online courses as reported by Norazah, Mohamed Amin, and Zaidan (2011). Blended learning is perceived as practical, motivating, supportive and flexible for its learners as suggested by Guzer and Caner (2014). UiTM and specifically UiTMCM are also keeping pace with the blended learning approach as one of the delivery mode in the teaching and learning process.

Poon (2013) in her study has highlighted that appropriate resources, suitability of the course, and support from the senior management of the university are the contributing factors to the success of implementing blended learning. She further emphasized that the institutional factor plays a major role to the success of blended learning implementation. Poon (2013) further stated that blended learning approach provides learning flexibility to students. Kintu, Zhu and Kagambe (2017) reported that the students' characteristics and blended learning design features are important factors in the effectiveness of blended learning. In this study, the teaching and learning flexibilities in the blended learning approach to both lecturers and students were investigated from the lecturers' perspectives.

According to Owston, York and Murtha (2013), blended learning may not be functioning well for low achiever students since this instructional approach encourages independent learners. They have suggested that the higher education institutions' administrators should consider offering students an option to either enrolling in a fully face-to-face or blended course. Moreover, Sabri, Isa, Daud and Aziz (2010) revealed that the blended learning approach is not suitable for all courses. They recommended that offering students alternatives or options will benefit students who have registered for difficult courses.

Singh (2003) in his research confirmed that blended learning offers both efficient and effective in delivering learning. To ensure effectiveness

in delivering learning, he suggested a framework that encompasses eight dimensions; institutional, pedagogical, technological, interface design, evaluation, management, resource support, and ethical. In their study, Zhang and Han (2012) revealed that students hold positive attitudes towards the blended learning approach compared to the traditional face-to-face teaching approach. They further concluded that students prefer new blended learning model compared to the traditional face-to-face learning model as it stimulates students' interest in independent, collaborative learning and finally escalates their confidence in learning. In this study, the researchers have gathered data based on lecturers' perspectives about their students learning outcomes when using the blended learning approach. Norazah et al. (2011) reported that students considered courses taught in the blended learning mode are more interesting. Among lecturers, they agreed that blended learning approach is an effective method in the teaching and learning process and it has benefited the students as confirmed by Norazah et al. (2011). Naemah, Jamal, and Saiful Nizam (2016) suggested that blended learning supports independent learning through analytical, innovation and knowledge enquiry using interactive and motivating teaching approach. Naemah et al.(2016) further added that the blended learning approach can stimulate the development of employability skills for independent learning and enhancing critical thinking skills among graduates.

A study by Effariza, Anis, Farah, Zahiruddin and Abd Halim (2017) found that variables such as intrinsic motivation and system functionality played significant and influential roles in determining the successful implementation of an e-learning system. The study has revealed that infrastructure and technical support play no significant roles in influencing the users' motivation. Wu, Tennyson and Hsia (2010) revealed that computer self-efficacy, performance expectations, system functionality, content feature, interaction, and learning climate are the primary determinants of student learning satisfaction with the blended learning system. Performance expectations are significantly affected by computer self-efficacy, system functionality, content feature and interaction. These factors are to be looked into by universities in planning and implementing a blended e-learning system to enhance students' learning satisfaction. In another study, Effariza et al. (2017) revealed that strong predictors and determinants of satisfaction of the learning management system (LMS) were system functionality, perceived ease of use and attitude to use. They also found that computer self-

efficacy, infrastructure and technical support were found not significantly related to satisfaction of LMS. If an individual believes that he or she can perform some specific performance attainments in computers, then he or she is said to have a capacity of computer self-efficacy.

Besides i-Learn Portal, students should also be exposed to Personal Learning Environment (PLE) as suggested by Jamaliah, Saliza and Rohana (2016). They recommended a hybrid cloud computing environment plus PLE should be created for a better student focused e-learning system. Jamaliah et al. (2016) concluded that the system should be able to support e-learning for students which would enable them to access web services both from i-learn and the internet platform. A study by Aeimi, Abdul Fattah and Eliyas (2017) also confirmed that students' preferences using PLE such as telegram for their learning process is significant to the advancement of learning particularly in optimizing their learning process in using mobile gadgets.

METHODOLOGY

Participants of the Study

This study was conducted in UniversitiTeknologi MARA Cawangan Melaka. The population of interest is all 147 lecturers for two semesters (September 2016 – January 2017 and December 2016 – April 2017) who conducted the teaching and learning process using blended learning approach. These lecturers teach either the diploma or bachelor degree students in three campuses of UiTMCM. Using the list of 147 lecturers, samples of 108 lecturers (Krejcie& Morgan, 1970) were selected using simple random sampling technique.

Instrument of the Study

Questionnaires were designed and used as the instrument of the study to investigate lecturers' perceptions towards the teaching and learning activities using blended learning mode by examining their level of activeness in three components of blended learning; content, forum and assessment.

Data Collection

To meet the purpose of the study, both primary and secondary data were collected. The primary data were gathered from the online questionnaires while the secondary data were collected for the actual blended level of activeness of the components in blended learning and the blended courses' performance. The actual blended level of activeness of the components in blended learning were obtained from the i-Learn Centre and also in the March 2017 diploma and December 2016 bachelor degree students' final examination results for the blended courses' performance. Eighty one or 75% participants responded to the on-line questionnaire.

Data Analysis

For analysis of data, SPSS version 23.0 was used. Both descriptive and inferential analysis were employed. Blended learning level of activeness was categorized as inactive, less active and active. This was obtained from the online questionnaire based on lecturers' perceptions. In the present study, lecturers' characteristics such as gender, age group, level of study taught, years of experience using blended learning approach in teaching and learning and status of the blended courses conducted were emphasized. In order to answer research question i), gender was categorized into male and female, the age group of lecturers was recoded into "less than 40 years" as younger lecturers and "40 years and more" as middle age lecturers, years of experience is regrouped into "less than 3 years of blended learning experience" and "3 years and more of blended learning experience" and status of blended courses conducted was categorized into compulsory blended and not compulsory blended. An independent t-test was administered to examine whether there are significant differences in the blended learning level of activeness across gender, across young and middle age lecturers, across years of experience using the blended learning approach in teaching and learning process and across status of blended courses.

In order to answer research question ii), an independent sample t-test was againconducted to determine whether there are significant differences on lecturers' perceptions towards blended learning approach across the blended level of activeness. Lastly, for the third research question, blended courses performance was measured using the final mean score of the

blended courses. Then, using one way analysis of variance (ANOVA), the differences in blended courses achievement between actual levels of activeness in blended learning approach was examined for each blended learning component.

Reliability of Measurement

This study measures the consistency of the research results by conducting a reliability test on lecturers' perceptions towards the approach of blended learning. Internal consistency using Cronbach's alpha that assesses the consistency of the scale used was tested. Cronbach's alpha of at least 0.7 and preferably close to 0.9 is accepted in many researches. For this present study, the reliability test showed that Cronbach's alpha with 10 items was 0.826. This value was acceptable and it shows that the scales of measurement used were consistent.

RESULTS AND DISCUSSIONS

Sample Demographics

The participants consist of 81 academic staff, working in 3 campuses ofUiTMCM. Majority of the members of staff were from Alor Gajah Campus. A detailed demographics of the participants is shown in Table 1.

Table 1: Demographics of Participants Demographic Variable Frequency

Demographic Variable		Frequency (N = 81)	Percentage
Gender	Male	19	23.5
	Female	62	76.5
Age	Less than 30 years	2	2.5
	30 years and less than 40 years	50	61.7
	40 years and less than 50 years	22	27.2
	50 years and above	7	8.6
Campus	Alor Gajah Campus	60	74.1
	Bandaraya Melaka Campus	11	13.6
	Jasin Campus	10	12.3
Years of Service	Less than 3 years	6	7.4
	3 years and less than 5 years	9	11.1
	5 years and less than 10 years	36	44.4
	10 years and less than 20 years	22	27.2
	20 years and above	8	9.9
Level of Study Taught	Diploma	58	71.6
	Bachelor Degree	23	28.4
Status of Blended Course Conducted	Compulsory	45	55.6
	Not Compulsory	36	44.4

Table 1 shows the participants comprised of 76.5% females and 23.5% males. Majority of the respondents (61.7%) were of age 30 years and less than 40 years and followed by the age group of 40 years and less than 50 years (27.2%). Majority of the participants were based in Alor Gajah Campus (74.1%), followed by Bandaraya Melaka Campus (13.6%) and Jasin Campus (12.3%). Most of the respondents (44.4%) have been in service for 5 years and less than 10 years, 37.1% in service for 10 years and above and 18.5% in service for less than 5 years. Majority (71.6%) lecturers were teaching the bachelor degree students and 28.4% lecturers were teaching the diploma level students. A proportion of 55.6% participants have responded that the statuses of the blended courses conducted were compulsory and 44.4% said that the blended courses were not compulsory.

Teaching Experience Using Blended Learning Approach

The participants consisted of 75.3% of less than 3 years of experience and 24.7% participants were of 3 years and more experience using the blended learning approach in teaching and learning process. Majority (72.3%) of the lecturers were only teaching oneblended course while 27.7% of lecturers were teaching more than one course.

Blended Learning Level of Activeness

Lecturers were asked for their perceived responses of the blended level of activeness when using blended learning mode of teaching. The blended learning level of activeness as perceived by lecturers were categorized into active, less active and inactive. A proportion of 44.4% of lecturers said that they were active users of the blended learning approach in the teaching and learning process, 40.7% lecturers were less active and 14.8% lecturers were inactive. The three components of the blended learning approach (content, forum and assessment) were tracked by the i-Learn Centre, UiTM Shah Alam.

The actual level of activeness for the blended learning components was obtained from the i-Learn Centre. For highly active users of the blended learning approach, they have to access the content with a hit of 7 times or more, the forum with a hit of 3 times or more and the assessment with a hit of 2 times or more. For the three components of the blended learning approach, an exact percentile of 88.5% lecturers was active in the content, 53.8% were active in the forum and 61.5% were active in the assessment. The blended learning level of activeness for the three components is displayed in Table 2.

Table 2: Actual Blended Learning Component Level of Activeness

Level of Activeness	Usage Frequency of Blended Learning Components		
	Content	Forum	Assessment
Inactive	0	0	0
Low active	1 – 6 times	1 – 2 times	1 time
High active	7 and more times	3 and more times	2 and more times

With the definition of blended learning component of level of activeness shown in Table 2, the results of the study revealed the proportion of component level of activeness as displayed in the following Table 3.

Table 3: Proportion of Component Level of Activeness

Level of Activeness	Component of Blended Learning		
	Content	Forum	Assessment
Inactive	11.5%	46.2%	38.5%
Low active	26.9%	3.8%	7.7%
High active	61.6%	50.0%	53.8%

Majority of the lecturers were highly active in the content, forum and assessment as shown in Table 3. Participants were most highly active (61.6%) in the content component, the assessment component ranks the second highly active (53.8%) and the forum component ranks the third highly active (50%). Most of the participants (46.2%) were inactive in the forum component, 38.5% inactive in the assessment component and 11.5% inactive in the content component. From the results, we can conclude that majority of the lecturers (88.5%) were active (low active and high active) users in the content component, 61.5% were active in the assessment component and 53.8% were active in the forum component.

Lecturers' Perceptions towards Blended Learning Approach

Participants' perceptions towards the effects of blended learning approach on students were determined by the mean score and the standard deviation of the items used. More positive opinions were indicated by the higher mean score. Results showed that lecturers' perceptions towards their involvement in the blended learning activities were not very positive.

Table 4: Lecturers' Perceptions towards Blended Learning Approach
1- Extremely Disagree, 2- Disagree, 3-Neutral, 4-Agree, 5- Extremely Agree

Item	Mean Score	Standard Deviation
Blended learning approach is a delivery method in teaching and learning that is flexible to both lecturers and students.	3.90	0.889
Blended learning approach is an effective method in teaching and learning as compared to traditional face-to-face teaching method.	3.23	0.978
Blended learning mode of teaching method is suitable for all courses.	2.56	1.065
Blended approach in teaching and learning could boost students' learning outcomes.	3.27	0.936
Blended learning approach in teaching and learning could stimulate learning interests among students.	3.43	0.978
Teaching materials provided on-line assist students in their learning.	3.93	0.854
Face-to-face lectures are redundant as all teaching materials are provided on-line.	2.42	1.011
Blended learning approach needs more allocation of time for preparation of teaching materials.	3.91	0.825
Students are more independent using blended learning approach.	3.30	1.030
Students are more excellent academically with teaching and learning using blended learning approach.	2.94	0.857

Almost positive opinions were for statements "teaching materials provided on-line assist students in their learning" (mean = 3.93), "blended learning approach needed more allocation of time for preparation of the teaching materials" (mean = 3.91) and "blended learning approach is a delivery method in teaching and learning method that is flexible to both lecturers and students" (mean = 3.90). Less positive opinions were indicated by statements "blended learning approach in teaching and learning could stimulate learning interests among students" mean = 3.43), "students are more independent using blended learning approach" (mean = 3.30), "blended learning approach in teaching and learning could boost students' learning outcomes" (mean = 3.27) and "blended approach is an effective method in teaching and learning as compared to traditional face-to-face teaching method" (mean = 3.23) as shown in Table 4.

66.7% of the lecturers said that the blended approach in the teaching and learning process were flexible to both lecturers and students as agreed by Poon (2013). Only 38% lecturers said that students were more

independent using the blended learning approach in teaching and learning. This result contradicts with the study by Zhang and Han (2012) for which they confirmed that students became more independent when learning using the blended approach. Only 45.6% lecturers have agreed that the blended learning approach was an effective method in the teaching and learning process as compared to the traditional face-to-face teaching method. More than 50% of the participants disagreed that BL mode of teaching method was suitable for all courses. Some courses like the art and design courses were not suitable to be blended because students were required to learn in the studios to complete the practical part of the learning cycle. Lecturers' opinions that courses using communication skills such as public speaking course was also not suitable to be blended since students have to speak publicly as part of their assessment upon completion of the course. The results were consistent with the study by Poon (2013) who concluded that course suitability is an institutional factor that influences the success of blended learning implementation. The result is consistent with the study by Sabri et al (2010) confirmed that not all courses can be blended. Approximately 48% lecturers agreed that the blended approach in teaching and learning process could boost students' learning outcomes and 53% lecturers agreed that the blended learning approach could stimulate learning interests among students. The results are also agreed by Norizah et al (2011).

Research Question 1

Do lecturers' characteristics (gender, age group, level of study taught and years of blended learning experience) differ significantly in the level of activeness using the blended learning approach in the teaching and learning process?

Table 5: Independent Sample t-Test of Blended Learning Level of Activeness across Gender, Age Group and Years of Experience Using Blended Learning(1 – Inactive, 2 – Less Active, 3 – Active)

Lecturer Characteristics	N	Mean	Std. Deviation	t value	df	Significance
Gender						
Male	19	2.42	0.607			
Female	62	2.26	0.745	0.868	79	0.388
Age Group						
< 40 years	52	2.25	0.764			
40 years and above	29	2.38	0.622	-0.779	79	0.439
Level of Study Taught						
Diploma	58	2.16	0.745			
Bachelor Degree	23	2.65	0.487	-2.954	79	0.004*
Years of Experience Using Blended Learning						
< 3 years	61	2.16	0.734			
3 years and more	20	2.70	0.470	-3.058	79	0.003*
Status of Blended Course						
Compulsory	45	2.64	0.484			
Not Compulsory	36	1.86	0.723	5.821	79	0.000*

* Significant at 5% significance level.

Results showed that male lecturers were more active (mean = 2.42) but insignificant ($t(79) = 0.868$; $p > 0.05$) at 5% significance level when using the blended learning approach in the teaching and learning process as compared to the female lecturers (mean = 2.26). This indicates that male and female lecturers were active using the blended learning approach in the teaching and learning process. Perceived responses of blended learning level of activeness was also not significant ($t(79) = -0.779$; $p > 0.05$) between young (mean = 2.25) lecturers and middle age (mean = 2.38) lecturers. Result indicated that there were no differences in the perceived level of activeness when using the blended learning approach in the teaching and learning process across the age groups of lecturers. Regardless of their ages, lecturers were active in conducting classes using the blended learning approach. This is mainly because most of the courses are compulsory to be conducted using blended learning approach.

Lecturers teaching the bachelor degree students were significantly ($t(79) = -2.954$; $p < 0.05$) more active (mean = 2.65) than lecturers teaching the diploma level students (mean = 2.16) using the blended learning approach in the mode of teaching. Lecturers with 3 years and more experience using the blended learning approach in the teaching and

learning process was significantly ($t(79) = -3.058$; $p < 0.05$) more active (mean = 2.70) than lecturers with experience of less than 3 years (mean = 2.16). This finding indicated that years of experience using the blended learning approach in teaching and learning process motivates lecturers to be more active using the approach. The result also implied that with years of experience using the blended learning approach has increased among lecturers, computer competency has also increased. Besides that, 55.6% of the lecturers have responded that the courses they taught were compulsory to be conducted using the blended learning approach. Results also showed that those lecturers with courses compulsory to be conducted using the blended learning approach were more active (mean = 2.64) than lecturers with courses which are not compulsory (mean = 1.86) to be conducted using the blended learning approach and it was found to be significant ($t(79) = 5.821$; $p < 0.05$). The findings are as shown in Table 5.

Research Question 2

Do lecturers' perceptions towards blended learning approach differ significantly across perceived responses of blended level of activeness?

The active users of blended learning agreed more significantly ($t(79) = -4.324$; $p < 0.05$) than less active users that the blended learning approach was a delivery method in the teaching and learning process which was flexible to both lecturers and students. They also agreed significantly ($t(79) = -2.748$; $p < 0.05$) that the blended learning approach was an effective method in teaching and learning as compared to the traditional face-to-face teaching method. However, they disagreed ($t(78) = -1.782$; $p > 0.05$) that the blended learning mode of the teaching method was suitable for all courses. Lecturers who were actively conducting classes using the blended learning mode agreed more significantly ($t(79) = -2.524$; $p < 0.05$) than the less active users that the blended learning approach in the teaching and learning process could boost students' learning outcomes.Besides that, active lecturers using the blended learning approach agreed more significantly ($t(78) = -3.196$; $p < 0.05$) than the less active lecturers that the approach in the teaching and learning process could stimulate the learning interests among students than those less active users using the blended learning approach.

Students were more independent using the blended learning approach and this was significantly ($t(77) = -2.345$; $p < 0.05$) agreed among active lecturers in the blended learning approach. Active and less active lecturers using the blended learning approach ($t(78) = -1.497$; $p > 0.05$) agreed that the teaching materials provided on-line were able to assist students in their learning process. They also disagreed ($t(78) = 0.686$; $p > 0.05$) that face-to-face teaching method were redundant as all teaching materials were provided on-line. Active and less active lecturers agreed ($t(78) = -1.394$; $p > 0.05$) that the blended learning approach needs more allocation of time in terms of preparing teaching materials. Also, they disagreed ($t(79) = -1.641$; $p > 0.05$) that students were more excellent academically by using the blended learning approach in the teaching and learning process.

Research Question 3

Are there significant differences in the blended courses performance between the actual blended learning levels of activeness for each blended learning component?

From Table 6, results reveal that there was no significant difference in the blended courses performance between content level of activeness ($t(17) = -0.438$; $p > 0.05$), forum level of activeness ($t(17) = -0.418$; $p > 0.05$) and assessment level of activeness ($t(17) = 1.095$; $p > 0.05$). The findings were further supported by the fact that 75.3% lecturers have responded that the blended courses were being taught previously using face-to-face method only. 45.9% lecturers have reported that the students' performances had improved while 45.9% responded the results were unchanged and 8.3% lecturers said that the performance were aggravating. Results indicated that the actual activeness of the blended learning components has no positive effects on the blended courses performance.

Table 6: Independent Sample t-Test of Mean Blended Course Performance BL Component Level of Activeness

BL Component	BL Level of Activeness	N	Mean Blended Course Performance	Standard Deviation	t	df	Sig
Content	Inactive	3	65.63	1.097	-	17	0.66
	Active	16	67.50	7.223	0.438		7
Forum	Inactive	11	66.65	7.768	-	17	0.68
	Active	8	67.97	5.103	0.418		1
Assessment	Inactive	6	69.65	4.341	1.095	17	0.28
	Active	13	66.08	7.344			9

CONCLUSIONS AND RECOMMENDATIONS

We therefore concluded that the implementation of blended learning in UiTMCM is successful in terms of lecturers' awareness towards using the blended learning approach in their delivery method in the teaching and learning process. This was supported by the results that the lecturers teaching compulsory blended courses were significantly more active than those lecturers teaching courses that are not compulsory to be conducted using the blended learning approach. This was also proven by the male and female lecturers who were both active using the blended learning approach in their teaching delivery method. Also, it is further proven by the young and middle age lecturers were both active using the blended learning approach as a teaching mode. However, lecturers teaching the bachelor degree students were significantly more active than lecturers teaching the diploma level students using the blended learning approach in delivering their lectures. Nevertheless, lecturers with 3 years and with more experience using the blended learning approach as the mode of teaching were found to be significantly more active compared to those with experience of less than 3 years. The result indicated that years of experience in teaching using the blended learning approach have positive influences on the blended learning level of activeness. The findings also concluded that lecturers that have conducted the compulsory blended courses were significantly more active using the blended learning approach compared to lecturers who have conducted blended courses but the courses are not compulsory to be blended. Therefore, it is concluded that lecturers' characteristics, namely, level of study taught, years of experience using the blended learning approach in teaching and learning and the status of the blended courses conducted play influential roles in determining the blended level of activeness.

In terms of flexibility of the blended learning approach to both lecturers and students, it was proven that the blended learning approach is an effective method as compared to traditional face-to-face teaching method. The blended learning approach could boost students' learning outcomes, stimulate learning interests among students and students were more independent using the blended learning approach was found to be significantly agreed among active users compared to the less active users of blended learning.

However, both the active and the less active lecturers disagreed that the blended learning mode of teaching is suitable for all courses. The active and the less active lecturers also agreed that the teaching materials provided on-line can assist students in their learning process; blended learning approach needs more allocation of time in the preparation of the teaching materials. In fact, these lecturers do not agree that students are more excellent academically by using the blended learning approach in the teaching and learning process.

Participants were most highly active (61.6%) in the content component and most of the participants (46.2%) were inactive in the forum component. It is concluded that the majority of lecturers (88.5%) are active (low active and high active) users in the content component, 61.5% are active in the assessment component and 53.8% are active in the forum component. Results revealed that the actual blended learning components level of activeness in the teaching and learning process have no positive effects on the blended courses performances. This indicated that regardless of the actual blended learning component level of activeness of lecturers, students similarly are able to perform well in the blended courses.

It is highly recommended that for the blended learning process to be effective as a teaching delivery method, factors such as appropriate resources, suitability of courses, computer competency to lecturers and students, workload management and friendly ICT environment are to be vitally looked into. In terms of appropriate resources, lecturers should be allowed to employ other methods or applications that would help them to prepare more interesting and interactive teaching materials. To students also, they should be given support to enhance their creativities and be given the rights to use other medium to deliver their ideas as suggested by Jamaliah,

Saliza and Rohana (2016). The i-Learn Portal can be improved by having additional components such as "online chat group" and "scoring board" so that the instructors and students can know their activeness status when using the blended learning approach. It is recommended that an application in mobile phone, rather than the through on-line, to be introduced to make the i-Learn interface more user friendly.

The blended learning approach is suitable for search and delivery of cognitive information while face-two-face teaching method is essential in consultation session for learning outcomes that involves psychomotor skills. Thus, suitability of courses is important as not all courses can be blended. If the courses are wrongly chosen to be blended, then it might end up in ineffective mode of teaching that would result in the failure of the learning outcome. For effectiveness in the blended learning approach also,computer competencies are important for both theinstructors and students. Both lecturers and students must be highly trained and skilled in using computers and internet so that they can be fast learners and effective users of the blended learning approach. Workload management is another important factor to look at the effectiveness of the blended learning approach. Time is a critical factor to make sure that the time allocated for the preparation of materials for blended courses is sufficient. Time for the blended session of a course must be accurately managed as part of the completion of the syllabus in the allocated time given.

Finally, to look at the effectiveness of the blended learning mode of teaching, the ICT (computers and internet) environment must be user friendly in terms of readiness, stability and easily accessible. The interruption and instability of this environment would demotivate both lecturers and students to use the blended learning approach. For lecturers and students, this will affect their level of activeness to use the blended learning approach as the mode of teaching.

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Utilisation of e-Learning in the Teaching of Preclinical Year Students in a Medical Program

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ABSTRACT

Medical teaching is an apprentice-type training, where teachers and students have to physically meet in teaching and practice sessions. However, this notion is being challenged by introduction of virtual instructional methods. The present day students belong to Generation Y; they have high affinity for all things virtual since they have been introduced to this world from an early age. The aim of this paper is to describe the changes in utilization of virtual tools in teaching and learning of preclinical medical students in a public university. The trend of e-learning practices of lecturers teaching the pre-clinical years was observed over the last 5 years. Data was obtained through module guides, feedback during annual curriculum review and the changes observed in notional hours over the years. Results shown that the utilization of i-learn had drastically increase in the last 3 years. The usage was minimal in 2014/15; it reached full utilization for module preparation in 2015/16. This platform was used to provide module information as well as for posting learning material for tutorials, practical and directed self-learning sessions. All pre-clinical lecturers were familiar with i-learn format and training was provided as required. The use of other peripheral technologies, such as Facebook and twitter, were still limited, partly due to the opinion that students would be distracted by other content within this social media realm. As some of the contents were taught by virtual learning, face-to-face time was reduced.Hence, the utilization of e-learning the Faculty of Medicine UiTM was centered on using the university's learning management system. Familiarity with e-learning has been achieved within

the last 5 years and the Faculty is moving forward in on-line learning content and course development.

Keywords: *e-learning, medical teaching, instructional methods*

INTRODUCTION

Medical education is traditionally divided into basic science and clinical teaching(Bhutta et al., 2010). Over the last 30 years, a shift towards student centered and blended learning had ensued (Harden & Hart, 2002; Seifer, 1998). University Technology MARA (UiTM), Malaysia has a well-defined e-learning policy, governance and implementation plan(Endut et al., 2012), developed since 2005. The UiTMe-learning governing body had done an excellent job in promoting and supporting online learning activities. Almost all faculties and academic programmes within UiTM run a percentage of their courses by blended learning, defined as a hybrid of method of learning, usually referring to combination between face-to-face and online learning (Cenejac, 2017).

Replacing even a portion of face-to-face teaching with virtual instruction can be very challenging for some academics, especially in the medical fraternity. The notion that face-to-face is more effective than virtual learning is entrenched among teachers in higher learning institutes (Kim & Bonk, 2006). Medical education components of knowledge, skills and attitude are thought to work best in traditional campus learning. This method is believed to ensure comprehension of subject matter and student engagement. The skills are taught by direct observation of the teacher by the students and of the students by the teacher.

However, at the turn of the century enormous progress had been made in the medical field, partly as result of the unravelling of the human genome. This had led to an avalanche of knowledge in medical sciences. The use of traditional method of teaching had led to stagnation of curriculum (Bhutta et al., 2010). The incorporation of new knowledge into medical teaching is in this conservative setting slow, leading to disadvantages in terms of future practice. Some academics even believed that knowledge taught during medical school days would be obsolete by the time the students

graduate. Such is the rapidity of knowledge evolution in the field. Students have to be taught the skill of self-learning andlecturers need to learn how to teach students to do this. Thus novel exploratory learningtools have been introduced such as Problem-based learning (Bhutta et al., 2010).

At the same time, the explosion of technology and the internet had enabled the students to obtain information at their fingertips. The avalanche of information has to be managed. The combination between e-learning and face-to-face teaching is, to some extent, inevitable. The Faculty of Medicine UiTM decided to embark on e-learning in 2013. This paper aims to describe the progress of e-learning in the Faculty since then until the present day.

METHODS

The trend of e-learning practices of lecturers teaching the pre-clinical years was observed over the last 5 years. Data was obtained through module guides, feedback during annual curriculum review and the changes observed in notional hours within the years.

RESULTS

After the decision to venture into e-learning was made, two sessions within the Annual Curriculum Review Workshop (ACRW) 2014 were dedicated to the deliberation of this subject. One session focused on implementation of information technology and multimedia in teaching/learning in the Faculty; while the other was on exploring student readiness for e-learning. The conclusion of the discussions was that the Faculty would embark on e-learning on a large scale, involving all lecturers. The process would begin by utilizing UiTM's learning management system (i-learn). The Faculty also made a commitment towards the training of lecturers on the technical aspects of content development for online learning.

Faculty utilization of UiTM e-learning management system (LMS) had drastically increase in the last 3 years. The usage was minimal in 2014/15; it reached full utilization for module implementation in 2015/16. This platform was used mostly for communication and uploading learning content such as

tutorial questions, practical materials and directed-self learning packages. All pre-clinical lecturers were strongly encouraged to be familiar with the LMS format. Training and technical support were provided as required. The use of peripheral technologies (such as *Facebook* and *twitter*) in teaching were still limited, partly due to the opinion that students would be distracted by other content within this social media realm. Basic science disciplines met and decided on the topics that could be taught by e-learning. The features of the topics include ease to understand and ready familiarity of students with the content of the topics. This had led to some reduction in face-to-face time. The notional hours of the preclinical years has successfully been reduced in recent years due to re-shuffling of certain topics, however this reduction is only minimally contributed by conversion to virtual learning.

Students' point of view on e-learning implementation was obtained from the survey conducted prior to the ACRW 2014 workshop. Students found little difficulty in navigating technical aspects of virtual learning, as they were familiar with the internet and its associated hardware and software. The most challenging aspect of implementing virtual learning was poor internet connectivity. A more recently obtained student feedback in 2017 found a reported improvement in internet service in campus, but still was deficient in certain areas, especially at the student hostel, where students did most of their learning.

Students also wished to have more material posted online and would like the lecturers to be more available for an online discussion. However, many students (47.6%) were unsure if they would be able to manage their time well with online learning. E-learning in the Faculty was managed through appointment of an e-learning coordinator, who answers directly to the Deputy Dean (Academic and Student). In the early phase of e-learning implementation within the Faculty, lecturers were encouraged to attend training sessions provided by the UiTM's e-learning governing body. These had resulted in production of a few teaching videos and teaching packages. The unsatisfactory internet connection was also one of the factors hindering lecturers in developing e-learning content. Since significant amount of time had to be invested in creating e-content, poor internet would render the execution of the program difficult. Thus, the investment was seen to give a meager return.

DISCUSSION

The findings in this short study were discussed according to pertinent headings in e-learning, with the results reflected against the current body of literature.

E-Learning Policy and Governance

Online education has become an important strategy in higher education. In 2004, 2.35 million students had enrolled in online courses in the United States (Kim & Bonk, 2006), this figure had increased to 6 million in 20157. The Malaysian Higher Education Blueprint 2015-2025 also stated that 70% of courses has to employ blended learning by 20258.

UiTM e-learning policy was already in-line with the above Malaysian Higher Education Blueprint. The Faculty, while acquiescent to the University's policy, had been slower in formulating a clear e-learning policy and implementation plan. Although e-learning governance was well demarcated, the task of planning and implementing e-learning still lacked a clearly defined line, resulting in uncertainty among some of the lecturers as to the guideline or procedural aspect of blended learning development and its channel of endorsement within the Faculty.

Incorporating e-learning into a programme is more complex than it appears; requiring substantial individual and organizational change (Zentel et al., 2004). Application of e-learning requires a shift in comprehension and behavior of those involved (Aswathy & Jagannath, 2017). Many academics still view e-learning as impersonal, constraining and not flexible enough to adapt to the diverse need of the students (Kim & Bonk, 2006). On the contrary, an effective e-learning design has the opposite characteristics from the above features, that is: personalized, flexible and non-limiting. Academics must be compelled to grasp pedagogical methods that are effective in virtual learning (Kim & Bonk, 2006), this is important to ensure success of the blended program. Training in the Faculty need to focus on both technical skills and pedagogical proficiency. There is a need to scale-up and entrench innovation in the pedagogy of e-learning in medicine.

Another policy and governance issue is pertaining e-learning budget allocation. Funds are needed to train of human capital (lecturers, administrative staff and students) as well as in acquisition software and hardware (Embi, 2011) such as better internet service or a high quality equipment used for content development. These item could incur significant cost to the Faculty and should be viewed as an investment. Thus, e-learning could be a high risk undertaking and requiring proper management, because otherwise it may lead to a non-return in investment and financial ruin for the institution. Its failure could lead to an expensive crash such as the fall of UK e-University or a small painful demise of a section within the institution (Salmon, 2005).

The Learning Management System

The management system used by the Faculty is UiTM'si-learn system, a commercially purchased system from a local vendor (Embi, 2011; Embi et al., 2011). Lecturers mainly use this system for communicating with and posting learning content for students. This was comparable with usage within other institutions of higher learning, particularly at the early stages of its e-learning usage (Salmon, 2005). As the time progressed, lecturers may be encouraged to use other components of the system, especially those that promote student involvement in learning such as on-line group work and use of portfolio.

E-Learning Training

Training and support is critical for on-line learning (Kim & Book, 2006), academics involved in online teaching plays a different role compared to the traditional lecturer (Kim & Book, 2006). The most important skill required was of moderating or facilitating learning sessions as well as ability to plan an online course (Kim & Book, 2006). Training on effective pedagogical methods in e-learning is valuable to non-educationist experts such as lecturers in the Faculty. Their exposure on various learning methods may make them better at constructing their teaching sessions, especially in relation to the most preferred method by many e-learning instructors: the constructivist method, where students construct their leaning based on the contents or on-line activities posted (Kim & Book, 2006). They would also benefit in knowing that students preferred content designs that were relevant,

project-based, interactive, collaborative, "supports and encourages" inquiry, provides more choice and control over their learning (Salmon, 2005). These are the characteristics of the constructivist method that had resulted in effective implementation of the e-learning component (Salmon, 2005).

Apart from lecturers, students may also be trained to be effective online learner.This include providing knowledge on how e-learning is constructed and the learningoutcome is and how it could be achieved. Students may also be taught to on ways to self-regulatetheir learning (Kim & Book, 2006).

E-Content Development

E-content development in Malaysia utilizes the strategy of pairing the contentexpert (lecturer) with a development unit (Embi, 2011; Embi et al., 2011). The involvement of the Faculty's lecturersin this activity is mostly confined to specific projects by specific innovators. Most of thelecturers do not significantly engage in this activity. This intelligent body of academicsneed to be appropriately directed to this innovation zone by appropriate motivationalrewards by Faculty management.

E-Learning Integration into Teaching and Learning

At present, although the e-leaning practice of the Faculty is only rudimentary, allcontent posted are integrated with face to face learning. A study involving 1635 lecturersfrom 26 institute of higher learning in Malaysian showed that majority of lecturers agreedthat e-learning activities have increased (Embi, 2011), that e-learning is beneficial to students and thatit has a positive impact in students' performance (Embi, 2011). Nevertheless, the effectiveness of e-learningimplementation in the Faculty has to be studied and the results conveyed to thelecturers in order for improvements to be made in the number of lecturers involved increating online learning content and in encouraging use of an effective method ofconstructing such learning.

Challenges in Implementing e-Learning in the Faculty of Medicine

The biggest challenge in e-learning implementation in the Faculty isunsatisfactory internet connectivity. This is especially so in the students hostel, wheremost students access their on-line learning (Embi, 2011). In addition, many students rely on thecampus wireless network to do the learning (Embi, 2011). This challenge must be tackled seriously.

Proposed Improvements

On reflection, a few focused area can be identified to improve e-learning in theFaculty. The first is to develop a clear policy and implementation plan on e-learning. Thiswould lead to a more concrete e-learning implementation.The last few years have been an exploratory foray for most Faculty's lecturersinto the realm of E-learning. The overall prevailing sentiment is supportive of onlinelearning and aspiration to increase its use. At the beginning of the journey, manylecturers, especially the seniors, expressed their objection of students using theirsmartphones, tablets or other communication devices in class. Now, these devices areused as part of student engagement by using real time quizzes and polls during teachingsessions.

The strategy in adopting e-learning in medicine should embrace innovations. Research need to be performed ascertaining the core characteristics and the cultural values of the Faculty. We need to understand where we came from in order to figure out where we are going. The faculty need to reflect on its past ideas and actions to come to a conclusion on its identity and then chart its future direction. A small tweak in the Faculty's sail could lead to a whole new journey and ending at an entirely different destination.

In doing this, the Faculty may identify its needs and develop programs to match its own culture. This ought to be done within the overall context of common development needs of the medical program (Salmon, 2005). In developing on-line courses, the Faculty can begin by identifying its fundamental capabilities, existing strengths (what is it good at, what makes it special) and figure out a strategy on how to take advantage of these points (Salmon, 2005).

Unique features of the Faculty and niche expertise of the lecturers can be harnessed to construct new on-line courses. This courses could be tailored further to meet the general demand and requirement of the medical and health fraternity. Such an approach would create specialized or distinctive courses, while simultaneously avoid production of similar courses as offered by other institutions.

Another aspect that needs to attention is research on effectiveness of e- learning.Although studies have shown that the both students and lecturers view on line learning as advantageous and has encouraging impact on learning outcome (Embi, 2011; Embi et al., 2011), there need to be objective measurement on its effectiveness, such as correlating its use with examination results and clinical assessment scores.In addition, research to discover a novel ways to deliver blended learning should be encouraged. The user-friendliness of the learning management system could lead to complacency among the lecturers. Introducing and familiarizing lecturers with peripheral technologies could lead to new ways in conducting teaching and learning.

CONCLUSION

The utilization of e-learning the Faculty of Medicine UiTM was centered on using the university's learning management system. Familiarity with e-learning has been achieved within the last 5 years and the Faculty is moving forward in on-line learning content and course development.

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e-Portfolio System Development for Integrating Students' Capability: A Conceptual Framework

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ABSTRACT

An electronic portfolio which is known as e-portfolio or digital portfolio is a collection of electronic document describing knowledge, skills, experience, abilities, progress or achievement of a person. The purpose of this paper is to propose a conceptual framework to develop e-portfolio to showcase the students' capability to the industries. This framework will be used at one Higher Education (HE) institution in Malaysia as a guideline for e-portfolio system development. Recently, the initiative of HE Ministry in Malaysia to make students' e-portfolio available at all the public universities have received numerous enquiries for establishing the e-portfolio system in their institutions. A wide literature search was conducted to review on the existing framework for e-portfolio system development. The finding showed that there was a lack of guidance for development of student e-portfolio framework. Therefore, this research discussed a conceptual framework involved in the student e-portfolio system development. The conceptual framework was based on literature review and previously developed frameworks. It is hoped that this framework will be used by other institutions for developing e-portfolio system in the future.

Keywords: *e-portfolio, Conceptual framework*

INTRODUCTION

E-Portfolio is an electronic evidence of achievement and self-evaluation that can be shared on a limited basis to support the formal, informal and non-formal learning process (Balaban, Divjak & Mu, 2011). Electronic evidence may include text, images, video, digital files or even hyperlinks. Most educational institutions require their students to maintain their learning outcomes, experiences and achievements in electronic evidence. These electronic evidences will indicate the capability and featuring work that has been done by the students. Previously, this evidence maintained in a form of paper-based portfolio in which students later use as a foundation to create curriculum vitae for employment upon completion of their study. The limitation using paper-based portfolio are not easily updated or shared online. These days the use of e-portfolio is becoming increasingly common among higher institution students to store, manage and share their electronic evidence (Haggerty & Thompson, 2017).

There are various types of e-portfolio in literature that are based on objective (Klenowski, 2002) and usefulness (Johnson, Mims-Cox & Doyle Nichols, 2009). Generally the e-portfolio can be categorized into three major types: developmental e-portfolio display e-portfolio and assessment e-portfolio (Himpsl& Baumgartner, 2009). The development e-portfolio is used to show the progression and growth of student skills. This portfolio is considered works-in-progress and include both self-assessment and reflection elements. The purpose of this portfolio is to store all the students work which later be selected for display e-portfolio. The display e-portfolio is used to display the students' best work. The purpose of a display e-portfolio is to showcase the achievements obtained by the student. The students will demonstrate this portfolio to potential employers to gain employment at the end of their study. Lastly, the assessment e-portfolio is used to document the student learning based on their learning outcomes. The purpose of an assessment e-portfolio is used to evaluate student capability as defined by the course outcomes.

Although these e-portfolios are different in theory, they actually overlap in practice. Thus, the selection of types of e-portfolio to be developed depends on the requirement of the institution. It is important for the institution to be clear of the purpose for creating the e-portfolio for the students.

However, in Malaysian higher education institutions, students use e-portfolio as a platform to document, share and reflect their learning; and later to showcase their talents, skills and abilities to potential employers. It shows that student portfolios takes many different forms and used for different purposes. So this e-portfolio system need to be carefully designed in a system to meet all the requirement need by the higher education institutions. The development of e-portfolio system requires an appropriate framework to meet the requirement. Therefore, this study was conducted to propose a suitable framework for the development of e-portfolio system for higher institution students.

CONCEPTUAL FRAMEWORK

The conceptual framework help the researchers as a guideline to develop the student e-portfolio system. It helped them to understand better the processes involved in developing the e-portfolio system. Figure 1 shows the conceptual framework used to develop the e-portfolio system. The first phase is initial study. In this stage, the existing student e-portfolio system in the higher education institution were reviewed and analyzed. Based on the review, most of the student e-portfolio system were managed in open source platform. The second phase involves the development of student e-portfolio system using the System Development Life Cycle (SDLC) by Bekri et al., 2013. Below are the five stages involved in the development of student e-portfolio system using the SDLC.

Stage 1: Analysis

The analysis stage is divided into two: requirement gathering and requirement analysis. While the requirements are divided into functional requirements and non-functional requirements. Functional requirements are defined as processes, information, and interactions. These are the desired functionality of e-portfolio system. Non-functional requirements are non-functional characteristics that address operational and technical requirements. They may include the software, security, hosting, environment and etc. Example functional and non-functional requirements for an e-portfolio system are listed in Casley and Day (2014).

There is many existing e-portfolio software available for the development of e-portfolio system. A preliminary research was conducted to evaluate the existing software for e-portfolio implementation in higher education institutions (Himpsl & Baumgartner, 2009). However, the decision to select the right software depends on the requirements, resources, expertise and time needed by the higher education institutions.

Techniques that can be used for gathering the requirements for the development of student e-portfolio are interview, questionnaires, user observation and reviewing of existing documents. Once all the requirements are gathered, it is needed to be analyzed to fit the institutional policies and necessities. The output of this stage will be a set of requirements for the student e-portfolio system.

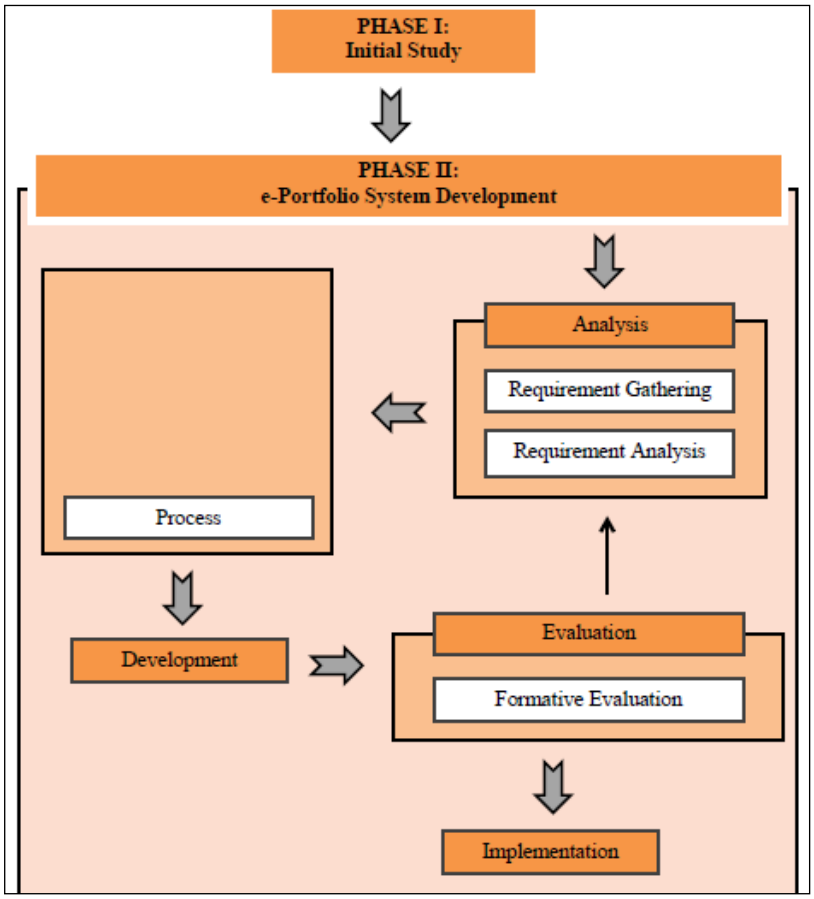

Figure 1: Conceptual Framework for Developing the E-Portfolio System

Stage 2: Design

In the design stage, the user interface, interaction, database and process were designed. The user interface was design with interface elements required for e-portfolio system. The interface elements included the design of input controls, navigational components and informational components. These elements are the building blocks for e-portfolio system interfaces. Thus it need to be designed to be simple and appropriate so that it helps with task completion, efficiency, and user satisfaction.

The interaction design of e-portfolio system concerns with the way people (e-portfolio system users) interact with the system. There are five ways for a user to interact with the system. The user can interact by using the text, visual representations, physical objects/space, time, and their behaviour. This interaction defines the structure and behaviours of the system. By good interaction design the designer able to convey meaningful information, effectively communicates the system's interactivity and functionality, provide feedback on user interactions and system state changes, and prevent user errors.

Next, the database for student e-portfolio was designed. Tables were created to store all the data and artefacts of student e-portfolio. The database design is divided into three steps: (1) conceptual database design, (2) logical database design and (3) physical database design. The conceptual database model is based on the requirements of the system. While the logical database design is based on the target data model for the database e.g. relational data model. Finally, the physical database design is the implementation of the database on secondary storage.

Lastly, the process design is concerned with how data moves through the system, and with how and where it is validated, secured and/or transformed as it flows into, through and out of the system. There is a process design proposed for the student e-portfolio by (McKenna & Stansfield, 2012). The processbegins when students collect digital evidences from their learning experiences to be put into the e-portfolio. They will then select and link those evidences which can be located in online sources like personal blogs, YouTube and etc. Next, they will review, evaluate, and reflect on evidences by making comparisons between what they have done, reflect upon and what they already know. Once completed the reflection process, they will present and share their evidences to their e-portfolio to lecturers and peers. At this stage, the lecturers, supervisors and peers can provide some feedback about the students. Lastly, based on the feedback obtained, the students will plan and understand their mistakes and try to overcome it before going back into the loop again. Besides that, the potential employers or sponsors also can access the students' e-portfolio to view their performance and capability.At the end of this stage, a set of documentation describing the user interface, interaction, database and process design is produced and made available for use in the next phase.

Stage 3: Development

The development of e-portfolio system only begin after the design stage is completed. This stage involves the development of e-portfolio system using the identified software or tool in analysis stage. At this stage all the planning and design of student e-portfolio are turned into a complete working system. The database and application (e-portfolio system) will be stored in development server before it is fully implemented to production (live).

Stage 4: Evaluation

The evaluation is conducted on the e-portfolio system. Before the e-portfolio system goes to live, it should be thoroughly tested. In literature, there are three types of evaluation for evaluating various stages of the design and development process of online learning system. The evaluation types are: (1) diagnostic, (2) formative and summative [9]. But for evaluating the e-portfolio system, the formative evaluation is suggested as it allows us to evaluate the processes and usability of the system (Wright, 2003). Formative evaluation is a type of usability evaluation that helps to "form" the design for the e-portfolio system. A set of criteria proposed by Himpsl, Klaus and Peter Baumgartner (2010) for evaluating the e-portfolio systems is used for the formative evaluation. The outcome from evaluation stage will be used to identify the existing problems in the e-portfolio system. Based on the finding, the system is improved.

Stage 5: Implementation

Once the problems are fixed and system is error free, the e-portfolio system will be implemented. There are few steps need to be followed for the implementation of e-portfolio system. There are:

1. Obtain domain for the e-portfolio system.

2. Move all related folders and database from development into production server.

3. Configure the database and application

4. Test for system functionality to ensure all the function can be accessed once the system is moved to the production server.

Once this process is completed, the e-portfolio system can be accessed online using the assigned domain. The successful of e-portfolio implementation is depending on student's active participation. There are six components for successful implementation of e-portfolio system in higher education institution. These components are awareness, motivation, commitment, resources, leadership, and evaluation (Blevins & Brill, 2017). These component are suggested to be used by higher education institution to support the successful implementation of e-portfolio system.

CONCLUSION

In conclusion, besides being a tool in learning, the e-portfolio system has the potential as displaying the students' performances and capabilities to their peers, lecturers, sponsors and even potential employers. Thus, this study suggested a conceptual framework for the development of e-portfolio system to showcase the students' artefacts'. The collection of students' artefacts in the e-portfolio system offers opportunities for students to reflect on their own work over time and their learning. The findings of this study proposes phases and stages related to the e-portfolio development that may implicate the developers and researchers.

The usage of technology for student portfolio showcase can disadvantage some students. We need to guide the students to use the system and support them technically if needed. Poor digital literacy skills can decrease active participation of students in e-portfolio system. Thus, future research should give emphasize students' skills and their perception of the use of this e-portfolio system.

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Developing an Introduction to Financial Mathematics MOOC

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ABSTRACT

Financial Mathematics a subject taught under the actuarial science program in preparation for theprofessional actuarial examination under the SOA as well as getting students to understand the monetary aspect of the current financial system. The present methods of teaching the subject underscore the difficulty students faced in trying to master the subject matters. Major difficulties included difficulties of the subject contents, limited face to face discourse with lecturers, and time limitation on teaching the subject contents. A new platform using the Massive Open Online Course (MOOC) is considered to address the above issues to ensure students have assessed to understand the subject in a more conducive manner.

Keywords: *MOOC, Open Learning, Financial Mathematics, IFoA, ASC303, UiTM*

INTRODUCTION

Mathematics plays an important role in the financial services industry and there is a growing demand for graduates with knowledge and understanding of both financial matters and the relevant mathematics (Haslifah Mohamad Hasim, 2015). This course provides a thorough training in both aspects with a range of modules in economics, finance and mathematics, including specialist modules that deal directly with applications of mathematics in finance (Kellison, 2009). Therefore, this paper illustrated and described

the use of a Massive Open Online Course (MOOC) UniversitiTeknologi MARA (UiTM) to deliver financial mathematics for UiTM's Actuarial Science students all around Malaysia. It also provides a platform to deploy innovative techniques enhancing positive thinking through blended learning (Brahimi &Sarirete, 2015).

Current Issues in Teaching and Learning

Blended learning is a combination of e-Learning, face-to-face and autonomous studies. It has been increasingly popular in recent years, in response to amazing online learning progress. Among them: Online discussions, messages and feedback from lecturers and peers. In the meantime, the course is accessible 24/7 - any time from any location (Spyropoulou, Demopoulou, Pierrakeas, Koutsonikos, &Kameas, 2015). While student assessment and automatic grading offered by many learning systems can also help students to improve their existing knowledge. This is also according to the style and learning style of each student, creating a more comfortable environment for both parties. If students are having problems with a particular topic, they can reach web resources complementing or getting quick help from their instructors (Leito, Helm, & Jaluk se, 2015). Mohd Nor Hajar Hasrol, Mohamad, Rahayu, Nor Azilah and Azlan (2013) stated that the current issues in teaching and learning, such as:

1. Lack of space and time
2. All communications are not archived for future reference
3. Communication in groups
4. Motivate students for self-learning
5. Low and medium levels of student interaction and accountability.
6. Difficult to share ideas and responsibilities

Massive Open Online Courses UiTM

Massive Open Online Course (MOOC) UiTM is an alternative to UiTM's online learning platform. It is an introduction to cater for the new approach to learning that dominates current life styles especially that of younger generation (Spyropoulou et al., 2015).

The four main features of MOOC are course information, learning materials, learning activities and course assessments. These features are consistent with the need of Blended Learning Mode which was listed as one of the main elements in national e-learning agenda. The implementation of MOOC is also guided by the Dasar e-Pembelajaran Negara (DEPAN) formulated by Ministry of Education, Malaysia (Spyropoulou et al., 2015). MOOC is connected with UiTM's Integrated Academic System. Student and lecturer accessibility to MOOC are concurrent with the course registration module and lecturer's teaching assignment. The use of MOOC starts at the beginning of a semester and student and lecturer may access MOOC's features based on their list of course registration. At the same time, lecturers could upload and update the learning material and information about the course. Throughout the semester, most of the learning activities that involved students and lecturers are available in MOOC. MOOC is accessible through any browser and also from mobile application via Open Learning mobile application (Shuanga, Azeezeen, Tengku, Thambyrajaa, & Ibrahimb, 2012).

Advantages of using MOOC

These are specific advantages of using MOOC (Ng, 2014):

1. Decrease dependency on class instructors.

2. Wider opportunities for students to engage in learning.

3. Save cost.

4. Reduce the number of F2F class hours.

5. Enhance students' learning and retentive ability.

6. Designers and learners are not limited to one medium or delivery channel to meet the learning objectives.

7. It promotes a continuous learning approach which is more effective at creating change and deep learning.

8. It provides more opportunities for social learning, collaboration, increased participation and informal strategies.

9. Using both synchronous and asynchronous approaches can provide more opportunities for learners to cultivate skills and apply them.

10. There is potential for faster development and reduced costs depending on the approaches that are selected.

11. Technology-enabled delivery can reach a geographically dispersed audience.

Introduction to Financial Mathematics MOOC

This course will explain, describe and discuss on the basic concepts, calculations and simple applications of the mathematical modelling used in the financial world. Its goal is to provide students with first-hand exposure in financial modelling and actuarial analysis as basic knowledge before proceeding further to the Advanced Financial Mathematics course in the later semesters of the Actuarial Science Program (Ng, 2014). At the end of the course, students should be able to:

1. Describe the fundamental concepts, key terms and various investment instruments in Financial Mathematics.

2. Apply the key procedures of Financial Mathematics in valuing various stream cash flows and bonds.

3. Analyze the complexity of financial decisions by translating real-world problems into mathematical terms in business and personal arenas.

This learning style is adapted from the National Learning Policy which consists of 3 items. The main features of MOOC are course information, learning materials, learning and assessment activities courses. These features are consistent with the requirements of the Combined Learning Mode listed as one of the key elements in the national e-learning agenda (Aldon et al., 2017).

Involvement of Students

The implementation of MOOC enable students to achieve the objectives of higher education strategic plan from the three perspectives; cognitive, psychomotor, and affective. The higher education strategic plan strives to produce knowledgeable graduates who are competent and able to put knowledge into practice (PelanStrategikPengajian Tinggi Negara, 2007). Online learning course offers flexibility since it allows students to plan their study based on their own time preferences. The virtual classroom can also save time as they can study anywhere. They do not have to go to the library since course materials are always available online. Thus, students can study according to their own pace and composure.

Evaluation of MOOC

The use of MOOC at the beginning of semester enable lecturers to monitor students' performance throughout the semester according to the planned learning activities. Since it is accessible at almost anywhere and anytime and due to the automatic grading system, it will assist students in improving their understanding on the subject matters while making it easy for lecturers to assess their students. If students face difficulty while learning through MOOC, they can easily access any web sources to get immediate additional information to help them understand the subject contents. In order to measure the effectiveness of using MOOC as an added learning platform for students, the examination results from two consecutive semester in which this course is offered were compared. The passing rate for the two semester (December 2015 – April 2016 and December 2016 – April 2017) were compared by mapping to the course learning outcomes (CLO).

RESULTS AND DISCUSSION

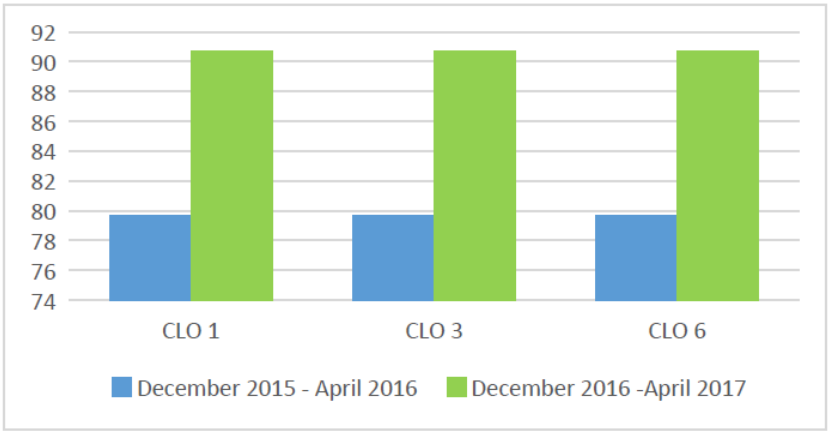

Figure 1: Pass Percentage of the Course Learning Outcomes

During semester December 2015 – April 2016, the passing rate is 79.69%. Meanwhile, the result indicated an increase in the achievement of passing rate which is 90.72% when the implementation of MOOC for this subject started in semester December 2016 – April 2017. This result showed that the use of MOOC has a positive impact on students' performance.

As blended-learning combines e-learning with traditional classroom teaching, it is easier for students to have an online discussion and get feedbacks from lecturers as they usually like to spend their time using internet. The study conducted by Brahimi and Sarirete (2015) also states that students tend to use social networking sites to connect with classmates and stay current with class news regarding exams and homework and most of them are active in learningoutside the classroom especially for Mathematics subject. Besides, Kashefi et al. (2012) alsofound that a blended learning environment can support students' learning especially regarding to mathematical thinking.

CONCLUSIONS

Financial Mathematics is a subject taught under the actuarial science program in preparation for the professional actuarial examination under the Society of Actuaries (SOA) and as one of the requirements for CT1 exemption under the Institute and Faculty of Actuaries (IFoA) in UiTM. As students face difficulties due to the limited face to face classroom learning and time constraint on teaching the subject contents for the lecturers, the implementation of MOOC can help in making the learning process easily accessible with unlimited course resources.

The improvement in passing rate among students between the two semesters proved that MOOC is a suitable platform for students to learn this subject. The features available in MOOC also making it possible for lecturers to deliver the subject matters in a more interactive and interesting way as compared to traditional classroom teaching.

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The Influence of Students' Characteristics on the Successful Use of the Interactive Method of Al-Quran Recitation in Universiti Teknologi Mara (UiTM), Kelantan

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ABSTRACT

This research examines the concept of interactive Quran recitation and how the students' characteristics influence its application among a selected group of university students. The narration of the Quran is regarded as a form of worship and should become a daily practice that should be a daily routine at any available time. Learning the Quran is indeed an obligation, especially understanding its meaning and applying it as an Islamic way of life. UniversitiTeknologi MARA (UiTM) is a public university that emphasizes Islamic education among its students. Therefore, every Muslim students who are in Session (Part) 01 to 03 of their undergraduate studies in UiTM are required to take an Islamic Education course or any courses with a CTU code. One of the CTU course assessment requirements is Quranic Analysis, which requires students to memorize, read (recite) and analyze verses from Surah Yasin. For the reading of the Quran, the traditional method of reading is currently practiced which requires each student to audio record his/her recitation before a lecturer in the classroom. Nevertheless, with the integration of Information Technology (IT) in teaching and learning, the interactive method of reciting the Quran is a valuable alternative. It allows students to recite selected Quranic verses using an online method (e.g. mobile phones) at the time appointed by the lecturer. The aim of this survey is to evaluate which students' characteristics have an influence on the successful implementation of the interactive method. This interactive

method was applied to a sample of respondents (students from the 01 section, UiTMMachang Campus) and the findings indicate which characteristics haveinfluence on the successful application of the method.

Keywords: *Recitation, Quran, Interactive, Student Evaluation*

INTRODUCTION

The academic system at UniversitiTeknologi MARA (UiTM) has long made it mandatory for its students to takean Islamic education course to fulfil the graduation requirements of their Diploma and Degree. This is in line with the needs of being a Muslim and the provisions of the law especially pertaining to the Muslim Bumiputerasin Malaysia. As an example, at the diploma level, students are required to take the Islamic education courses during the 01, 02 and 03 academic sessions. Principles of Islamic Fundamentals or CTU101 is the university course required of all Muslim students in Session 01. This is followed by Islamic Thoughts or Civilization or CTU151 in Session 02. Finally, in Session 03, students will take a specific Islamic education course according to their respective faculties such as the Islamic Economic System or CTU241 for Business Management Faculty. For CTU101 and CTU151, 20% of the semester assessment (50%) comprises Sentences Analysis. The significance of this requirement is the rationale behind the researchers' interest to examine the method of evaluating specific Al-Quran competencies among students at the UiTM Kelantan branch.

This study investigates the concept of Quran recitation and how this is applied by the selected university students. As mentioned earlier, studying the Quran is an act of worship and is highly encouraged in Islam. Accordingly, the Academy of Contemporary Islamic Studies in UiTM has established that one of CTU's course evaluation requirements is Quran analysis that requires the students to memorize, read (recite) and analyze theverses of the Quran from Surah Yassin. Quran recitation is one of the components in the assessment of the coursework in CTU101 subjects (Principles of Islamic Fundamentals) for 1st-semester students and CTU151 (Islamic Thoughts) for the semester 2. The narration of the Quran is one of the constituents in the evaluation of coursework in the subject CTU101 (Principles of Islamic Principles) and CTU151 (Islamic Thoughts).

The scoring percentage for the recitation and analysis of the Quran is 10%. There are other components involved in the evaluation of the course which are 10% for memorizing, 15% for test and 15% for coursework. The overall assessment percentage is 50%.

1. We would like to suggest that the newly proposed method is an option to facilitate the evaluation of thestudents' recitation which will be conducted using the electronic media such as telephone interactive lines to ease the process or teaching and learning.

2. The findings of this study can introduce an innovation to the evaluation system currently practiced by Contemporary Islamic Studies Academy to streamline the Quran recitation techniques to assess students in UiTM Kelantan.

PROBLEM STATEMENT

The increasing total number of pupils who study the CTU101 and CTU151 courses has led the lecturers to diversify their evaluation of students' Quranic interpretation methods. The interactive method is an attempt to appeal to students' interests to recite Quran and continue the practice of reciting Quran from time to time. The use of technology also allows lecturers to complete the evaluation of the recitation and the al-Quran analysis within the prescribed period before the examination. Given the need to introduce an interactive method, it is important for the study to establish if any of the students' characteristics can influence its successful implementation.

RESEARCH OBJECTIVE

To ensure the successful use of this technique; it is crucial to determine the factors that influence the effective application of the interactive technique. It could help predict whether the strength of the interactive Quranic method among the students of Semester 1 and 2 can be fully utilized. Apart from that, it aims to measure how much this method can help facilitate the lecturers to evaluate the recitation competence of the pupils and simultaneously save time.

LITERATURE RESEARCH

Recitation of Quran

The recitation of the Quran is an act of daily worship. Learning the Quran is an obligation, apart from the need to comprehending the lessons and applying them as a way of life. The essence of the Quran is a guide to a human being while they are negotiating life while reciting it can provide the serenity of mind.

Interactive Approach to Learning

The process of teaching and learning is a cognitive operation that lecturers are familiar with. Educational activity is viewed as a process of delivering knowledge, skills, attitudes, and values. While learning is as an operation of assuming and maintaining knowledge as well as acquiring skills, it involves the process of understanding and reacting to the surroundings. Based on the concept of learning, activities may include experimenting, listening to lectures, watching videos and participating in outdoor activities. Founded on the concept of teaching and learning, it can be deduced that has a very close relationship to produce a scholarship that provides a response to the students (Noraini Idris et al., 2009).

Prior Research

The researchers found that there are many books and studies pertaining to the interpretation of the Quran. Among them are related to various scientific studies. Russanani and Siti Fatimah (2005) in discussing the concern about and frequency of reading the Quran in Malaysian Higher Learning Institutions found that the respondents' involvement in reciting the Quran is excellent, but it is not balanced by the frequency of Quranic reading. The reciting of the Quran is found to be infrequent. According to FadzilahSiraj and Wan Hussain Wan Ishak (2000), in their research on interactive approach and competency levels showed that the delivery of this teaching method should depend on the level of ability and knowledge of the students identified through the assessment made within a certain period of time. This interactive approach needs to be well structured so that students can learn and evaluate using effective pedagogical methods.

According to Monika, also known as Munirah Abd. Razak (2014) in the scope of Interactive Approach and Effective Methods, the role of interactive engineering and communication tools in reading is one of the effective methods of teaching and finding out about the Quran. In scientific studies, Rosmawati Umar (1993) conducted a study on the "Learning of Quranic Recital at SyeikhHj School. Othman, Kuching, Sarawak. His research found that there were a handful of students who cannot read the al-Quran because they are not exposed to the Quran during childhood. This was because the students were not exposed to the teaching and learning of the Quran since childhood.

Today's technological advances have given a boost to new challenges to the world of the teaching and learning.The 21st century is synonymous with the digital era of Information and Communication Technology (ICT) skills. The importance of information and communication skills is in tandem with the needs of 21st-century employment skills especially for those in the field of education (Siti Faizzatul Aqmal Binti Mohamad Mohsin & Razali Bin Hassan, 2011). The effective and meaningful applications of applied skill in the learning sessions have led to the readiness of educators to become increasingly engaged in upgrading their knowledge of applying technology in the teaching and learning process. Efforts should be made to enable educators to better their skills using the latest technology in the teaching and learning process. It aspires to develop educators who can tap into the latest technological revolution to keep abreast with the rapidly changing technology so that the educational activity and the learning process can encourage students to learn as well as produce creative and advanced scholars.

The methods of learning should engage the paradigm shift. According to *Dewan Bahasa Dan Pustaka* Dictionary, interactive interaction is mutual, communicating with each other. It enables the continuous stream of data between the computer and its users, or between users and users through means of engineering or communication tools such as telephones or data processors. The design involves the system between the student and the reader. It screams for a strategy that permits users to bring in touch directly with the ongoing technology tools that involve two-way communication. The learning model is the tier of learning attained by a lecturer to achieve certain learning objectives.

The use of multimedia has become one of the key elements that challenges teaching and learning (R & D) and in establishing accomplishments such as science and mathematics (Habibah Hj. Lateh, Arumugam Raman & Teoh Ah Nui, 2004). However, it is rarely used as an instruction tool in Islamic education subjects. Interactive recital methods using electronic media online are considered to produce the new generation with critical and creative minds. Interactive approaches to learning can improve learning results as it can produce data quickly, improve delivering time and P & P processes become more attractive. This research aims to find out how it can be applied to the learning of Quranic learning of the Quran b focusing on the design, procedure, and the final outcome. Technology-based exploration and teaching have a good potential and a bright future in line with the government's desire to further develop information technology infrastructure in the country, particularly in education.

Interactive learning is a pedagogical approach that studies the relationship between students' active thinking and the content of lessons that emphasizes the attention, retention, and determination of the students' scholarship. These interactive learning measures are tailored to the students' level of Quranic reading fluency with a preliminary review or assessment to conclude whether the reading is low, medium or high. For students who pass this level, the interactive approach can be used in the next assessment. For students who are weak in their reading, they are still required to use the *talaqqi* method, in face-to-face instruction in the classroom.

The previous research reviewed indicated that there are still a considerable number of good academic achievers in secondary and higher learning institutions who have yet to master the reading of the Quran. Thus, research needed to be conducted to obtain accurate information retaining to the weaknesses in the recitation of the Quran and the best means to improve the reading of the Quran.

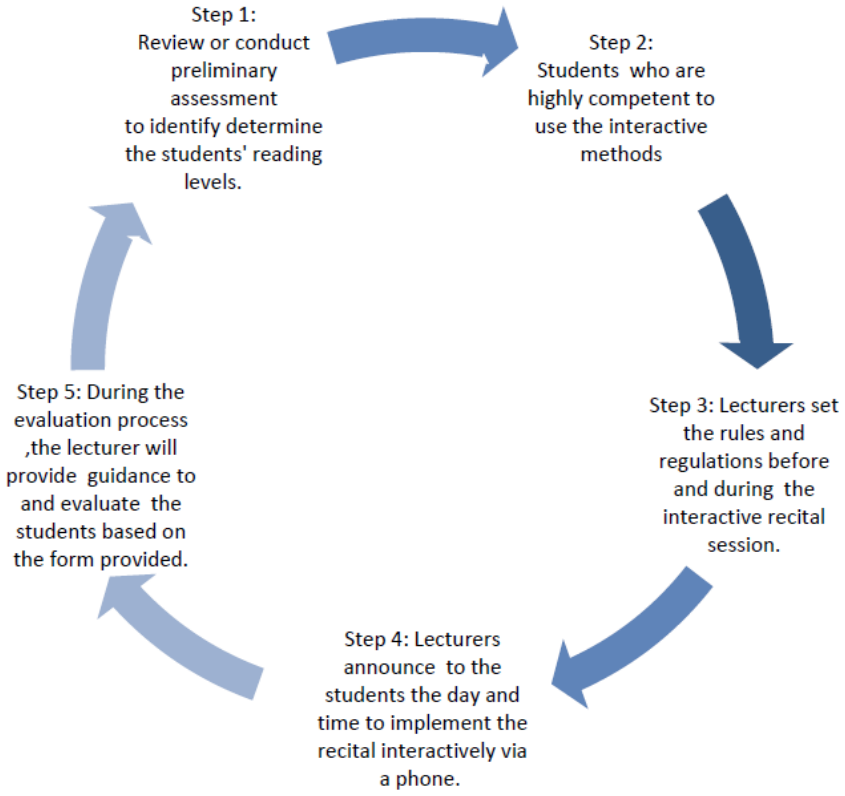

Figure 1: Interactive *Tilawah* Application Flow Chart

RESEARCH METHODOLOGY

Research Method

This field study is a cross-sectional study that involved selected Part (Section) 1 UiTM Diploma students in Machang. Therefore, one or more dependent variables and independent variables related to the selected students were studied. The study's population consisted of all Diploma students from Part 01 of the Information Management Faculty (IM), Business Management (BM), Computer Science and Statistics (CS), Accounting (AC), Design and Development Management (AM) who were required to take the course of Principles of Islamic Fundamentals (CTU101)

at UiTM Machang Campus. This study used a stratified sampling taken from different groups of the population samples from all the above faculties. When the permission to use the sampling from the UiTM management of Machang campus was obtained, a random sampling procedure of the stratified ratios covering all the faculties was conducted. The lecturers involved helped to select the students, and they were briefed about the questionnaires before the questionnaire was handed to them to distribute.

Questionnaire

A set of related questionnaires were distributed by the research team. The questionnaire was split into three parts. Part A was concerned with the profile of the respondents or students at the UiTMMachangcampus, Part B focused on the constituents that influenced the learning of the Quran, and Section C was associated with to the perception of interactive Quran reading. A summary section and the number of questions are shown in Table 1.

Table 1: Component of Survey Questionnaire

SECTION	ITEM	QUESTION NO.
A	RESPONDENTS' PROFILE	1 - 9
B	FACTORS AFFECTING THE AL-QURAN LEARNING	10 - 40
C	PERCEPTION OF THE INTERACTIVE AL-QURAN READING	41 - 47

Data Analysis Technique

The data from this study were analyzed using Statistical Package for the Social Sciences (SPSS) version 24.0 packages. Hence, the frequency distribution and the component of the nominal data will be utilized to identify the sampling. The distribution results will be presented in frequency tables and charts. The conclusion based on this criterion is the validity of the data is determined by the frequency and the percentage value specified by the respondents certifying the data. To evaluate the validity of the interval data, a component analysis will be used. Through this analysis, the variables are not categorized as dependent or independent, but the whole interrelated relationship between the variables will be examined. This analysis will reduce the number of variables interconnected to several factors or reasonable dimensions for the purpose of further analysis. The

Cronbach's Alpha reliability technique is then applied to assess the reliability of these components. Reliability will be assumed if the Alpha value is 0.60 or larger. All of these elements are grouped and named as new variables. Intercalation among the variables will be studied through the Spearman rank order calibration procedure.

To examine Hypothesis 1, the Spearman's Rank-Order Correlation was used to determine the relationship between the factors influences the reading of the Koran. In order to test hypothesis 2, the Independent Sample T-test and ANOVA One Way are used to compare perceptions about the interactive reading of the Qur'an among students.

Exploratory Factor Analysis

Table 2: Results of the Exploratory Factor Analysis

KMO	Bartlett's Test of Sphericity
0.810	.000

Table 2 shows the results of the exploratory factor analysis. The Kaiser-Meyer-Olkin (KMO) value is 0.810 which exceeds 0.7. The Sphericity Bartlett test is accurate given that the value 0.000 is less than $\alpha = 0.05$.

Table 3: Variables

Variable	No.	Item	Load Factor
Factor 1	4	B24	0.741
		B25	0.719
		B26	0.752
		B27	0.744
Factor 2	4	TrB14	0.642
		TrB15	0.630
		TrB20	0.661
		TrB21	0.669
Perception	4	C2	0.624
		C3	0.790
		C4	0.803
		C5	0.753

Table 3 illustrates three variables. The number of items for the Factor 1 variable has four items, Factor 2 has four items, and Perception also has four items. All the items for each variable have a factor loading value greater than 0.60.

Descriptive Analysis

Table 4: Descriptive Analysis

Variable	Point	Frequency	Percentage (%)
Gender	Man	26	19.1
	Woman	110	80.9
Accommodation	College Students	130	95.6
	Non- College Students	6	4.4
Academic Qualifications	SPM	134	98.5
	STPM	1	0.7
	Other Certificates	1	0.7
Islamic Studies	Formal	12	8.8
	Non-formal	124	91.2
Duration spent in the Islamic education system	1 – 3 years	15	11.0
	4 – 5 years	50	36.8
	More than 5 years' experience	71	52.2
Working Experience	Yes	62	45.6
	No	74	54.4

Table 4 illustrates that the majority of the respondents are women (80.9%), while the male percentage is 19.1%. 95.6% of the respondents reside in the college accommodation while 4.4% of the respondents live outside the college. Most of the respondents (98.5%) have the SPM academic qualification while those with STPM and other academic qualifications are only 0.7% each. The percentage of respondents with formal Islamic education is 8.8%, the rest (91.2%) has no formal Islamic education. Furthermore, the percentage of respondents who have 1 to 3 years of the education system in Islam is 11.0%, followed by 36.8% who have 4 to 5 years of Islamic education, and more than 52.2% have had 5 years of exposure to Islamic education. The respondents with working experience are 45.6%, while those with no working experience are 54.4%.

Alpha Cronbach

Table 5: Alpha Cronbach

Variable	No.	Alpha Cronbach
Factor 1	4	0.801
Factor 2	4	0.601
Perception	4	0.782

Alpha Cronbach value acceptable according to Nunnally et al. (1994) is 0.60 and above. Table 5 shows the Alpha Cronbach value for each of the above variables, above 0.60.

Table 6: T-test: Gender

	Levene Test		T-test		
	F	Sig	t	df	Sig
Factor 1	**3.678**	**0.057**	**0.337**	**134**	**0.737**
Factor 2	**5.657**	**0.019**	**0.877**	**134**	**0.387**
Perception	**0.508**	**0.477**	**0.511**	**134**	**0.597**

Based on the Levene test, a significant p-value for Factor 1 and Perception should be greater than 0.05. This implies that the similarity of variance is the same. Whereas, the significant value p for Factor 2 is smaller than 0.05. This implies that the similarity of variance is not similar. For Factor 1, the significant value is 0.737 which is greater than 0.05. Thus, we can resolve that there is no important conflict between men and women. For Factor 2, the significant value is 0.387 which is greater than 0.05. Thus, it can be reasoned that there is no important conflict between men and women. Next, is the perception variable, the significant value is 0.597 which is greater than 0.05. Thus, it can be reasoned that there is no important conflict between men and women.

Table 7: T-test: Accommodation

	Levene Test		T-test		
	F	Sig	t	df	Sig
Factor 1	1.326	0.252	0.931	134	0.354
Factor 2	1.164	0.282	0.739	134	0.461
Perception	0.315	0.575	0.406	134	0.685

Based on the Levene test, the significant value p for all the variables is greater than 0.05. It indicates the similarity of variance is the same. For Factor 1, the significant value is 0.354 which is greater than 0.05. Thus, we can resolve that there is no substantial conflict between the students who reside in the college students and the non-college students. For factor 2, the significant value is 0.461 which is greater than 0.05. Thus, we can deduce that there is no substantial conflict between college students who live in the college and those who reside outside of college. In terms of perception, the significant value is 0.685 which is greater than 0.05. Thus, we can conclude that there is no substantial conflict between students living within or outside the college.

Table 8: T- test: Islamic Studies

	Levene Test		T-test		
	F	Sig	t	df	Sig
Factor 1	1.183	0.279	0.776	134	0.439
Factor 2	0.054	0.817	0.298	134	0.766
Perception	1.331	0.251	0.305	134	0.761

Based on the Levene test, the significant value p for all the variables is greater than 0.05. It shows that the similarity of variance is the same. For Factor 1, the significant value is 0.439 which is greater than 0.05. Therefore, we can conclude that there is no significant difference between the formal and informal Islamic education. For Factor 2, the significant value is 0.766 which is greater than 0.05. Hence, it can be concluded that there is no significant difference between formal and informal Islamic education. Next, in terms of the perception variables, the significant value is 0.761 which is greater than 0.05. Hence, it can be concluded that there is no significant difference between formal and informal Islamic education.

Table 9: T-test: Working Experience

	Levene Test		T-test		
	F	Sig	t	df	Sig
Factor 1	0.274	0.601	0.124	134	0.901
Factor 2	1.457	0.229	0.238	134	0.812
Perception	0.108	0.743	1.584	134	0.116

Based on the Levene test, the significant value p for all the variables is greater than 0.05. It shows the similarity of variance is the same. For Factor 1, the significant value is 0.901 which is greater than 0.05. Therefore, we can conclude that there is no significant difference between the students who have working experience and those who have none. For Factor 2, the significant value is 0.812 which is greater than 0.05. Therefore, it can be concluded that there is no significant difference between working experience and absence. Next, to Perception variable, the significant value is 0.116 greater than 0.05. Therefore, it can be inferred that there is no significant difference between having working experience and the absence of it.

ANOVA's Way

Table 10: ANOVA's Way: Academic Qualification

		Sum of Squares	Degree of Freedom	Mean Square	F	Sig
Factor 1	Between Group	0.927	2	0.464	1.896	0.154
	In Group	32.527	133	0.245		
	Total	33.454	135			
Factor 2	Between Group	0.004	2	0.002	2.238	0.111
	In Group	0.105	133	0.001		
	Total	0.109	135			
Perception	Between Group	0.846	2	0.027	0.095	0.909
	In Group	25.014	133	0.286		
	Total	25.860	135			

In terms of Factor 1, the significant value p is 0.154 which is greater than 0.05. Therefore, there is no significant difference in the mean value of Factor 1 between the academic qualification group. For Factor 2, the significant value p is 0.111 which is greater than 0.05. Therefore, there is no significant difference in the mean value of Factor 2 between the academic qualifications of the respondents in the group. For the Perception variable, the significant value p is 0.909 which is greater than 0.05. Thus, there is

no significant difference in the mean of perception between the academic qualifications of the students.

Table 11: ANOVA's Way: Duration in the Islamic Education System

		Sum of Squares	Degree of Freedom	Mean Square	F	Sig
Factor 1	Between Groups	0.020	2	0.010	0.040	0.961
	In Group	33.434	133	0.251		
	Total	33.454	135			
Factor 2	Between Groups	0.003	2	0.001	1.617	0.202
	In Group	0.106	133	0.001		
	Total	0.109	135			
Perception	Between Groups	0.770	2	0.385	1.374	0.257
	In Group	37.277	133	0.280		
	Total	38.047	135			

For Factor 1, the significant value p is 0.961 which is greater than 0.05, Therefore, there is no significant difference in the mean value of Factor 1 between the timeframe a group spent in the Islamic education system. For Factor 2, the significant value p is 0.202 which is greater than 0.05. Thus, there is no significant difference in the mean of Factor 2 between the duration a group spent in the Islamic education system. For the perception variable, the significant value p is 0.257 greater than 0.05. Thus, there is no significant difference in Perceptions between the groups based on the duration that they spent in the Islamic education system.

Correlation

Table 12: Correlation

		Factor 1	Factor 2	Perception
Factor 1	Pearson correlation	1	0.397	0.427
	Sig (2-tailed)	.	0.000	0.000
	N	136	136	136
Factor 2	Pearson correlation	0.397	1	0.348
	Sig (2-tailed)	0.000	.	0.000
	N	136	136	136
Perception	Pearson correlation	0.427	0.348	1
	Sig (2-tailed)	0.004	0.000	.
	N	136	136	136

There was a statistically significant correlation between all the variables in this study because the significant value p for each variable was less than 0.05.

Effectiveness Outcome

Through the interactive medium, the writers determined that it facilitates and eases the process of recitation or *tilawah*. It receives a good degree of acceptance and attracts students to read the al-Quran. The achievement of al-Quran recitation among students also shows a positive increase from time to time.

CONCLUSION

Quran recitation is a lifelong learning process for a Muslim. Quran recitation process can be continued any time throughout a lifetime using this method. The outcome of this work can further advance the implementation of educational activity and the learning process of CTU101 and CTU151. Therefore, lecturers need to be proactive and able to diversify their methods in line with the current advancement in technology. Hopefully, interactive *tilawah* can be an option to traditional methods and can be effectively used in the teaching and learning of Islamic education, especially CTU101 & CTU151 at Kelantan branch of UiTM.

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Think-Pair-Share Strategy Using Smartphone to AssistIn-Class Formative Assessment

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ABSTRACT

Think-Pair-Share strategy is a cooperative learning technique that encourages individual participation through questions. Recent study indicated that a fair number of students chose not to participate in this learning activity. To address this issue, in-class measurement and assessment of student understanding has been developed. Based on a client-server model, the Student Response System (SRS) adopted the think-pair-share strategy using students' smartphone as clients. Three distinct levels of answering the questions were asked; i.e. in the think phase, students independently develop their own ideas on the specific topic that has been asked, while in the pair stage, students discuss their view with a partner that allow students to express their thoughts and ideas while considering those of their partner, and finally, in the share phase, students share their refined ideas with a larger group such as the whole class with the support of their partner. On the server side, responses from students on questions posed can be automatically viewed by instructor during the Teaching and Learning process. Initial result is encouraging, i.e. experiment with a group of students has managed to improve assessment of their understanding up to seventy percent, while helping to improve students' socialization processes through interactions among students while strengthening their cognitive and affective domain.

Keywords: *Active learning; Computer-assisted instruction; Cooperative learning;*

INTRODUCTION

Frequent feedback about the quality of student learning by using formative in-class assessment during the learning process often helps instructor to find out if learning is taking place, what students are learning and how well they are learning (Cowie & Bell, 1999). Based on this gathered information, the instructor could act on the post-assessment and may customize the teaching and learning activities in order to promote further improvement of student attainment (Crooks, 2001).

Normally, when an instructor asks questions, only a few students would actively participate in the discussion. Hence, this may pose difficulty for the instructor to gauge the level of understanding for the rest of the class. One formative assessment tool that helps solve this problem is known as think-pair-share strategy (Lyman, 1981; Sumarsih & Saragih, 2012; Raba, 2017; Demetry, 2010; Webb, 2009).

Think-pair-share strategy is a cooperative learning technique through questions via three distinct levels: Think Pair and Share. First, students quietly think about a question given by the instructor. They independently think about this question by themselves before making a response. Second, students pair with a partner to share and discuss their view. This allows students to express their thoughts and ideas while considering those of their partner. Then, the pairs of students will decide which answer is the best. Lastly, students share their answers with the whole class with the support of their partner (Lyman, 1981; Sumarsih & Saragih, 2012; Raba, 2017; Demetry, 2010; Webb, 2009).

However, current study indicated that a fair number of students (perhaps 10-15%) chose not to participate in this active learning activity (Demetry, 2010). To remedy this problem, technology is often seeks as a tool for students to engage in their learning by enhancing the learning environment to be more conducive, interactive and relevant (Gok, 2011).

Addressing this concern, a client-server application of the think-pair-share strategy using Android application installed on students' smartphone as clients has been developed. Here, an instructor will get faster response on the level of student's understanding on the topic covered in the current session so that the instructor can do immediate assessment and act on the result.

This paper is organized as follows. Section 2 outlines the related works on think-pair-share strategy and Student Response System (SRS). Section 3 introduces the implementation of think-pair-share strategy in the client-server model. Section 4 elaborates on the experiment conducted. Finally, Section 5 provides the conclusion.

RELATED RESEARCH

There are numerous researches that have been conducted on think-pair share strategy, a cooperative learning technique developed by Frank Lyman at the University of Maryland (Lyman, 1981). For instance, Sumarsih and Saragih (2012) reported that the strategy has improved students' achievement in writing narrative test for English as a Foreign Language (EFL). While for oral communication skills in EFL classrooms setting, Raba (2017) indicated that the strategy plays a positive role in improving students' oral communicative skills, creating a cooperative learning environment and enhancing students' motivation to learn better. Webb (2009) also reported the same findings while conducting technical communication classes using several active learning techniques including think-pair-share strategy for mechanical and electrical engineering diploma students.

Concerning Student Response System (SRS), often small hand-held device called clicker will be utilized by students. Using the device, student may remotely respond to multiple choices questions that are posed during lecture (Gok, 2011;Matin, 2012). Another cheaper approach is using online based SRS such as Kahoot (Rodrigo et al., 2016) that eliminates the need to give students handheld clickers. Through Kahoot, instructor create online quizzes and mirror the questions on a big screen, students respond to the quiz items on any Internet-connected device, including their smartphones.

Results obtained showed that SRS is often useful for introductory courses and for monitoring peer learning methods in the large lecture classroom because the system can give feedback to both students and instructors on how well the entire class understands concepts presented. Once this feedback is obtained, an instructor can modify the course of instruction, or students can work out misconceptions by peer or classroom discussion (Gok, 2011;Matin, 2012; Rodrigo et al., 2016). Based on the benefits that have been discussed as aforementioned, SRS using think-pair-share strategy was proposed in this work.

APPROACH AND METHOD

Student Response System (SRS) is a client server application that implements think-pair-share strategy – using Smartphone to obtain fast feedback from students and instructor can view the responses in their laptop for in-class measurement and assessment of student understanding. SRS consists of android application installed on students' Smartphone (as clients) with a Wi-Fi connection to the laptop (as server) that belongs to the instructor.

During the teaching and learning process, the instructor will ask the question to the group of students for the purpose of assessing the student information. This is the common summative assessment process to observe the student capability on their understanding. During this stage, the Think Pair and Share process will take place where the student will be given a space to discuss with their peers before choosing the answer. Then, the student will give the response by submitting the answer of such question through their smartphone based on Android application as shown in Figure 1.

Figure 1: Android application installed on students' Smartphone (as clients)

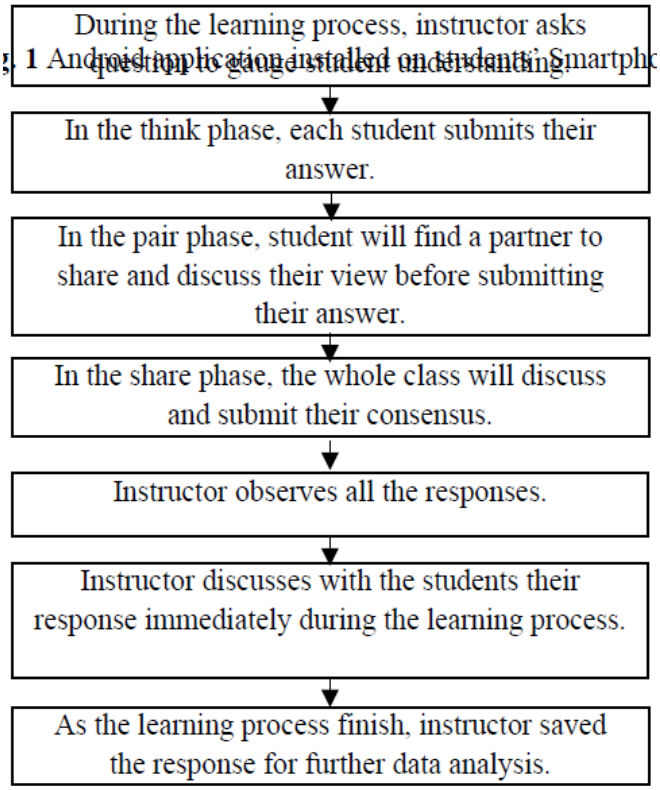

Figure 2: Flowchart of Formative Assessment using think-pair-share strategy

Once the answer has been submitted by the student, the instructor will evaluate the response at the dedicated server. For such server application, the instructor might use any personal computer or laptop as a tool to observe the response. Immediately after receiving the answer from the student, the instructor will discuss with the student regarding the answer. The discussion should be conducted in active learning environment where the student will be asked to give their reason of choosing their preferable answer.

After the learning process is completed, the instructor will save all the students' answer for analyses purpose. The server also has been designed to accommodate the basic analysis tools as shown in Figure 3 and 4. Figure 3 shows the tabulated result from the student answer in term of number of

percentile, while Figure 4 illustrate the tabulated result of the similar group of students in term of bar chart.

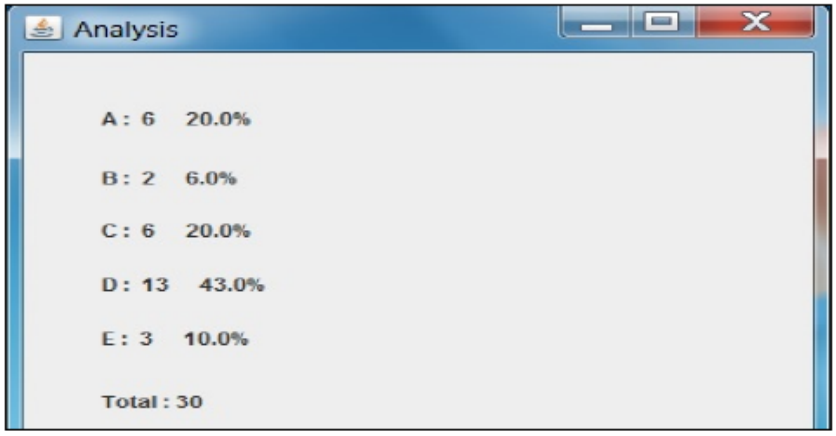

Figure 3: Result from the Students' Answer in Term of Number of Percentile

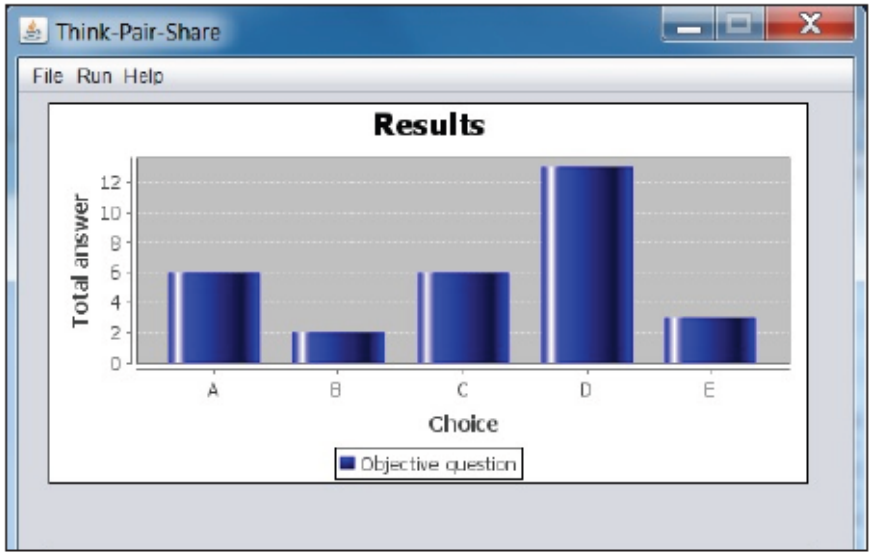

Figure 4: Result of the Similar Group of Student in Term of Bar Chart

RESULT

An assessment was done to evaluate the applicability of integrating SRS with think-pair-share strategy. The assessment was done to a group of semester 6 students studying Operating System subject, an engineering course at Faculty of Electrical Engineering, Universiti Teknologi MARA, ShahAlam. The assessment consisted of 10 questions was posed during lecture. The same set of question was answered by the same group of students which are by individual, by pair, and by sharing with the whole class. The results of the assessment are depicted in Figure 5.

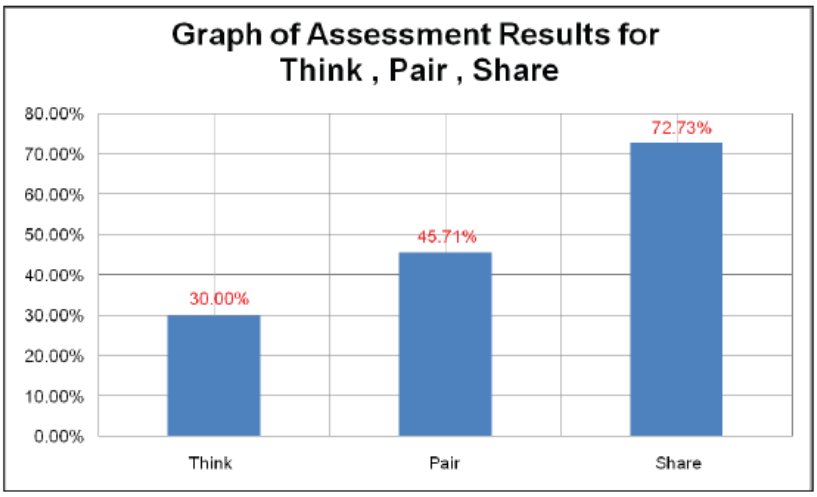

Figure 5: Results of the Assessment

In the think phase, each question was given 120 seconds for the students to think before they can submit their answers. For this individual assessment, about 30% in average were correctly answered by the students. When students were pair up in a team, they were given 5 seconds to discuss the question with their partner and another 120 seconds to answer it. While individual answers managed to score about 30% in average of correct answers, the result working in pair has increased to 45.71% in average. When the whole class discussed and shared their answer, the result increased further to 72.73% in average.

CONCLUSION

The proposed SRS has been introduced to improve student learning outcomes and classroom interactivity. With SRS, students only need to submit their answer using Smartphone which make the process faster and more convenience. Hence, the responses from students will be recorded. The responses can be saved to file for further discussions and analysis on the Teaching and Learning methodologies. Overall, the results indicated the system was able to help both instructor and students. Students may improve their understanding through discussion with their partner and the whole class.

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