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THE ROLE OF SELF-REGULATED LEARNING STRATEGIES ON LEARNERS' SATISFACTION IN MASSIVE OPEN ONLINE COURSES (MOOCs)

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ABSTRACT

Learning in Massive Open Online Courses (MOOCs) require individuals to be able to self-regulate their learning in order to monitor and adjust their behaviour and actions in a specific learning context. Studies have highlighted that learners who are able to self-regulate their learning, in either formal or informal settings, employ more effective learning strategies in online settings. However, MOOCs attract a diverse range of learners, each with different experience and satisfaction. The purpose of this study focused on examining the role of self-regulated learning (SRL) and its components (planning, time management, help-seeking, and self-evaluation) on learners' satisfaction in Malaysia MOOCs. Data were collected from 281 learners from a UUM MOOC namely *Asas Keusahawanan*, in the second semester of the Malaysian universities academic calendar. Findings indicated that all of SRL components except help-seeking are important factors for explaining learners' satisfaction in a MOOC. This study provides valuable recommendations for the developers of Malaysia MOOCs platforms, and the instructors in engaging learners with suitable SRL strategies and increase the level of course satisfaction in Malaysia MOOCs.

Keywords: Self-regulated learning, satisfaction, massive open online courses, MOOC, entrepreneurship

INTRODUCTION

Massive Open Online Courses (MOOCs) have of been much interest around the world and attract more audiences compared to traditional online education and the courses are free and cater to all types of learners [22]. In early 2012, MOOC providers such as Coursera, edX, and Udacity expanded rapidly by providing online courses. The rapid growth of MOOCs can be seen in 2018 as there were almost 81 million learners in 9,400 MOOCs developed by more than 800 higher learning institutions [19]. It is expected that the numbers of both MOOCs learners and the institutions offering MOOCs will continue to increase in the future.

Learners in MOOCs are expected to be responsible for and control their own learning whereas the instructors usually facilitate the learning activities in traditional face-to-face classrooms [14]. Therefore, in the absence of support and guidance from an instructor, the ability to regulate one's learning process is a critical skill to achieve personal learning objectives. Prior work found that many learners struggle with self-regulation in online learning environments [15]. In the context of MOOCs, which afford low levels of support and guidance, the absence of external pressure to make progress and the issue of learners' outcome measure of satisfaction in MOOC requires that learners be highly self-directed to achieve their course goals [10,12,18]. This raises the question of how learners' self-regulation strategies may support their satisfaction in learning environments like MOOCs.

LITERATURE REVIEW

Self-regulation is the process that learners possess and execute key skills to plan and organize learning activities in their learning environment, schedule study time, seek help when needed, and monitor whether learning goals were achieved [3,6]. Among its sub-components, planning is considered as the key constituent skill for self-regulation [25] and it refers to one's decision making on how to accomplish a learning task by setting goals, environments structuring, and identifying the learning strategies to achieve set goals [11]. Whipp and Chiarelli [23] observed that when undergraduate students plan their learning they successfully complete learning tasks and felt satisfied with the final outcomes. Similarly, Kizilcec et al. [14] found that goal setting and planning are important strategies for learners in MOOCs which predicted fulfilment of personal course goals. Thus, the following hypothesis is presented:

H₁. Planning has a positive and significant relationship with learners' satisfaction.

Time management, another important component of self-regulation, refers to allocating the time effectively to complete course activities on time [6]. Time management is considered as one of the top challenges that students face in online courses with more than seventy percent of graduate students indicated that time management is one of the critical factors for their success in an online course [20]. Similarly, the results from a study conducted by Yukselturk and Bulut [24] indicated that time management significantly impacts student achievement and satisfaction in an online certification program. Consequently, the following hypothesis is proposed:

H₂. Time management has a positive and significant relationship with learners' satisfaction.

The next component, help-seeking, is a social component of self-regulation and is defined as one getting assistance from others (e.g., instructor, peers, and parents) to complete a specific course related task [6,25]. Whipp and Chiarelli [23] found that help-seeking is one of the key strategies that promote successful students' adaptation to online learning environments. Moreover, in MOOC's learning context, Kizilcec and Schneider [13] found that help-seeking is important component to regulate students' learning and enhance their motivational beliefs. Consequently, the following hypothesis is proposed:

H₃. Help-seeking has a positive and significant relationship with learners' satisfaction.

Self-evaluation is another critical component of self-regulation that refers to students' skills in monitoring their performance and continuously evaluating their learning progress. Ley and Young [16] proposed that providing opportunities for students to self-evaluate their progress and performance (e.g. asking to self-evaluate assignments) helps them to identify learning deficiencies and improve learning outcomes. Examining data collected from over 200 graduate and post-baccalaureate students, Barnard et al. [3] found that self-evaluation mediates learners' overall achievement in an online course. Thus, the following hypothesis is proposed:

H4. Self-evaluation has a positive and significant relationship with learners' satisfaction.

METHOD

Participants

Participants in a MOOC of the Universiti Utara Malaysia (UUM) namely *Asas Keusahawanan* were surveyed for this study. The MOOC was built on Openlearning platform and exposed to the learners the basics of entrepreneurship in term of history, concepts, self-development, skills and behavior. A participants was defined as a person who enrolled to the MOOC and who participated in at least one activity in the course.

Of 1358 participants who enrolled to the course in the second semester of 2018/2019 session of the Malaysian universities academic calendar, 281 (20.7%) participants responded to the online questionnaire. The number of female participants 231 (82.2%) was greater than the number of male 50 (17.8%) participants, and the participants' ages ranged from 19 to 35 years old. Majority of the participants are undergraduates' students (98.6%) from UUM whereby they enrolled for this MOOC as part of their course requirement. Approximately, half of the participants 119 (42.3%) accessing for this MOOC several time per week while 172 (61.2%) participants have experience learning in MOOCs.

Instrumentation

In order to measure self-regulation and learners satisfaction in MOOC, the Online Self-regulated Learning Questionnaire [3] and E-learner Satisfaction Survey [21] were adapted. The English version of the instruments were translated into Malay by utilizing back translation procedure [5]. Prior to conducting the back-translation, three Malay-English experts, which are also the native speakers of Malay, from Malaysian Institute of Translation & Books (ITBM) and one public university in Malaysia were invited to do the translation. After the accuracy of the translation is certain, the finalized Malay version of the instruments were administered to the learners at the end of the course.

Results of a factor and reliability analysis confirmed that the instruments are valid and reliable measure of learners' self-regulation and satisfaction in MOOC. The final self-regulation questionnaire consisted of four construct (e.g., planning, help-seeking, time management, and self-evaluation) with 20-items and the satisfaction survey consisted of one construct with 7 items. For both instruments, students rated their agreement to given statements with a 7-point Likert-type response format having values ranging from strongly disagree to strongly agree.

DATA ANALYSIS AND RESULTS

Partial least squares (PLS) structural equation model was employed to examine the influence of self-regulated learning strategies on learners' satisfaction in MOOC. The researchers followed the 2-step analytical procedure suggested by Hair, Black, Babin, & Anderson [8] whereby the measurement model was evaluated first and then the structural model was assessed next. The measurement models describe the measurements of constructs and structural models define the relationships among constructs in structural models [9]. The application of the PLS method for assessing the structural and measurement models used in this study is due to the technique's capacity for performing simultaneous analyses, which results in more accurate assessments [2].

Assessment of Measurement Model

Convergent validity measures the extent to which the items of a scale that are theoretically related are correlated. According to Hair et al. (2010) a composite reliability (CR) of 0.70 or above and an average variance extracted (AVE) of more than 0.50 are deemed acceptable. As can be seen from

Table 1, all the value of every CR fell in-between 0.872 to 0.968, which exceeds 0.70. The value for every AVE fell in-between 0.695 to 0.846, which exceeds the suggested value of 0.50. Therefore, all constructs have fulfilled the convergent validity acceptably, as showed in Table 1.

Table 1. Measurement assessment results

First-order construct	Second-order construct	Item	Factor loading	Cronbach's alpha value	CR (above 0.7)	AVE (above 0.5)
Goal Setting (GS)		GS1	0.901	0.926	0.948	0.819
		GS2	0.888			
		GS3	0.921			
		GS4	0.909			
Environment Structuring (ES)		ES5	0.907	0.909	0.943	0.846
		ES6	0.921			
		ES7	0.931			
Task Strategies (TS)		TS8	0.852	0.846	0.910	0.718
		TS9	0.759			
		TS10	0.836			
		TS11	0.887			
	Planning (P)	GS	0.953	0.940	0.938	0.836
		ES	0.901			
		TS	0.887			
Time Management (TM)	TM12	0.837	0.840	0.904	0.758	
	TM13	0.885				
	TM14	0.889				
Help-Seeking (HS)	HS15	0.878	0.776	0.872	0.695	
	HS16	0.776				
	HS17	0.844				
Self-Evaluation (SE)	SE18	0.913	0.880	0.926	0.807	
	SE19	0.879				
	SE20	0.902				
	LS1	0.903	0.960	0.968	0.811	
	LS2	0.921				

Learner Satisfaction (LS)	LS3	0.901			
	LS4	0.915			
	LS5	0.878			
	LS6	0.920			
	LS7	0.866			

Note: CR = Composite Reliability, AVE = Average Variance Extracted

Next, the discriminant validity is assessed which is the extent to which a measure is not a reflection of some other variable. This can be established through the use of the Fornell-Larcker criterion [7] as can be seen in Table 2. The square roots of the AVEs upon the diagonals (as depicted in bold) were found to be greater than that for the correlations among constructs (respective rows and columns). According to Hair et al. [9], this indicates a good discriminant validity. Furthermore, the exogenous constructs have a correlation of less than 0.85 [1]. Therefore, all constructs had their discriminant validity fulfilled acceptably.

Table 2. Fornell-Larcker criterion of discriminant validity

Construct	Planning	Time Management	Help-Seeking	Self-Evaluation	Learners Satisfaction
Planning	0.914				
Time Management	0.790	0.871			
Help-Seeking	0.763	0.743	0.834		
Self-Evaluation	0.835	0.770	0.829	0.898	
Learners Satisfaction	0.829	0.719	0.690	0.788	0.901

Note: The square root of the average variance extracted are represented diagonals and the other values represent the correlations.

Assessment of Structural Model

Structural models are tested through computations of beta (β), R^2 , and respective t -values with use of a bootstrapping technique, according to a resampling of 5000 [9]. Figure 1 and also Table 3 show structural modelling assessments that display the findings of the various hypotheses tests, with each hypothesis confirmed. Planning meaningfully predicts learners' satisfaction, therefore H_1 is acceptable given that ($\beta=0.528$, $t=7.921$, $p < 0.05$). Time management marginally predicts learners' satisfaction with ($\beta=0.093$, $t=1.789$, $p < 0.05$), while help-seeking was not a significant predictor of learners' satisfaction in MOOC with ($\beta=-0.032$, $t=0.538$, $p > 0.05$), and hence, H_2 is acceptable but H_3 is not acceptable respectively. The role of self-evaluation also meaningfully predicts learners' satisfaction, and therefore H_4 is confirmed with ($\beta=0.302$, $t=4.369$, $p < 0.05$). Overall, the self-regulation strategies applied in this study explain 72.1% of learner's satisfaction in MOOC.

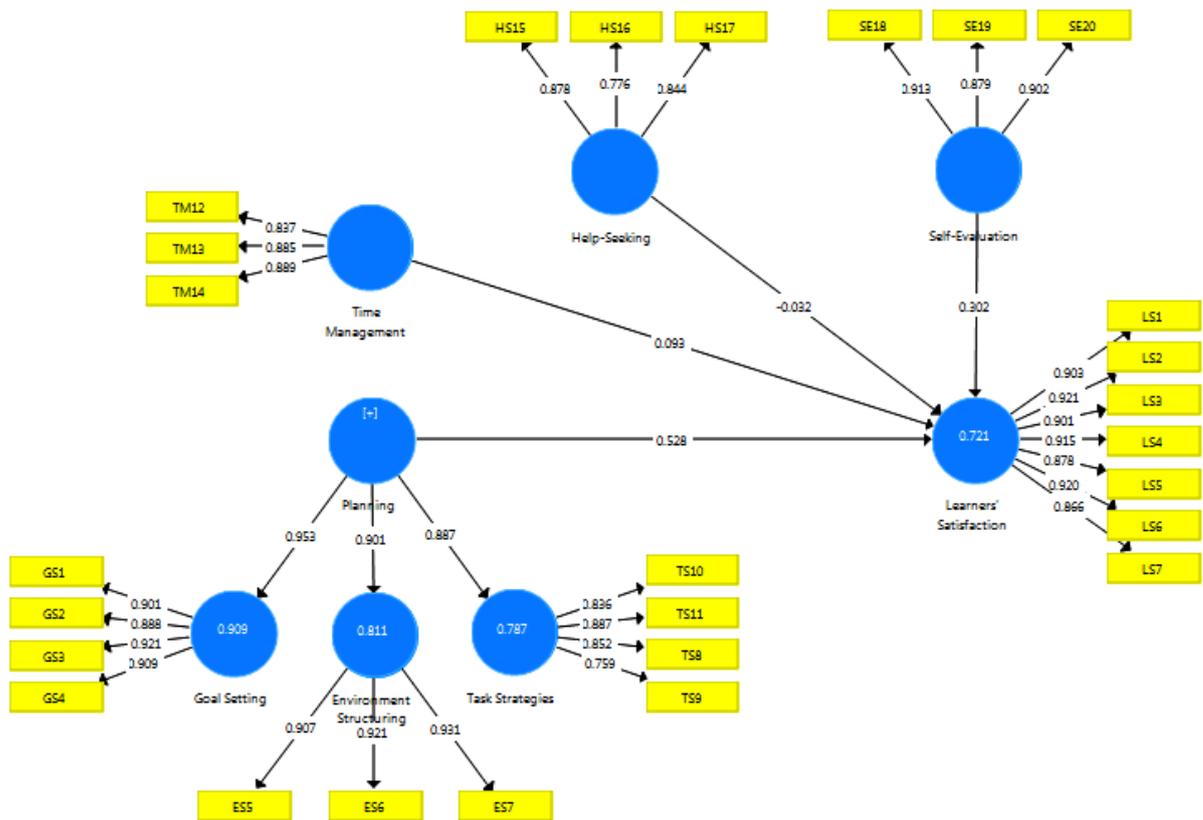


Figure 1. Structural model

Table 3. Structural assessment result

Hypothesis	Relationship	Std. Beta	t-value	p-value	Decision
H ₁	Planning -> Learners' Satisfaction	0.528	7.921	0.000	Supported
H ₂	Time Management -> Learners' Satisfaction	0.093	1.789	0.037	Supported
H ₃	Help-Seeking -> Learners' Satisfaction	-0.032	0.538	0.295	Not Supported
H ₄	Self-Evaluation -> Learners' Satisfaction	0.302	4.369	0.000	Supported

DISCUSSION

The current study investigated the importance of self-regulation strategies on learners' satisfaction in a MOOC. Among the four components (planning, time management, help-seeking and self-evaluation) examined in the study; planning has been found as the most important strategy explaining learners' satisfaction in a MOOC. This finding highlights the importance of planning and its components (goal setting, environment structuring and task strategies) as one of the self-regulation strategies [25] and aligns with previous empirical research studies [14,23]. For example, in their case

study with six graduate students, Whipp and Chiarelli [23] found planning as one of the important factors which have an influence on satisfaction. Similarly, in another study conducted by Kizilcec et al. [14] with 4831 learners in 6 MOOCs, the findings showed that learners who were stronger in planning and SRL skills outperformed their counterparts who were not good at planning in MOOC.

The next component of self-regulation investigated in this study was time management. The results of the study show significant influence of time management on learners' satisfaction. This finding is supported by some studies that found time management having a significant influence on learning factors [20,24]. For instance, Song et al. [20] reported time management as one of the important factors affecting student achievement in online learning after surveying with 76 graduate learners. Similarly, in their study with 80 students taking an online computer programming course, Yukselturk and Bulut [24] found that time management is an important skill needed for successful and satisfactory online learning experiences.

Help-seeking was not found as a significant self-regulated learning strategy influencing learners' satisfaction in MOOC. The finding seems surprising considering that prior work has found that learners who report working on the course with someone else, such as a friend, have higher performance [4,13]. However, this finding is aligned with recent study by Kizilcec et al. [14] that showed help-seeking is not a significant factor affecting learners' goal attainment in the MOOCs learning context. One possible explanation of this phenomena is based on the norms about help-seeking vary across cultural contexts, which is more likely visible in collectivist contexts [17]. Therefore, considering different learning context in MOOCs learning environment is imperative in encouraging effective scaffolding for help-seeking [14].

The last component of self-regulation investigated in the study was self-evaluation. Self-evaluation was found to be a significant factor for explaining learners' satisfaction in MOOC. This finding consistent with the previous studies suggesting self-evaluation as an important skill to have in order to be more satisfied in online learning environments [3,16,23]. For example, Barnard et al. [3] reported that self-evaluation is one of the self-regulated learning strategies that mediate learners' overall achievement in online learning. Similarly, Whipp and Chiarelli [23] reported self-evaluation as one of the important self-regulation components that is mostly adapted by successful online learners.

CONCLUSION

In this study, we found that planning, time management and self-evaluation are significant factors influencing learners' satisfaction in MOOC. Our findings demonstrate the importance of learners' ability to plan and setting their goals in order to self-regulate their learning in MOOC. It is also importance for them to well manage their time when learning, while providing learners with tools to evaluate their achievements during the course in order to increase their satisfaction level. Course designers, developers and instructors should not only develop excellent learning materials, but also assist MOOC learners to make proper planning, set their goals and learning time, and to evaluate the potential benefits of the course.

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CYBERBULLYING IN E-LEARNING PLATFORM: A TEXT MINING ANALYTICS

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ABSTRACT

The adoption and use of Learning Management System (LMS) in Higher Education Institutions (HEIs) have become inevitable for teaching and learning process. It facilitates communications between teachers and students, as well as among students, regardless of physical barriers and time. However, there is also a dark side to the online environment, given more and more adolescents admit they have been the victims or bystanders of cyberbullying. In order to ensure that the online learning environment is safe for everyone, it is critical to assess the extent of the conversation carried out through the platform so as to ensure that no such misconduct is carried out via LMS. This paper also aimed to propose a practical solution to combat cyberbullying in an educational platform, and shed some lights on the potential applications of text mining techniques in educational research.

Keywords: Cyberbullying, E-Learning, Text Mining.

INTRODUCTION

The advancement of technology had changed the way education is carried out in all level of education institution, particularly higher education. Among others is through the adoption and use of Electronic Learning (E-Learning), which primarily aimed to facilitate the learning process by delivering information and instructions to individuals over an intranet or through the internet [1]. The adoption of E-Learning by higher education institutions is also aimed to provide a conducive collaborative environment for students to communicate and share ideas in an online learning environment [2].

Today, one of the most rampant misconduct in online activity, especially among youth, is cyberbullying [3]. While there is extensive research on the extent of cyberbullying in social media among university students [3, 4], little attention had been given on the possibility of how E-Learning platform may be used to carry out such misconduct. Hence, it is the aim of this paper to shed some lights on the use of data analytics, particularly text mining, in order to understand the nature of cyberbullying in an E-Learning platform of a higher education institution. The subsidiary aim of this study is to propose practical solutions for all stakeholders in combating cyberbullying.

LITERATURE REVIEW

E-Learning Use in Higher Education

The advent of the internet and its advancement throughout the years have made possible to develop courseware with many multimedia and interactive elements and deliver it online. The research examining the benefits of E-Learning had been extensive. Among the many advantages associated with E-Learning documented in the literature were: increase learner's convenience, the flexibility of content delivery, and promote student's ability to develop self-learning ability [1, 5]. In other words, the perspective focused on personalization and learners' rights and responsibilities.

Hrastinski [6] emphasizes the importance of social support communication feature that every E-Learning platform should have in order to sustain the communities. It is expected that such an online environment, just as in traditional education, enables the learners to ask questions and share information and ideas. In addition, through such communication, learners would be able to obtain social support, which is desirable for creating an atmosphere that fosters collaborative learning.

Along with the promising benefits that E-Learning may offer to institutions and learners, there are challenges – or disadvantages as a number of researchers refer to –, that inherent to any technology adoption. Arkorful and Abaidoo [7] reported the negative impact of E-Learning on socialization skills due to the limited role of instructors as directors in the educational process. They also cautioned the issues of piracy, plagiarism, cheating, and other inappropriate use which may occur in the E-Learning platform.

Cyberbullying

Cyberbullying is an emerging problem in higher education institutions, especially as the internet increasingly becomes more accessible and part of daily life in university. It can be defined as the use of communication tools on the internet which intentionally and repeatedly caused harm or disturbance to a specific individual or group of individuals [8]. Such term has been regarded as a generic term to describe a range of behaviours, including internet harassment and online bullying [9] (see Figure 1).

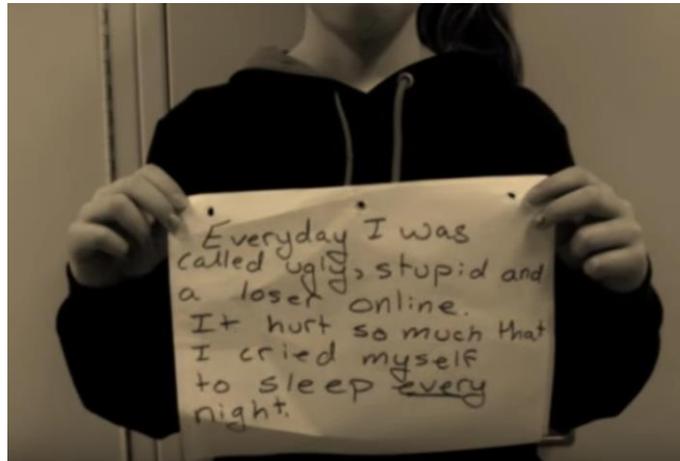


Figure 1. Cyberbullying Victim’s Message Posted Online
(Source: HandsShinetheLights [10])

The increasing attention on cyberbullying in higher education is triggered by the high variable prevalence rates for victimizations and perpetrations reported in earlier studies [4, 8, 11]. Different to face to face bullying, cyberbullying has a longer “shelf life” of the bullying text or images, which can place the victim in harm’s way for longer periods of time [11].

Previous research [12, 13] have classified cyberbullying into several types of online misconduct, which described as follows:

- *Harassment* : repeated aggressive and offensive messages
- *Flaming* : rude messages
- *Denigration* : sending fake or false statements or information about someone
- *Masquerade* : the bully pretends to be someone who they are not
- *Outing* : sharing others’ private information
- *Trickery* : tricking someone to sharing secrets or solicit information
- *Exclusion* : intentionally leaving someone out of an online group
- *Cyberstalking*: threats of harm or intimidation

The victims of cyberbullying are often harmed psychologically rather than physically [14], reported feelings of anxiety, depressions and suicidal ideation [15]. Unfortunately, many educators and parents often unaware of when and where it is happening.

Cyberbullying has also been identified to disrupt all aspects in the learners’ lives which may have interfere with the academic development of learners [4, 12]. Studies have urged society to no longer regard such instances as a trivial nature of growing up [13, 16]. Instead, it is imperative for both parents and educator to start considering the severity of psychological harm they may cause to the victims.

METHODOLOGY

In order to achieve the objective posited in this study, a series of individual conversation records posted in English and Malay language between students were collected from E-Learning platform’s database (see Figure 2). Any messages recorded as broadcast, or personal communications with lecturer or instructor, are not included in the dataset.

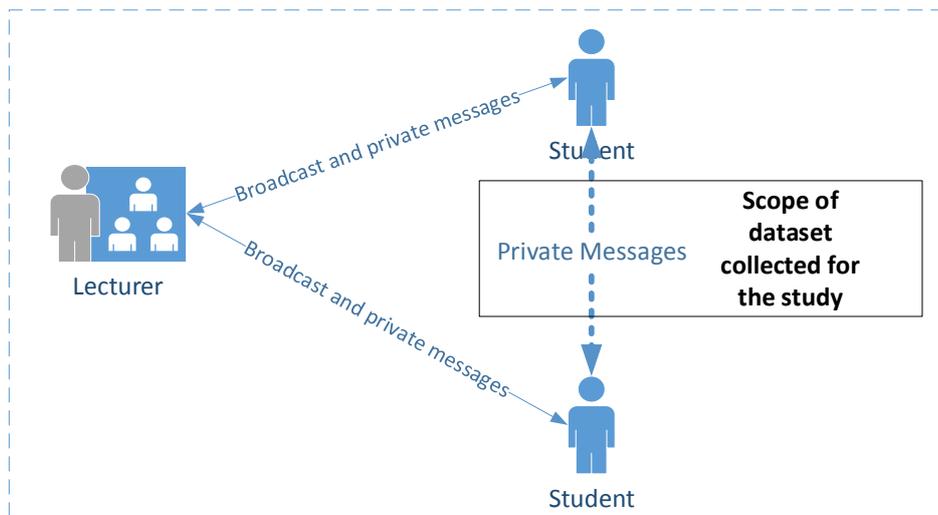


Figure 2. Scope of Dataset Collected for the Study

Given the focus of this study is to examine the content of the message, hence, no personal information was retrieved in the dataset. The userID captured in the dataset is a system-generated number which is different from the personal identification number of the individual. Other attributes retrieved in the dataset were full messages and time created (see Figure 3). The dataset used the messages collected between 3rd September 2017 and 17th July 2018, with the total number of 3498 messages were retrieved as the sample for text mining. The messages were saved into spreadsheets for analysis.

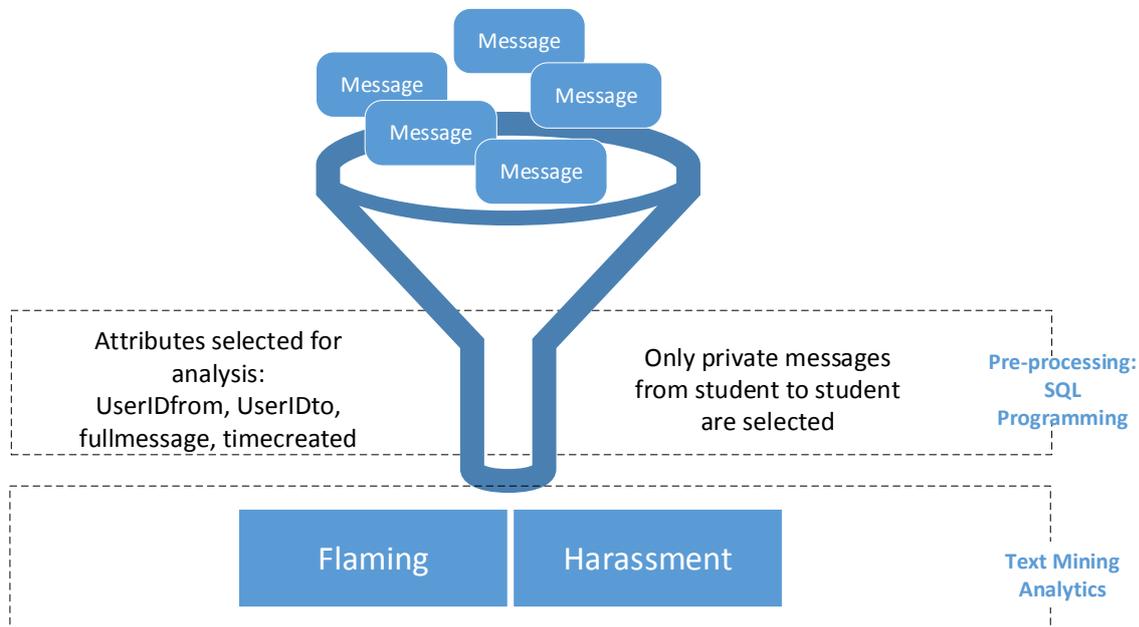


Figure 3. The Adopted Methods of Data Analytics and Selected Attributes

The text mining process in this study was carried out in multiple stages. The messages collected was sent to the pre-processing stage, in which raw data was transformed into a usable format. It was then followed by text mining techniques to gain insights about the contents and context of the messages in the dataset. A renowned tool in textual data analysis and mining, ATLAS_{ti}, was used to facilitate the mining and analysis using common linguistic methods such as extracting, grouping, indexing and so on. The result of the analysis enables the researchers to explore and extract key concepts, generate categories, and rapidly gain insights from interesting patterns, connections, and unusual information in the textual data.

RESULTS AND DISCUSSIONS

The aim of this study is explore the use of text mining to understand the nature of cyberbullying in an E-Learning platform of a higher education institution. In order to address such aim, an analysis was conducted to identify the average of the frequency private messaging among students on every hour. As illustrated in Figure 4, the highest average number of private messages among students were recorded at 2 PM, where students often resume their classes from the lunch break.

It is also interesting to note on the relatively high number of the traffic of private messaging between 9 PM to 1 AM, hence supports the findings of the previous study who found that more and more young people lose sleep over online activity [17].

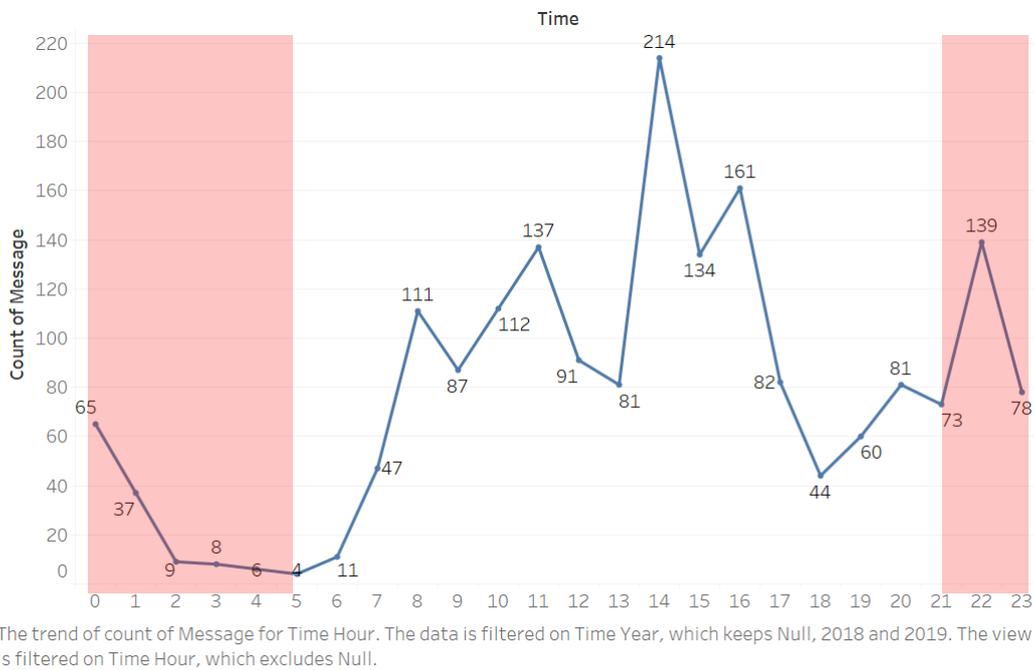


Figure 4. Average Number of Private Messages Sent via E-Learning Platform in 24 Hours and the Critical Window for Cyberbullying

During the text mining analysis using linguistic assessments of the instances in the sample dataset, it was found that a total of 49 messages (or equal to 1.4 percent of all messages) were categorized as flaming and/or harassment. Figure 5 also shows the trendline of the frequency on flaming and harassment messages occurrence in 24 hours. As can be seen, many of these offensive messages were posted late at night, however different to conventional belief, it has smaller number as compared to the remaining time of the day. The highest number of cyberbullying messages were posted during the day, and shows that internet enable the perpetrators to act yet furtively away from the watchful eye of the educator.

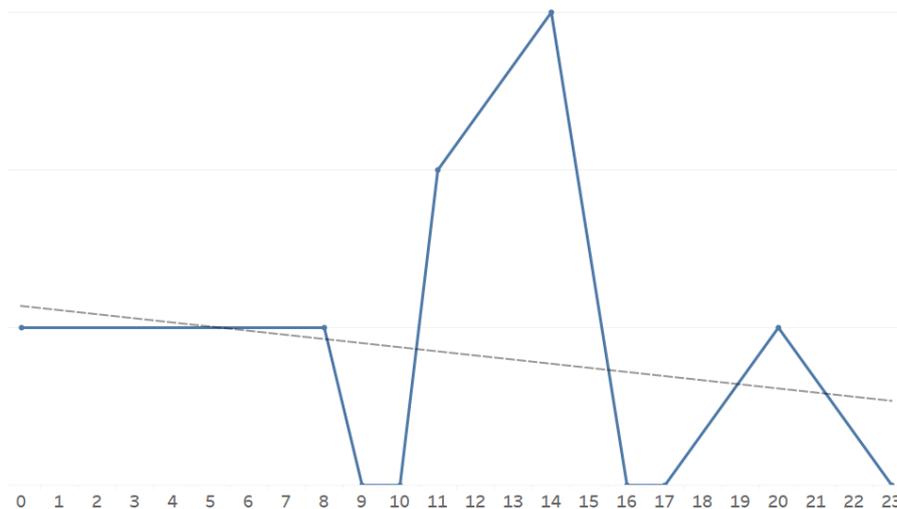


Figure 5. Trendline of Flaming and Harassment Messages Occurrence in 24 Hours

The above results highlight a number of practical solutions which may be undertaken by relevant stakeholders. For the University as the owner and provider of the E-Learning platform, it is imperative to formulate relevant strategy and policies to prevent and/or tackle any issues pertaining to cyberbullying. Such strategy would also include relevant efforts to promote the awareness of cyberbullying and its impact to the individual, and institution in general. Other strategy may include an automated regular analysis of private messages contents through the use of data analytics, so as to allow all stakeholders to be informed of any alarming pattern of communications among students, during and after hours.

CONCLUSION

This exploratory study examines the extent use of data analytics, particularly text mining, to assess the nature and cyberbullying carried out in the E-Learning platform. The findings of this study enable all stakeholders in higher education institutions to understand how E-Learning may be used by perpetrators to furtively bully others via internet, during the day or after hours in an online educational facility.

A number of practical solutions are proposed in this study, among others the imperative effort to promote the awareness of cyberbullying and its negative impacts – psychologically – to the victims. Further research is needed to expand the understanding of cyberbullying at the university level through a longer historical dataset, and additional demographical information such as age and gender.

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THE EFFECTIVENESS OF LEARNING DESIGN MODEL IN MOOC: A STRUCTURAL EQUATION MODELING (SEM) APPROACH

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ABSTRACT

The successful content is the most significant issue in MOOC the realm of language learning such as lack of studies focusing on the effectiveness model of fully online language learning. Most existing researches were conducted for face-to-face and blended learning modes. Effectiveness is an important to factor for successful MOOC. Existing studies also mostly focus only on student perspective for effective learning design models. Therefore, this study analyzed students' perspective on an effective learning design model based on learner's characteristics and their performance in a language courses. A survey method has been used to collect data and analyses the students' perspectives after complete the language course. A Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to answer research questions. The survey was conducted online involving 130 respondents after completing the Mandarin MOOC course. The findings show that visual, active, thinking and intuitive dimensions contribute to the effectiveness design model that shows improvement in student performance for all construct: learnability, effectiveness, ease to use, interactivity and satisfaction.

Keywords: Learner characteristics, Students' perspective, Self-Assessment, Effectiveness

INTRODUCTION

Massive Open Online Course (MOOC) is a new online learning method in education that is currently developing (Xiao & Pardamean, 2016). The design of MOOCs inevitably involves a focus on complex pedagogical, technological, and organizational issues (Ichimura & Suzuki, 2017). Authors proposed ten dimensions for the MOOC design model: general structure, resources, vision, learner background and intention, pedagogy, communication, assessment, technologies, learning analytics data and support. Assessment in learning is used as an indicator of the level of skill acquisition (Xiao & Pardamean, 2016).

Language is an important instrument of communication among human beings in a community. Language MOOCs, in particular, constitute a promising educational model that can provide solutions to people's language needs, especially in countries where the academic system is unable to respond (Panagiotidis, 2019). In this paper, we analyzed student perception an effective learning design model

based on learner's characteristics and their performance in language courses.

RELATED WORK

Learner Characteristics

Learner characteristics can be personal, academic, social/emotional and/or cognitive (Drachler et al., 2012). A Learner's characteristics are defined as an individual mental factor, suggested to impact on the learning activities of students. Previous researchers listed three types of learner characteristics; i) learning styles, ii) cognitive styles and iii) multiple intelligent (Lever-Duffy & B.McDonald, 2009), (Hashim et al., 2017).

Learning style refers to learner's favored approaches to learning (Kumar et al., 2018). The previous researcher listed popular learning style models to build up a pedagogical hypothesis: i) Kolb Experiential Learning Theory; ii) VARK Model; iii) Felder & Silverman Learning/Teaching Style Model and iv) Dunn and Dunn Learning Style Model (Sadhasivam & Babu, 2017). Felder Silverman model was the most preferred model of learner style used in the learning theories compared to other learning styles (Kumar et al., 2018), (Fasihuddin et al., 2017), (Ahmadaliev et al., 2018). Previous studies found that eight dimension learning styles; active, reflective, sensing, intuitive, visual, verbal, sequential, global (Kumar et al., 2018), (Sadhasivam & Babu, 2017), (Fasihuddin et al., 2017), (Hmedna et al., 2016), (Al-Azawei et al., 2016), (Al-Azawei et al., 2017), (Hashim et al., 2017). Learning styles are innate preferences of individuals as to how they prefer to go about the process of learning and it is one of the dominant factors which affect the academic success of students (Karthigeyan & Nirmala, 2013).

Cognitive styles are the characteristic, self-consistent mode of functioning which individuals show in their perception and intellectual activities (Berry et al., 2005). Cognitive style is described as the way individuals imagine, perceive, distinguish, recognize, think and remember information (Mukherjee, 2016). The previous studies found that eight dimension cognitive styles; Introversion, Extraversion, Sensing, Intuitive, Thinking, Feeling, Judging, and Perceiving (Lever-Duffy & B.McDonald, 2009), (Mukherjee, 2016), (Garner-O'Neale & Harrison, 2013). The previous study assumes that student's activity in e-learning courses differs based on the cognitive style preference. They may be equally satisfied and perform at the same level. However, they may prefer different activities and benefit from different activities depending on their cognitive style (Simuth & Sarmany-Schuller, 2014). Cognitive Styles as the main factor that effects students' achievement (Hooda & Devi, 2017), (Ghaedi & Jam, 2014). Cognitive style is considered as one of the most important variables affecting the students in academics (Mukherjee, 2016).

According to (Hashim et al., 2018), identified suitable dimensions learner characteristics are for the design assessment model; i) visual and active (learning styles), and thinking and intuitive learner (cognitive styles). In this study, this dimension used to design and develop a self-assessment model. Through the learning design can monitor student academics through several indicators such as i) students' online activity, ii) online interaction, iii) academic performance (e.g., quiz scores), and iv) the utility of the LMS in terms of diversity of tools used and time flexibility (Godsk et. al, 2018).

Self-Assessment

Admiraal et al., (2014) mentioned the mostly categorization of MOOC pedagogy relates to the two main kinds of MOOCs, i) cMOOC and ii) xMOOC. According to Wong (2016), in MOOC assessment, the big challenge for a large number of students is to get detailed and timely feedback. Tenório et al., (2016) stated the assessment can increase the performance of students at the same time it brings benefits to the teacher. Current MOOCs are; i) lacking personalized learning guidance, and ii) intelligent assessment for individuals (Wang, 2016). In MOOC assessment, the issue is, there was a reduction of interest and activity of students during the session of the course (Lisitsyna & Evgenii,

2017). The important step toward designing efficacious courses and improving open online learning is understanding which factors account for students' learning outcomes including i) students' characteristics, ii) teaching context and iii) learning activities (Pilli & Admiraal, 2017). However, assessment is the third emerging issue in the literature on MOOCs (Admiraal et al., 2014).

MOOC in education must have three requirements; i) assessment ii) instructor and iii) model (Baneres et. al, 2016). The limitation of experiential learning and many high-impact practices in higher education is the lack of assessment of embedded learning outcomes at the individual learner level (Heinrich & Rivera, 2016). According to Gikandi et al., (2011) the term assessment is purposefully used to refer to the measurement of learner's achievement and progress in a learning process. Two major forms of assessment exist; i) formative and ii) summative assessments. Admiraal et. al, (2014) state that the quality of both assessments was moderate. The previous researcher mentioned, one of the most challenging problems in MOOCs is that it is infeasible for the teaching staff to grade all the assignments on such a large scale (Pilli & Admiraal, 2017). These authors suggest a reconceptualization of; i) curriculum activities and ii) student achievement based on various indicators of performance. The design of engaging and challenging assessment tasks is one of the most important elements of planning a course (Bearman et al., 2014).

Assessment models used across the professional development continuum in the health care professions can be grouped into four categories based on what they purport to measure and/or are best at measuring: i) measures of knowledge, ii) measures of professional decision making, iii) measures of practice performance including professional attributes, and iv) integrated assessments of practice-based skills and tasks (Leigh et al., 2007). The previous researcher argued that Self-Assessment is a key to student's achievement and gives significant information about students' achievements that are related only to the higher student achievement and improved behaviour (Hayat et al., 2013).

Effectiveness

Farid et al., (2018) highlighted three non-linear sequential phases to design and develop model including, i) before (planning and analysis), ii) during (design, prototype, and production), and iii) after (post-production and delivery). In MOOC development, two factors must often be considered; i) effectiveness and satisfaction (Smith & Macdonald, 2015), (Farid et al., 2018), (Mumtaz et al., 2017). According to Hannah (2017), in attrition in the higher education sector, the effectiveness of learning management systems (LMSs), and online pedagogies play a major role. Another challenge is teachers' scepticism about the effectiveness of online activities in improving learning (Cheng & Chau, 2016). According to Miranda et al., (2015) the effectiveness of a MOOC is dependent on a variety of factors such as i) quality of the content, ii) type of material that is used and iii) issues of a technical nature/technology.

Gamage et al., (2014), listed ten dimensions for effectiveness in MOOC are identified; i) Interaction, (ii) Collaboration, iii) Motivation, iv) Network of Opportunities & Future Directions, v) Assessment, vi) Support for learners, vii) technology viii) Usability, ix) Content/Material and x) Pedagogy. According to Bishouty et al., (2018) the effectiveness of this methodology can be measured based on the feedback of the students. In this study, five perceptions used to measure effectiveness design this model; i) Learnability, ii) Effectiveness, iii) Easy to use, iv) Interactivity and Satisfaction.

In this paper, we analyzed the effectiveness of the learning design model from students' perspective a PLS-SEM approach based on student perception. To assist the study, the following research questions were constructed:

Based on the above discussion, we hypothesize the following:

H₁: There is a positive relationship between visual and effectiveness for student performance.

- H₂: There is a positive relationship between active and effectiveness for student performance.
H₃: There is a positive relationship between thinking and effectiveness for student performance.
H₄: There is a positive relationship between intuitive and effectiveness for student performance.
H₅: There is a positive relationship between visual and effective design for student performance.
H₆: There is a positive relationship between active and effective design for student performance.
H₇: There is a positive relationship between thinking and effective design for student performance.
H₈: There is a positive relationship between intuitive and effective design for student performance.
H₉: There is a positive relationship between effective learning design and effectiveness for student performance.

METHODOLOGY

This research has adopted a quantitative research design with a cross-sectional survey approach and using second-generation data analysis that is the PLS-SEM approach.

Instrument; e-activities consist of the quiz, listening assessment, forum, test, and project. The questionnaire consists of the item to evaluate student perception towards an effective learning design model.

Data collection; Data collection was conducted for one year. Coursework assessments were conducted throughout the one-semester duration (one cohort) in Semester 1 2018/2019. The MOOC lessons and e-activities were implemented as online learning conducted by the language teachers. Some of the assessments were conducted via face-to-face and some of it via MOOC. This research adopted a quantitative approach for collecting data using a structured survey instrument. A total of 130 questionnaires were distributed to the students enrolled in Mandarin MOOC in a public university in Malaysia.

Statistical technique; PLS-SEM was used to perform structural model analysis. PLS was chosen because of the exploratory nature of this study. First, the measurement model (outer model) is tested to ensure its validity and reliability. Measurement properties of multi-item constructs, including convergent validity, discriminant validity, and reliability, are examined by conducting exploratory analysis. The bootstrapping is used to test the significant level construct in this study. The study model included 50 reflective measurement items (indicator) for 6 variables (latent variable) including independent variables (IV), dependent variable (DV), which constitute 9 relationships between them based on the hypotheses proposed study in the effective learning design model.

RESULT

The demographic profiles of the respondents revealed that the majority of respondents were male (62.1 %) and 36.9% of respondents were female. In SmartPLS, the analysis was undertaken in two stages: (i) validating the measurement model (i.e. confirmatory factor analysis 'CFA') and (ii) validating the structural model.

Measurement model assessment: To validate the measurement model (i.e. CFA) in SmartPLS, item loadings, average variance extracted (AVE) and composite reliability (CR) was assessed by running the PLS algorithm.

As shown in Figure 1, all the items loadings should be over the recommended value of 0.7 (Hair et al., 2016). The author recommended composite reliability values should be greater than 0.7. In this study, all the composite reliability values ranged from 0.934 to 1.0. The average variance extracted (AVE) measures the variance encapsulated by the indicator relative to measurement error and this should be higher than 0.5 to justify the use of construct (Hair et al., 2016). In this study, the value AVE ranged from 0.702 to 1.0, which was all within the recommended range. Also, the discriminant validity of the constructs was measured using the square root of the average variance extracted (AVE).

Overall, the measurement model (i.e. CFA) was assessed and confirmed by examining convergent validity and discriminant validity. Table 1 shows the result of the Smarts-PLS measurement model validity test.

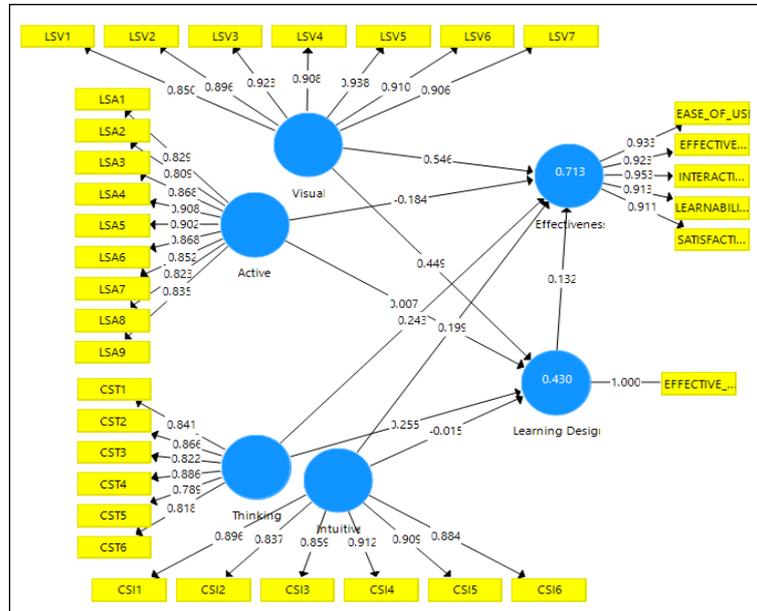


Figure 1. Measurement model in SmartPLS

Table 1. Smarts-PLS Measurement Model Validity Test

Convergent Validity	Discriminant validity
Indicator loadings > 0.70	AVE > square of inter-construct correlation
Composite Reliability (CR) > 0.7	No substantial cross-loadings
Average Variance Extracted (AVE > 0.5)	

Structural model assessment: To assess the structural model, a bootstrapping approach was applied in SmartPLS to determine the significance of the paths in the model. More specifically, the T value accompanying each path coefficient was generated using the bootstrapping technique and subsequently, the P values were generated, as reported in Table 3. Figure 2 shows the results of bootstrapping with 500 samples.

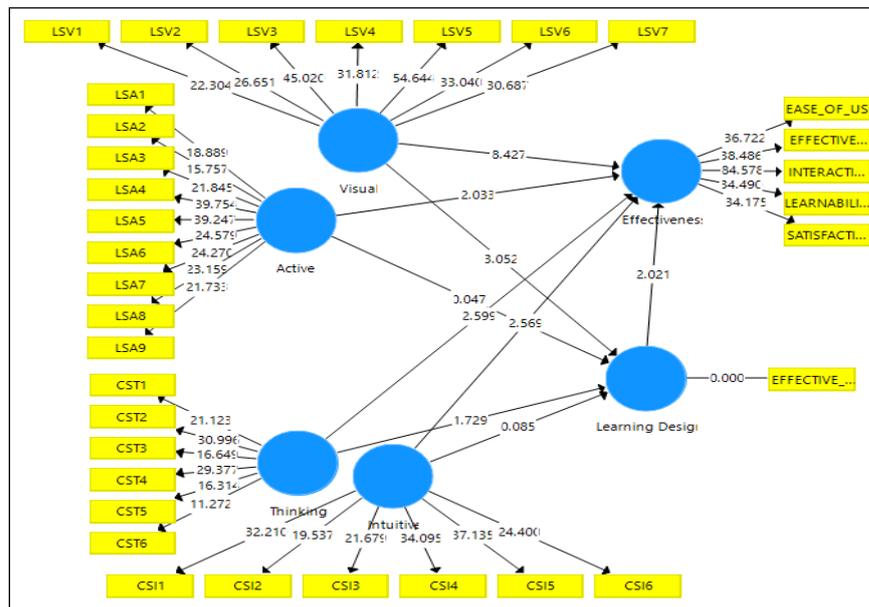


Figure 2. Structural effective learning design model results

As we can see in the table, among the nine hypotheses advanced in this study, six H₁, H₂, H₃, H₄, H₅, and H₉ were supported at p<0.01 confidence level. Therefore, three hypotheses were not supported (H₆, H₇, and H₈).

Table 2. Summary of the structural model analysis

Hypothesis	Path Co-efficiency	T Value	P-Value	Result
H ₁ Visual -> Effectiveness	0.546	8.088	0.000	Supported
H ₂ Active -> Effectiveness	-0.184	2.061	0.040	Supported
H ₃ Thinking -> Effectiveness	0.243	2.761	0.006	Supported
H ₄ Intuitive -> Effectiveness	0.199	2.424	0.016	Supported
H ₅ Visual -> Learning Design	0.449	2.863	0.004	Supported
H ₆ Active -> Learning Design	0.007	0.043	0.966	Not Supported
H ₇ Thinking -> Learning Design	0.255	1.734	0.083	Not Supported
H ₈ Intuitive -> Learning Design	-0.015	0.083	0.934	Not Supported
H ₉ Learning Design -> Effectiveness	0.132	2.046	0.041	Supported

Hypothesis H₁, H₂, H₃, and H₄ are testing the relationship between learner characteristics and effectiveness to improvement in student performance for all perception: learnability, effectiveness, ease to use, interactivity and satisfaction. H₁ supported at $p < 0.01$ confidence level. Visual will have a positive and significant on effectiveness for student performance. H₂ supported at $p < 0.01$ confidence level. Active will have a positive and significant on effectiveness for student performance. H₃ supported at $p < 0.01$ confidence level. Thinking will have a positive and significant on effectiveness for student performance. H₄ supported at $p < 0.01$ confidence level. Intuitive will have a positive and significant on effectiveness for student performance. The findings show all constructs from learner characteristics have a positive and significant to the effectiveness for student performance.

Hypothesis H₅, H₆, H₇ and H₈, and H₉ are testing the relationship between learner characteristics and design learning model to improvement in student performance. H₅ supported at $p < 0.01$ confidence level. Visual will have a positive and significant on learning design for student performance. H₆ not supported at $p < 0.01$ confidence level. Active will have a negative and not significant effect on learning design for student performance. H₇ not supported at $p < 0.01$ confidence level. Thinking will have a negative and not significant on learning design for student performance. H₈ not supported at $p < 0.01$ confidence level. Intuitive will have a negative and not significant on learning design for student performance. The findings show only one constructs from learner characteristics, visual has a positive and significant to the learning design.

H₉ supported at $p < 0.01$ confidence level. Learning design will have a positive and significant on the effectiveness for student performance. The findings show effective learning design model have a significant to all construct from all perception: learnability, effectiveness, ease to use, interactivity and satisfaction. Besides that only visual dimension contribute to learning design compared another dimension (active, thinking and intuitive). Both hypothesis H₁ and H₅ shows that the effective learning design model used to visualize to students improved their performance.

CONCLUSION

This study presents findings on the implementation of an online learning approach in learning a second language. The findings show eight hypotheses, six hypotheses supported the P-value (significant) and two hypotheses not supported. The findings show that that visual, active thinking and dimensions contribute to the effectiveness design model that shows improvement in student performance for all language skills: learnability, effectiveness, ease to use, interactivity and satisfaction ($p < 0.01$). This result shows the relationships between learner characteristics and student performance using the learning design model through activities in second language courses. In the future, we will further analyze student engagement after using the learning design MOOC assessment model.

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POLITENESS STRATEGIES USED IN ASYNCHRONOUS ONLINE FORUM

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ABSTRACT

ELSP@UNMC is a microsite developed in MyLinE platform (<http://myline.utm.my>) for students of Bangladesh College of Education Development Project (BCEDP) to respond to questions, give their own opinions, as well as agree and disagree with fellow participants. The asynchronous forum provides platforms to students to communicate their ideas at their own time and pace. This paper looks into the speech acts of agreeing and disagreeing preferred by the students in four different forums based on different topics. The strategies adopted were analysed using Brown and Levinson (1987) politeness strategies. Learners were found to agree more with other participants and tend to adopt positive politeness strategy. They not only agree with each other but also strengthen their fellow learners' opinion. Overall, the forum had a positive support and environment that made the learners able to express their ideas freely as they feel supported, safe and secure in the online environment. Due to this, the learners are driven to contribute more in the forum which increases their chances of practising the language. This is greatly needed as they hardly have a chance to practise English in their daily life.

Keywords: online asynchronous forum, politeness strategies, MyLinE, MUET

INTRODUCTION

The advancement of educational technology is providing learners the chance to learn a language beyond the four walls of the classroom. Learners can access learning materials or participate in the learning process online at their own convenience at their own pace and time. Online asynchronous forum is one technology that can be used to engage language learners in computer mediated

communication (CMC). This platform enables them to learn and improve their language skills through meaningful discussions. The opportunity to practise their communication skills within a specific online community will increase their knowledge on specific topics as they will be reading and responding to ideas and views given by fellow learners. Online discussions also prepare learners to generate ideas effectively. Ideally, they will be able to become effective members of an online community where they learn to participate in meaningful interactions. Online forum can serve as a platform to help learners with their writing and speaking as “asynchronous discussions combine the interactive aspect of written conversations with the reflective nature of composing” (Ware & Warschauer, 2006, p. 111).

As pointed by Megah (2009), one of the aims of online interaction is to convey meaning without losing face where learners have to decide on the most appropriate strategies especially when constructing utterances. The knowledge on the most appropriate communicative strategies would facilitate them in conveying messages effectively in an asynchronous forum. These strategies are part of the pragmatics of social interaction (Kreijin, Kirschner, & Jochems, 2004; Vinagre, 2008) that looks into how learners use speech acts such as agreeing and disagreeing in negotiating meaning. These acts, whether done directly or indirectly, are inevitable when responding to an issue or a topic. While doing this, learners have to consider to choose the most appropriate strategies without offending others. In other words, learners would have to learn how to get their message across without ‘losing face’ and while at the same time avoid ‘threatening other people’s face’ (Brown & Levinson, 1987). This study aims at investigating the preferred speech acts of agreeing and disagreeing used by learners in four different asynchronous online forums by applying Brown and Levinson’s model of politeness.

LITERATURE REVIEW

Online Forum Discussion

Online forum discussion is a type of asynchronous computer-mediated communication (CMC). This mode of communication does not require all participants to be present at the same time. Asynchronous communication enables a more diverse and detailed exchanges of information (Branon & Essex, 2001). It differs from real-time communication or also referred to as synchronous communication that has been shown to be less impactful as more learners failed to complete tasks when compared to those participating in asynchronous discussion (Schwienhorst, 2003).

Online forum discussion is a common method used in a blended education environment to supplement face-to-face instruction. It is well accepted that this method contributes to a positive learning outcome (Alzahrani, 2017; Lyu, 2018; Omar, Amir & Mohamad, 2018). The integration of online discussion in language classrooms not only help in instruction (Ürün, 2015) but also benefits learners through providing the opportunity to use the target language extensively (Ene, Goertler & McBride, 2005), employ wider vocabulary (Fitze, 2006), and experiment with more sophisticated language to negotiate meaning (Smith, 2001). The tasks required in online forum discussion require learners to participate in authentic communicative situations where they have to apply their linguistic knowledge to negotiate meaning and achieve their communicative goals.

Politeness as a part of CMC

The efficiency and effectiveness of online forum discussion depend largely on participants’ mutual corporation and the degree of politeness asserted (Vinagre, 2008). Politeness is central for any

social interaction to be successful. Politeness is often discussed in the context of face through the politeness model of Brown and Levinson (1987). Politeness strategies here refer to an action plan to lessen the possibility of disputes and conflicts and act as a tool to ease exchanges (Lakoff, 1973; Leech, 1983). This theory rests on the notion of facework (Goffman, 2017) and more specifically focuses on face-saving strategies and the mitigation process of face-threatening acts (FTAs). In any exchange, speaker and hearer each has a face that can be lost, maintained or enhanced. Therefore, during an interaction, face is constantly being attended to through cooperation between the speaker and hearer.

Linguistic politeness theory and Brown and Levinson's FTAs have also been used to quantify the exchanges used in an online forum and to determine their effectiveness (Vinagre, 2008; Park, 2008). It is important to ensure the success of learners' participation in online discussion so that negotiation of meaning can take place and tasks can be fulfilled. When learners become effective members in an online forum, they will feel comfortable in exchanging ideas, and this indirectly creates a sense of community among themselves.

As the nature of tasks in online forum discussions require learners to respond to a statement and answer a question, the acts highlighted in this research are agreeing and disagreeing. Agreeing refers to an act of expressing and willingness to accept similar opinion whether explicitly or implicitly, while disagreeing refers to expressing opposition to an opinion. These speech acts are reactions to the other speech acts such as stating or declaring as suggested by Austin (1962) and Searle (1969). It is the responsibility of the interlocutors to ensure what they intent is accomplished through their utterances, be it done directly or indirectly. When agreeing and disagreeing, speakers need to use specific strategies in order to achieve a successful interaction. These interactional strategies or specifically politeness strategies employed focus on facework – where speakers strategies to maintain their own face while at the same time avoid losing or threatening their interlocutor's face.

Politeness strategies employed for an effective communication are positive politeness, negative politeness, bald on record, and off-record (Brown & Levinson, 1987). Bald on record is an act that is direct, to-the-point, explicit, and unambiguous. The off-record strategy is an indirect speech act that does not require the hearer to take action directly. The speaker is cautious and not being forceful when delivering a speech act. Because of that, the hearer is free from the possibility of losing face. The positive politeness strategy is used to reduce the threat to the hearer's positive face while the negative politeness strategy is less imposing on the hearer using "distancing styles like using modal verbs or hesitation, apologizing for imposition, asking questions or asking for permission to ask a question" (Adel, Davoudi & Ramezanzadeh, 2016, p.50). 'Facework' happens almost naturally in face-to-face interaction and speakers are consciously aware or maintaining cooperative behaviour while interacting. In online forum discussion, however, participants are strangers to one another and face maintenance become a challenge. 'Facework' happens almost naturally in face-to-face interaction and speakers are consciously aware or maintaining cooperation while interacting. This paper explores how online forum participants realise their interactional strategies while attempting to create an online learning community.

METHODOLOGY

Participants

The participants for this research consists of 381 learners enrolled in the Bangladesh College Education Development Project (BCEDP) under the University of Nottingham Malaysia Campus

(UNMC). They are pursuing Masters in Educational Leadership and Management degree, their second postgraduate qualification. Among them are policy makers, master trainers, college principals and college teachers specialising in different disciplines including Physics, English, Political Science, Economy, Quranic Studies and Engineering. As part of their course, they are required to achieve at least a Band 4 in the Malaysian University English Test (MUET). To assist them in acquiring the required English language qualification, UNMC sought the assistance from Universiti Teknologi Malaysia (UTM) MyLinE Taskforce. Being the owner of MUET online learning resources recognised by the Malaysian Examination Council (MEC), the taskforce is entrusted to train these learners through face-to-face (F2F) and online teaching and learning. The F2F training takes place over a duration of 36 hours over three weekends. The online learning is carried out over two semesters through a dedicated microsite in Online Resources for Learning in English (MyLinE).

ELSP@Nottingham(UNMC) Microsite

Apart from monthly language learning activities that the learners have to complete, the microsite also houses several forums. These quizzes and the forums in the microsite are created to support English language learning for the learners in preparing them to sit for MUET. They are encouraged to express their thoughts and ideas on the topics posted online by the instructor.

Table 1. Topics in the Online Forum

Forum	Topic	No. of Posts
1	<p>Mobile apps: boon or bane?</p> <p>Hello to all! With the staggering number of mobile subscribers (almost 80% of the world's population) being online, the demands for apps have increased drastically. From your point of view, what are the advantages and disadvantages of apps for students? Do apps help students or just waste their time?</p> <p>Share your thoughts and ideas in at least ONE POST with a minimum of 50 words per post.</p>	225
2	<p>Teenagers and Emotional Intelligence</p> <p>Good day to all! Let's talk about emotional intelligence. We need to combine technological fluency with emotional intelligence in order to be successful in this increasingly digitalised world of ours. What are the ways to help teenagers develop emotional intelligence?</p> <p>Share your thoughts and ideas in at least ONE POST with a minimum of 50 words per post.</p>	157
3	<p>Entrepreneurship Programmes for Youths</p> <p>The community in which you live wants to organise a programme for its youths. The community thinks entrepreneurship programmes such as online and</p>	

	coffee/food truck businesses would definitely attract teenagers' participation. Do you agree? Share your thoughts and ideas in at least ONE POST with a minimum of 50 words per post.	110
4	The Most Important Factor to Consider when Applying for Enrollment into a University Do you agree that the reputation of a university is the most important factor to consider when applying for enrollment into a university? Share your thoughts and ideas in at least ONE POST with a minimum of 50 words per post.	122
	Total number of posts	614

Procedure and Data Collection

Before the learners were allowed to participate in the forum, they were taught how to navigate the microsite. They were given hands-on experience to practise writing a post in the forum. The instructor also briefed them about the tasks that they have to complete in the forum; the participants were required to participate at least in one forum per month for a year. There were no restrictions on which forum they want to participate. The instructions given to the learners were as follows:

- 1) You should write not less than 50 words for each comment
- 2) You may reply to any comment
- 3) You may ask questions and refute others' point of views

The aim of briefing the learners was to create an interaction that can motivate them to communicate and start using the language they already have. Five language instructors monitored the forum and prompted learners to respond and occasionally provided feedback. Once the period ends, the instructors recorded all online communications that took place in the four forums from September 2018 to September 2019 to determine the politeness strategies used by the learners in the online forum. In total, the data comprises 614 tokens (referring to the number of posts) from four different topics as shown in Table 3.1 below. The prompts were purposely designed to be similar to MUET writing prompt, where they have to agree or disagree with the topic given.

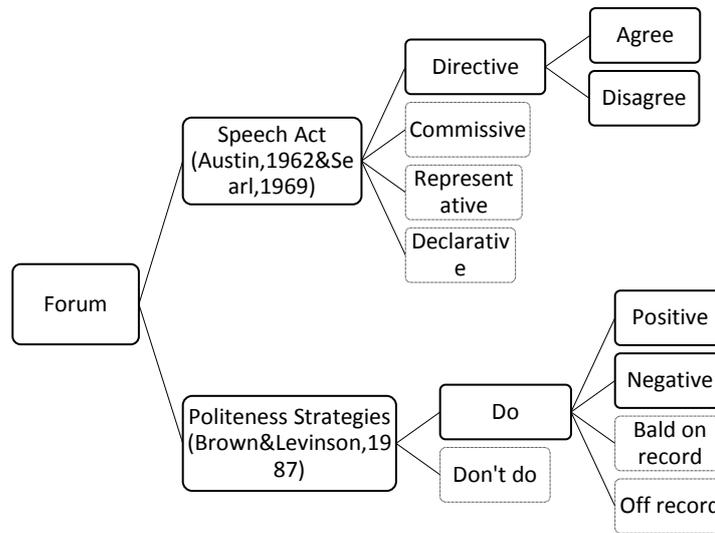


Figure 1. Research framework

As this study aims to describe politeness strategies adopted by adult learners in asynchronous online forum discussions, the data was analysed according to these two steps. Firstly, posts that are related to the ‘agreeing’ and ‘disagreeing’ speech acts, as suggested by Austin (1962) and Searle (1969) were identified. Next, the speech acts were then analysed to examine the types of politeness strategies employed by the learners using Brown and Levinson’s (1987) politeness strategies framework.

FINDINGS AND DISCUSSION

The aim of this research is to find out the preferred speech acts used by the learners in four forums. Below is the analysis of the forum posts that shows an overall summary of the findings.

Table 2. Summary of the Tokens in the Online Forum

FORUM	NO. OF POSTS	AGREEING ACT (134 tokens)		DISAGREEING ACT (29 tokens)	
		Direct	Indirect	Direct	Indirect
TOPIC 1	225	11	0	3	5
TOPIC 2	157	11	3	0	4
TOPIC 3	110	36	49	0	5

TOPIC 4	122	23	1	2	10
TOTAL	614	81	53	5	24

Table 2 shows the total number of posts that were recorded in the forum. However, the focus of this paper only concentrates on the acts of agreeing and disagreeing. Out of 614 posts identified, only 163 posts were speech acts of agreeing and disagreeing. The balance posts (451) were off-topic, merely repeating the questions, or plagiarising which do not fulfil the task requirement. This could be due to the background of the learners. Since these learners are adults who are working full time, majority of them only fulfil the minimum requirement of the task due to time limitations.

As can be seen in Table 2, the act of agreeing (134 tokens) outnumbered the act of disagreeing (29 tokens). Pomerantz (1984) highlights a similar trend in her study where participants preferred to agree than disagree. This trend can be seen in this study where most participants expressed that they shared the same views with the prompt and earlier posts of their fellow learners. This is indeed not surprising as agreeing is easier to do. They simply repeat fellow learners' ideas or paraphrase their ideas. When they expressed agreement, they used positive tone when supporting or responding to fellow learners' responses to maintain a good rapport among them. This could be supported by the claim that the act of agreeing is more straightforward and can be done without hesitation, and the structure of agreeing speech act is simpler compared to disagreeing speech act (Pomerantz, 1984). Example 1 below typifies the agreeing act done in the forum.

Example 1

Hi Mr Anarul You have written excellent. I agree with you. In addition to Teenagers can do everything. Though they are juvenile, their behavior like adolescent. They can not take a right decision all time. This period as a leader/judge they give capital punishment or no punishment at all. They can not measurement properly. That's why to take some important decision we should help them as a guardian.

In contrast, disagreeing is a lot more difficult to perform as it is more linguistically challenging. Disagreeing speech act has other more complicated strategies. Hence, the act is usually delayed because of hesitation, questioning and clarification (ibid.). Besides, learners need to take a stance, justifies their reasons and provide alternatives. These require a lot more linguistic effort and while they are doing this, they need to do a lot of 'facework' – the positive public image people seek to establish in social interactions (Goffman, 1955). Thus, learners need to choose and justify their words carefully so that they do not come off as too forceful. Pomerantz (1984) emphasises that disagreeing speech acts are more convoluted with efforts to maintain face of their interlocutor and hearer and to minimise the threat.

Table 3 summarises politeness strategies adopted by learners when agreeing and disagreeing. In this study, we looked into three politeness strategies as outlined by Brown and Levinson's (1987). Based on our initial findings there are two prominent strategies which are positive politeness and negative politeness.

Table 3. Politeness Strategies Adopted by Learners

FORUM	AGREEING (134 tokens = 82%)		DISAGREEING (29 tokens = 18%)	
	Positive Politeness	Negative Politeness	Positive Politeness	Negative Politeness
TOPIC 1	11	0	6	2
TOPIC 2	14	0	4	0
TOPIC 3	76	9	1	4
TOPIC 4	24	0	2	10
TOTAL TOKENS	125 (93%)	9 (7%)	13 (45%)	16 (55%)

As can be seen in Table 4.2 above, majority of the tokens found was agreeing speech act. When they expressed agreement, the learners opted to use positive politeness strategy (93%) compared to negative politeness (7%) strategies. The learners opted for positive politeness strategy mostly when agreeing with others probably because they recognised the presence of other learners' stance and respect the differences in opinions. Positive politeness refers to an act that concern on the 'facework' in the sense that the speaker highly anticipate his/her face and the hearer's face (Brown & Levinson, 1987). In other words, positive politeness means the speaker wants to give a good impression and at the same time the speaker wants the hearer to like him/her. An example of positive politeness strategy can be seen in the extract below:

Example 2

Hellow, How are you? I am completely agree with you about the teenagers and immotional intelligence. Teen age is very important period of every human life. This is very immotional time for every body. Physiological developments are going on in the body and mind of a teen agers very rapidly. So in this time they can realize every things easily. But it is a matter of great thinking that they do not understand the reality. This is very dangerous for the teenagers. So guardians should be very careful about their childrens

The learners were also found to use negative politeness strategy (7%) when expressing agreement. This could be because negative politeness strategy enhances prestige and power (Takano, 2005). However, in the context of online forum, this is not a common strategy use for agreeing as this

would provide social gap between learners. Positive politeness, on the other hand, are largely employed by the participants because it helps to minimize social distance and stimulate friendly responses from their friends. Thus, they opted for positive politeness rather than negative politeness when expressing agreement. However, we did find a small number of posts that used negative politeness to agree. An example is shown in the extract below:

Example 4

In fact it seems charming that online and coffee business will attract youth. But technology advancement is a precondition for succeeding this thought. If the community lacks of technology, then it cannot motivate youths. Similarly some countries posit social values which can prohibit them to stand against coffee business. In fact these motivation can be very effective in those countries which have advancement in technology as well as social values.

However, these findings are different from the findings in a study done by Correo (2014) who investigated politeness strategies in an asynchronous online discussion forum. The study found that about 90% of the participants used negative politeness while interacting in the forum. This could be due to the nature of the discussion topics. The topics chosen for this study's forums are issues pertaining to entrepreneurship, education and youth while Correo's (2014) online forum topic is related to politics. She further stated that discussing political related matters deal with political debate that would normally involve criticising 'divergent political stances' (p. 6). This explains why negative politeness strategy was used more often than positive politeness strategy in his or her study.

It is also found that off-record strategy was never used by learners in all forums when agreeing with fellow learners' views. This could be because the strategy requires the learners to give hints or clues and be ambiguous with their utterances (Maros & Rosli, 2017) in which the learners were not capable of due to their low English proficiency. Because of this, the learners tend to be direct when agreeing and disagreeing with the prompts in the forums and with each other's posts.

In general, out of the 29 disagreement tokens recorded, 45% were positive politeness strategy. One of the ways of doing so is by making false agreement (Brown & Levinson, 1987). This is also supported by Pomerantz (1984) and Mulkay (1985) who claimed that people disagree by prefacing their disagreements with agreements. They want to reduce face threat by hedging on their commitment to disagree. An example of that particular strategy is shown below:

Example 5

Dear

Thank you very much for start this subject as a topic for forum. You have already introduced some points which are the factors to consider when applying for enrollment into a University. All the factors are considerable but in my sense the most important one is tuition fees. In some cases some brilliant students can not enrolled themselves only lake of sufficient money. So renowned Universities authority can offer sufficient scholarship for those type of students.

However, 55% employed negative politeness strategy when expressing disagreement. This is because as an interlocutor, we need to do a lot more ‘facework’. The learners might not know this as they do not possess the sophisticated linguistic knowledge to do that. An example of negative politeness strategy when expressing disagreement is shown below.

Example 6

dear all my colleagues, good afternoon, hope I am agree with you about the importance the applying for enrollment into a University. But I have some important idea about enrollment into a University due to lack of knowledge, inability to understanding their theme, prospectus, logo and other important criteria. not only this I have thinking about the university profile, destination, locations, positional structure, sub area of hall, canteen, dormitory, teachers cottage , staff room and many others important things is needed to enrollment for entering a renowned university, The reputation of a University is first criteria to enrollment because the first things are the environmental conditions , the area of establishment, the historical background, the teachers quality, the experienced staffs, the administrator for betterment of enrollment

Similar to agreeing speech act, disagreeing speech act also does not contain off-record strategy since it requires learners to provide hints or clues when stating their disagreements. This strategy requires sophisticated language skills which include the ability to be non-coercive and non-threatening to the other learners.

CONCLUSION

This study draws upon Brown and Levinson’s politeness strategies in order to examine the acts of agreeing and disagreeing by learners in asynchronous forum discussions. The most common strategies observed in the forum are positive politeness strategy, negative politeness strategy and bald on record strategy. Among the three politeness strategies that were observed, the learners were shown to use more positive politeness when agreeing or disagreeing. Being adult learners, they were aware of maintaining and saving face, both of themselves and others. The overwhelming acts agreeing that outnumbered the disagreeing could be that there is an easier option for them to take and to complete the task within the time frame given. Also, as participants are professionals, they may be very conscious of saving their own face, thus, overwhelming option for choosing positive politeness strategies. However, to prepare participants for real communicative task, we still need to teach them the act of disagreeing and equip them with the appropriate expressions and strategies while maintaining set communicative goals. The tasks assigned also play a role in the quality of the students’ responses. Students can relate better with the topics that are close to their hearts and topics that they are passionate about. The tasks must also not run for too long. This will not guarantee a vibrant discussion and interests cannot be maintained. A big number of participants in the forum could also become a factor for less than vibrant participation. This is because learners will be pressured to respond and feel overwhelmed. The instructors must take all of these factors into consideration so that the tasks prepared for the students will be beneficial and discussion will appear fresh and interesting.

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THE COMPREHENSION THEORIES OF CONTINUOUS INTENTION TO USE TEL WITH E-LEARNING MODELS IN EDUCATIONS

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ABSTRACT

This study analyses comprehensive of the existing theories that validate the accuracy of technology acceptance models (TAM). Also, examining the adopted TAM factors in conjunction with massive open online course (MOOC) features for continuous intention to use. The main problem phased TAM is the adoption of the right factors used for modelling design. The objective is to come out with the common factors could be used in e-learning. The method of this study is based on the combination between the application of technology-enhanced learning (TEL) techniques factors and the facilities of e-learning factors. This combination can be tested by adopted model as it provides flexibility to both lecturers and students. The finding shows the variety additional factors used as of academic performance, and TAM factors with continuous intention to use e-learning are significant positive values for e-learning in educations.

Keywords: TEL, E-Learning, Continuous Intention, MOOC.

INTRODUCTION

Over the years Technology Enhancement Learning (TEL) services have improved the continuous intention to use e-learning in educational institutions. E-learning has many definitions, one of provides lecturers with a medium to easily disseminate their knowledge with interactivity that provides effective learning skills freely without being constrained to a specific space and time (Hone & El said, 2016). The e-learning mechanism is suitable for high education students that have experience in using technology and familiar with filling its needs (Hamidi, & Chavoshi, 2018). The overall use of e-learning is to help increase the level of continuous intention to use through satisfaction of student's communications and interactivity factors with technology acceptance model (TAM) factors.

In academic teaching and learning development process, e-learning has become one of the most common methods used in the educational learning process. However, e-learning process is faced with several issues that affect lecturer and student satisfaction on continuous intention to use. Thus, there is a need for institutions to evaluate their educational learning process towards improving the academic performance of their students through development the continuous intention to use e-learning system. Similarly, the literature on the continuous intention to use e-learning system is in infancy and there are fewer studies that developed electronic/trusted of use, assist, assessment and continuous intention to use e-learning system that is in line with Higher Education Institutes (HEI) requirements to ensure that all quality assurance elements are properly implemented. These studies depend on independent and control factors. Accordingly, the control factors are the most related to effectiveness, and student satisfaction towards attaining lecturer and student continuous intention to use, while, the independent factors include interactivity, course content, technology integration, student perception, and teacher subject knowledge (Larsen, 2009, Tawafak, et al., 2019). In this study, factors of perceived usefulness, perceived ease of use, and behavior intention from (TAM) were integrated into the identified independent and control factors (Tawafak, Romli, Arshah, 2018).

Historical development of educational institutions from the year 2000 to 2018 shows that there have been changes that are closely linked to differences in technology development. These changes started with simple training in classical education to virtual education where the educational system reflects the educational needs of technology learning. Therefore, technology-enhanced learning (TEL) applications is an important area that requires in-depth study in higher educational institutions (Wang & Hannafin, 2005). Moreover, there is the growing popularity of TEL as a new type of e-learning system practice which is utilized nowadays to mediate, support active learning and further create collaboration among students via web-based technologies. Many application learning systems like Wiki and Web 2.0 based, offer association between lecturers and learners towards continuous intention to use application system. Also, it gives the learner to study with confidence in improving their learning methods and their skills. This paper divided into five parts. First, the literature review to explain the previous studies related to e-learning and TEL development. Second, the comprehensive acceptance theories used in e-learning continuous intention to use with shows different methodologies proposed by other studies for testing the acceptance model. Third, the regression tools that pointed out to use TAM as the best theoretical model. Fourth, the results of the pilot study applied at Al-Buraimi College (BUC) in Oman. Fifth, the conclusions and contribution of this study.

LITERATURE REVIEW

In this section, there are 5 studies collected from an open database of journals and conferences proceeding related to the acceptance models for using e-learning with TEL approaches to enhance the continuous intention to use e-learning system. Many studies used Massive Open Online Courses (MOOC), which is the most world common use of platform utilized by universities (Huang, Zhang, & Liu, 2017; Wu, Chen, 2017). These electronic applications provide information to lecturer and administrators on the current state of their students in terms of learning achieved (Tawafak, et al., 2018). Thus, it should include the continuous intention to use e-learning system through the whole of learning identification items.

Findings from researchers such as Wu & Tai (2016); Wang & Hannafin (2005); Tawafak et al., (2018); Lee (2010); Wu & Chen (2017) suggested that the use of technologies such as Wiki chat, multimedia program, and e-learning system are only applicable to describes the outcomes of individual variables in providing the continuous intention to use of each approach. However, the authors mentioned that the aforementioned approaches are less applicable in explaining the effect of the factors from different theories to enhance continuance intention to use e-learning system (Wu & Tai, 2016; Tawafak, et al, 2018).

A lot of studies utilized technology acceptance theory (TAM) in exploring factors that influence in TEL and e-learning system adoption (Wang & Hannafin, 2005; Tawafak et al., 2018; Lee, 2010). A few theories were constructed in the continuous intention of use. The studies intention on significant factors moreover than an intention on continuous intention to use. There are many theories presenting the technology theories adoption, including Theory of Planned Behavior (TPB) by Ajzen (1991), Theory Acceptance Model (TAM) by Davis (1989), Theory of Reasoned Action (TRA) by Ajzen (1973), Task-Technology Fit (TTF) by Islam (2016), and Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh (2003). In this paper, the authors focus on two models TAM and UTAUT. Also, explain with more adoption to TAM and new constructs as healthy factors in e-learning system (Wu, & Chen, 2017; Mullen et al., 2017; Ifinedo, Pyke, Anwar, 2018).

As such, recent studies (Huang, Zhang & Liu, 2017; Hone & El said, 2016) related to MOOC have been published to examine how Massive Open Online Courses (MOOC) as an educational model attempt to go extend the direct factors proposed in TAM model. Both studies have been published that focused on the learning process involved factors like course content, teacher-subject knowledge with the interactivity to improve the effectiveness of continuous intention to use e-learning. These studies are mainly focused on exploring how lecturer, student, and technology are contribute to improve the continuous intention to use e-learning system. The identified factors from the Technology Acceptance Model (TAM) by Davis (1989) include perceived usefulness, perceived ease of use, and behavior intention. These factors help to investigate the differences between the individual's implementation of e-learning.

Furthermore, prior studies (Huang, Zhang & Liu, 2017; Hone & El said, 2016) examined MOOC in an attempt to examine the main factors proposed in TAM in conjunción with task-technology-fit (TTF). Conversely, this research integrates continuous tintention to use factors of TTF and TAM to develop an improved comprehensive model of the factors required to examine continuous intention to use e-learning. Findings reveal the suggest that several technologies aimed to investigate the continuous intention to use e-learning for higher educational students. Besides, findings from previous studies are mostly focused on the impact of students, lecturer, and technology on continuous intention to use e-learning system.

ACCEPTANCE THEORIES WITH E-LEARNING

There are many types of theories that used e-learning for validating and testing the continuous intention to use. Additionally, e-learning system can be employed to measure the lecturer experience and student satisfaction in acceptance of a variety of application systems used to improve the continuous intention to use. Table 1 shows the potential of different acceptance theories used for the continuous intention to use e-learning.

Table 1. Comparisons between existing Theories

Authors/Year	Research Objective	Theories Used	Mechanism Applied
Chen (2010)	Examine factors that influence e-learning adoption	TAM	Develop students learning outcomes and enhancing academic performance.
Islam (2016)	moderate student learning and lecturers teaching outcomes	TAM	Used different constructs and teacher experience as a moderator
Larsen (2009)	Examine the acceptance of model use.	TTF	Use of different technologies to evaluate the continuity
Papastavrou, et al., (2016)	Use of UTAUT toward engagement of technology continuous intention to use.	UTAUT	Survey distribution. Application model test Web 2.0 technology, and Blog tool
Ajzen, 1973	Understanding of major factors of belief and behaviour towards continuous intention to use.	TPB	Use of internet connection and web 2.0 technology.
Wu, Chen (2017)	Integrate TAM and MOOC for continuous intention use	TAM&TTF	Survey and web 2.0 technology

Figure 1. shows combined models of TAM and TTF factors to enhance the continuous intention to use e-learning system. TAM factors include perceived usefulness of using e-learning to get better information technology for students, perceived ease of use refers to the student predict to select the easy way of learning to understand the course offered in e-learning system. Attitude refers to the acceptance level of students influence positively towards continuous intention to use e-learning system. On the other type of testing models is Task-Technology Fit (TTF). This model used influence between the social community and TTF, and model feature influence to perceived ease of use in TAM. The outcome from this model is to test the continuous intention to use e-learning.

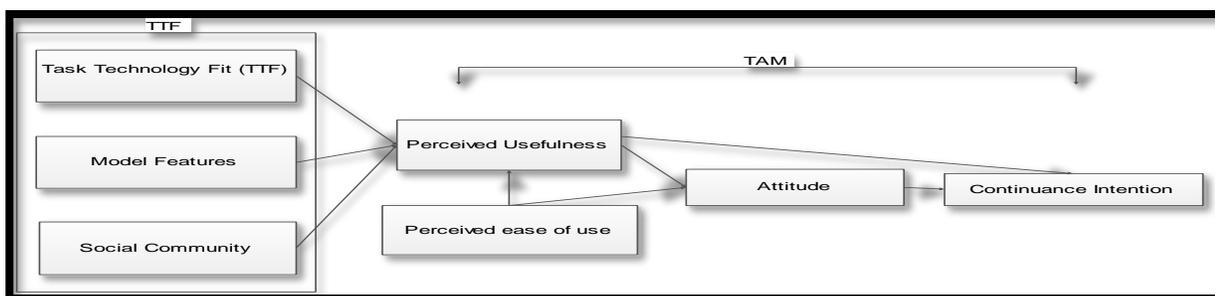


Figure.1. TAM and TTF Model for continuous intention to use (Wu, & Chen, 2017)

Figure 2. shows TPB theory that have different types of factors here their influence relationships between attitude toward behavior (A), subjective norm (SN), perceived behavior control (PBC) toward intention then results moved to behavior (Ajzen, 1973). This theory tests the acceptance of continuous intention to use but its work for organizational level for individual as this paper works on student in individual context. Therefore, this theory not highly recommended in this paper to use its factors to test continuous intention to use e-learning system in educational sector.

Figure 3. shows the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). This model constructed on four factors. The influence relations between performance expectancy (PE), effort expectancy (EE), social influence (SI) toward behavior intention. Besides, the facilitating conditions (FC) influence positively towards use behavior (UB). The performance expectancy and social influence, produce the UTAUT model with a high level of acceptance on continuous intention to use e-learning system. Besides, UTAUT is connected to MOOC to investigate the factors of the Wiki system on behavior intention to continuance intention to use. This study came with approving of using Wiki for continuance intention to use e-learning system.

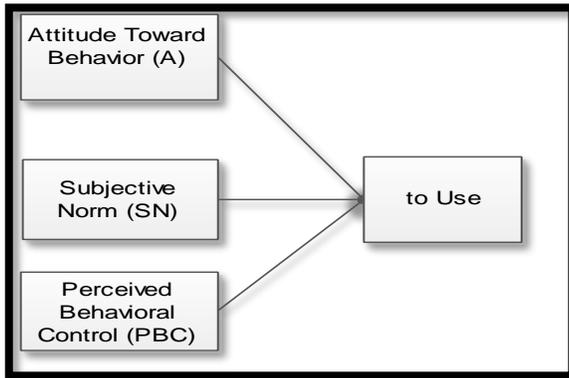


Figure 2. TPB Model

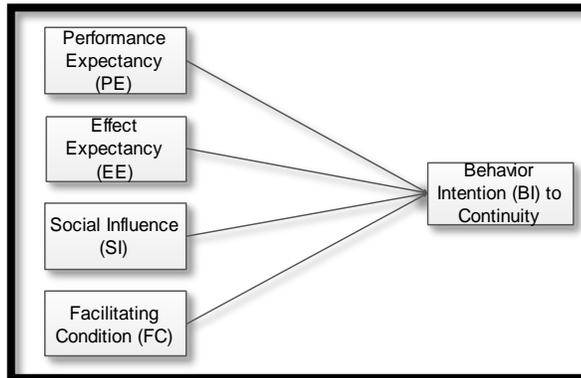


Figure 3. UTAUT Model

Moreover, Figure 4 shows adopted task-technology-fit (TTF) model, were the finding reveals the technology integration and interactivity are required to address the limitation to achieve more development for improving continuous intention to use MOOC as type of e-learning system (Mullen, et al., 2017).

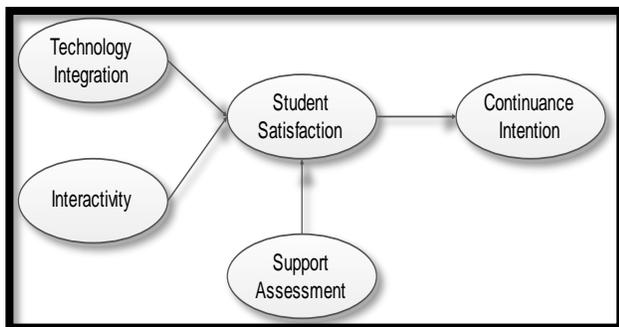


Figure 4. Satisfaction of Continuous use

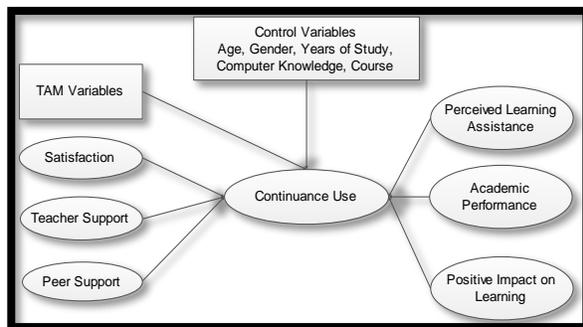


Figure 5. Model of Continence Use Impacts

Figure 5 shows another adapted TAM with extra factors used commonly in e-learning model. The relationship suggests that when the student participates in an e-learning system their academic performance is improved. The relationship further states that as the number of engagement students

increases, their learning outcomes improve due to the effectiveness of sharing of course materials online. These additional factors include satisfaction, teacher support, peer support and closed work with TAM factors to enhance the continuous intention to use e-learning system (Ifinedo, Pyke, Anwar, 2018; Tawafak, Romli, Arshah, 2018).

E-LEARNING REGRESSION ON ACCEPTANCE MODEL FACTORS

The regression of e-learning system has a different effect on learning feedback and acceptance accuracy. The relationship between using TEL tools and e-learning system will be converted to the right effect on which theory proposed to use for sure the continuous intention to use e-learning system. Table 2 shows the connection between applications and best theory model for this. This relationship has significant result with continuous intention to use. Table 2, refer to nominated TAM as the most common theory used to enhance continuous intention to use e-learning system.

Table 2. Connected Application Attributes and Reflection on Model Acceptances

Application	Attributes	Reference	Theory
Peer- 2 -peer observation	-Sharing information's objectives -Submit advice from expert learners -Consultant the assignments with best outcomes -Corporate learning procedure -World wild channel between learners	Wu, Chen (2017)	TAM
Wiki program	-Online discussion -Review course material -Guidelines of assignment previous samples -A large number of contacting teacher-student	Tawafak, Romli, Alsinani 2018	TTF, TAM
Video Blog	-Linked related to specific topics -Open access learning -Allow feedback collaboration	Wu, Chen (2017)	UTAUT
E-textbook	-Download PDF, slide-presentation, assignments word reports	Chen (2010)	TAM
Online Assessment	-Evaluation of submitted reports complexity, Similarity, Ideal, Correctness	Islam (2016)	TAM, TTF
Online quiz	-Testing knowledge skills -Timer and Right answers selection -Knowledge acquis	Wu, Chen (2017)	TPB, TAM, TRA

EXPERIMENT AND RESULTS

A pilot test was conducted before the final version of the questionnaire was distributed to the respondents on first semester 2017'18. Tawafak, et al., (2018) have suggested that before collecting data; applicable statistics from the original study is to be calculated to ascertain reliability. The pilot questionnaires were sent to the participants via email. Table 3, shows out of all questionnaires distributed, 12 questionnaires

were responded to be usable responses representing a response rate of 80%. The internal consistency of the items was measured by using Cronbach 's alpha analysis. Since the Cronbach 's alpha fell within the acceptable range (0.731 to 0.953) > 0.7), the reliability of the scale was confirmed. In this study many constructs are tested, some of these constructs that added from Mullen, et al, 2017 and the constructs that tested by Ifenido, et al., 2018, are also tested in this study by different items and with alpha Cronbach's results in all constructs above 0.7. table 3, explains results of PU=0.916, PEOU= 0.953, TI= 0.873, SA=0.759, AP= 0.845, BI=0.889, and SAT= 0.731, respectively.

The participant that was selected for data collection received a preliminary declaration stating that the analysis is voluntary and that their anonymity will be guaranteed if they chose to complete the study. Likewise, a panel of four experts consisting of English department members checked the grammar errors, while qualified and expert members of the IT department checked the understanding and meaning of the terms used in the survey.

Table 3. Pilot Study Using SPSS Alpha Cronbach's Evaluation

Construct	No. of Items	Alpha Cronbach's
Perceived Usefulness (PU)	2	0.916
Perceived Ease of Use (PEOU)	2	0.953
Technology Integration (TI)	2	0.873
Academic Performance (AP)	2	0.845
Behavior Intention (BI)	2	0.889
Satisfaction (SAT)	2	0.731

The SPSS was used to analyse the results from Al-Buraimi College (BUC) in Oman. The data were confined through both the hard copy distribution-based data survey with an online survey link to be filled by participants. The survey is utilized with BUC scientific sections.

Table 4. Questionnaire of the Study

Variable	Code	Measures	References
Perceived Usefulness	PU1	E-Learning systems enhance my effectiveness	Ifinedo, et al,2018, Wu & Chen, 2017
	PU2	E-earning systems improves my academic learning performance	
Perceived Ease of Use	PEOU1	E-earning systems is easy to use	Ifinedo, et al, 2018
	PEOU2	It's easy to get materials from E-Learning systems	
Technology Integration	IT1	The interactive content of E-Learning systems effectively communicated from the same course	Peltier et al., 2003, Hone, 2016
	IT2	The interactive content of E-Learning systems included information not covered in printed material of the same course	
Academic Performance	AP1	I anticipate good grades in courses where Learning systems is used heavily	Ifinedo, et al, 2018

	AP2	I anticipate better grades in classes where E-Learning systems is used heavily compared to where they are not used	
Behavioral Intention	BI1	I found myself considering the new information with E-Learning systems when taking action related to the topic.	Hwang, et al, 2018,
	BI2	It is worth to recommend the E-Learning systems for other students.	
Student Satisfaction	SS1	E-Learning systems is user-friendly	Ifinedo et al, 2018
	SS2	I am really happy with E-Learning systems after using it	

CONCLUSION

This paper explained the comprehensive methods used in e-learning system in the educational area. Previous studies used to analyse the selected variables that have a high effect on the continuous intention to use e-learning. Many theories are used to enhance continuous intention to use e-learning that seen in the literature review. This paper contributes the recommendation to use TAM with adoption to enhance continuous intention to use e-learning system. This adopted TAM with many adjusted constructs as student satisfaction, continuous intention, academic performance, and technology integration with perceived usefulness, perceived ease of use, and behaviour intention give significant results for continuous intention to use e-learning system. The SPSS program showed high reliability and validity of the examined survey. This paper is part of a doctorate in Computer Science and Software Engineering at UMP- Pahang-Malaysia.

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INVESTIGATING STUDENT'S CONCEPTUAL CHANGE OF SCIENTIFIC CONCEPT WITH AUGMENTED REALITY

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ABSTRACT

In an era of rapidly changing technologies, Augmented Reality (AR) technology has received increasing emphasis and widely used among educational practitioners and researchers. With the unique capability to display computer-generated information on top of a view of the real world, the comprehension of environmental could be enhanced. The effectiveness of AR in education has been well established. However, relatively little have been done regarding the integration of AR to promote conceptual change of scientific concepts. Therefore, this study will focus on the effect of AR on facilitating the conceptual change of scientific concepts among primary school students. A pre-experimental of one group pre-test and post-test research design was used. The students involved in this study consisted of 34 primary school students. The results of the pre-test and post-test analyses indicated that before learning through AR, the student's conceptions are very disorganized. However, most of the students managed to shift from misconception to had a scientific understanding after learning through AR. These findings indicated that AR should be integrated in education to assist the conceptual change.

Keywords: Augmented Reality, Multimedia, Conceptual Change, Education

INTRODUCTION

The integration and rapid advances in innovative new technologies have profound implications for education field. The technology can offer huge benefits to the educational systems where it can influence and revolutionize the way educator teaches and the way student learn. In an era of rapidly changing technologies, Augmented Reality (AR) technology has received increasing emphasis and widely used among educational practitioners and researchers. Generally, AR can be referring to technology that displays digital information such as images, sound, and video on top of a view of the real environment (Ibanez, 2018). AR have been gaining considerable attention in education field due

to their massive potential to enhance the comprehension of abstract concepts and construct new understanding (Yoon et al., 2017) in a more interactive way. AR have been recommended to be integrated in a teaching and learning process due to the unique ability that able to overlay the virtual object in a real world that might unachievable with the use of other technologies.

The usefulness of AR in education has been well established in the literature. However, there is little principled empirical work that has been carried on the issue of conceptual change with the use of AR that remains relatively unexplored (Yoon et al., 2017). The term conceptual change refers to the development of fundamentally new concepts, through restructuring elements of existing concepts, in the course of knowledge acquisition. In the enthusiasm for promoting AR as a major factor for education, there is a need to investigate the effect of AR in promoting conceptual change and help students dispel misconceptions. Previous studies on science education has discovered that students commonly hold robust misconceptions that are fundamentally contrary to actual scientific concepts. These pretentious ideas are typically labeled as an alternative ideas or misconceptions in science education (Vosniadou & Skopeliti, 2017). According to Taber (2017), the alternative frameworks that students possess are beliefs and perceptions that differ from the beliefs of scientists. Students will hold this belief firmly and will affect their learning and this may cause their losing interest in the subject, which would later render their negative attitude towards learning.

Hence, it is a great need for effective teaching tools that assist students in restructuring and changing their existing conceptual understanding. In traditional method of instruction, teachers spend most of the in-class time giving lectures (Chang & Hwang, 2018) and the learning material were also based on static materials (Wong, 2018). Students rarely have chances to gain more understanding due to static materials that unable to show any information in a dynamic way where the contents required to show that motion and continuous movement to represent the concept. Thus, AR may have the potential to situate students in conceptual knowledge development. Therefore, this study aims to investigate the effect of AR toward student's conceptual change of scientific concept.

LITERATURE REVIEW

AR brings virtual information to any indirect view to allow user interact with the real world. Many studies have reported the learning application of AR in many educational contexts as shown Table 1. In addition, the educational advantages of AR also have been explored and summarized in Table 2.

Table 1. Educational context of AR application

Educational Contexts	Researchers
Humanities and arts	Di Serio, Ibáñez & Delgado (2013); Liu & Tsai (2013); Pucihar & Kljun (2018)
Medical Education	Calle-Bustos, Juan, García-García & Abad (2017), Kobayashi, Zhang, Collins, Karim & Merck (2018)
Museum education	Chang et al., (2014), Yoon, Anderson, Park, Elinich & Lin (2018)
Physics	Akçayır et al. (2016), Cai et al. (2017), Frank and Kapila (2017)

Earth Sciences	Bursztyn et al. (2017), Chen and Wang (2015), Tarng et al. (2016), Phon et al. (2015)
Life Sciences	Chen et al. (2016), Huang et al. (2016), Zimmerman et al. (2016)
Mathematics	Cascales-Martínez et al.(2017), Gutiérrez de Ravé et al. (2016)
Biology	Safadel & White (2019), Erbas, & Demirer (2019), Garcia-Bonete, Jensen, M & Katona (2019)
Chemistry	Irwansyah, Yusuf, Farida & Ramdhani (2018), Berson, Shin, J., & Jenkinson (2018)
Astronomy	Patricio, Costa, Carranca, & Farropo (2018), Sirakaya & Cakmak (2018)

Table 2. Educational context of AR application

Advantages of AR	Researchers
Ensure long term retention	Cai, Chiang, Sun, Lin, & Lee (2017), Sommerauer, P., & Müller (2018)
Enhancing spatial skills	Cuendet et al., (2013); Lin et al., (2015), Han, Jo, Hyun and So (2015),
Improve learner's understanding	Chen et al., (2016), Tarng et al., (2016)
Ensure high-level cognitive outcomes	Cascales-Martínez et al., (2017), Chen et al., (2016) Enyedy et al., (2015)
Support fun learning	Ibáñez, Di Serio, Villarán and Kloos (2014), Yilmaz (2016)
Encourage positive attitudes	Akçayır, Akçayır, Pektaş and Ocak (2016), Hwang, Wu, Chen and Tu (2016), Lu and Liu (2015)
Enhancing motivation	Sumadio and Rambli (2010); Serio, Ibanez and Kloos (2013)
Enriching interaction	Bujak et al. (2013); Wojciechowski and Cellary (2013); Wu et al. (2013)

METHODOLOGY

As an educational potential of AR is just beginning to be researched and mostly applied in higher education settings (Yilmaz, 2017), an experiment in this study was conducted on primary school student. The selected unit of scientific concept was on the astronomical concepts as student have difficulties in explaining the basic natural phenomena (Slater, 2018).

Research Design

A pre-experimental of one group pre and post-test design was adopted as research design in this study. This study examined how student's understanding was change from misconception to scientific concept after learning through AR. This study comprises of three main phases: i) pre-test, ii) AR application and iii) post-test.

Participant

The participant involved in this study comprised of 34 students (32% male, 68% female) from one of the 5th grade primary school in East Malaysia. The justification for specifically targeted students in this grade because some of the concept of astronomy is first introduced in 5th grade.

Instruments

Two research instruments of this study included the pre-test and post-test and AR application. The pre-test and post-test was constructed to measure students' understandings of the targeted astronomy concepts on a movement of the earth, the moon and the sun before and after learning through AR. The questions in both test were referred to the textbooks and teaching materials and validated by the two subject matters expert with more than 5 years of experience in teaching science course.

An AR application was developed in a form of AR educational book to help students learn and overtake misconceptions about science concepts. For the development process, the 3D virtual objects were prepared using an Autodesk Maya and the AR platform was developed using Unity 3D. The programming language used to develop this application is C#. This application looks like a normal educational book, but there are AR markers were incorporated in the interface. This AR educational tool enabled the webcam/camera to recognize pages in the book and turn them into 3D presentations. The virtual objects can be manipulated using real physical AR markers by just using bare hand. Each page of the developed AR application consisted of notes, pictures and AR marker that represent the virtual objects. There are also the instructions listed below the notes part that will guide the user which marker to use. All the content was presented by the virtual objects of 3D animations and it can be observed from different point of views. After starting the system, the students are able to make exploration and manipulation towards the pattern markers to illustrate virtual objects in order for them to understand the content better. They can see the 'real' earth, moon and sun which are represented by 3D effects and animation. The virtual objects will be rotate and revolve represented through animation. When a webcam detects a marker on a book, the AR software will create a virtual object which can be manipulated by rotating or tilting the AR pattern or book. Fig.1 illustrated the AR development process and the output of the application.

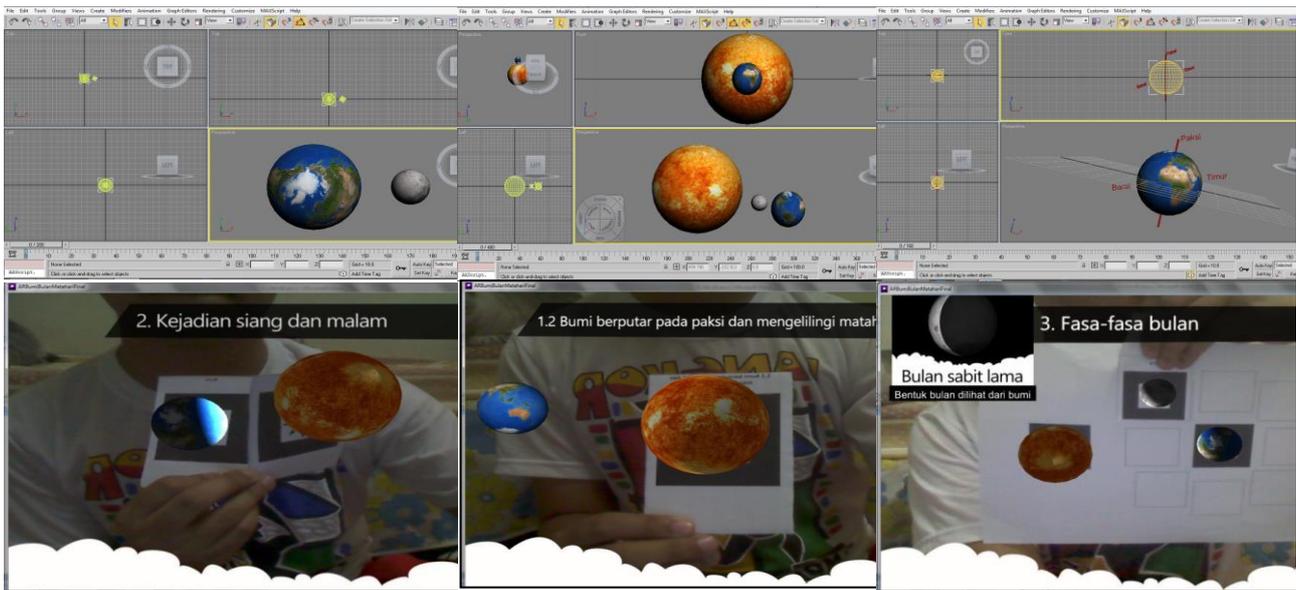


Figure 1. The development process and AR application

Research Procedure

The research process for this study begin with the participants answered the pre-test before the AR treatment. This stage was to determine their conceptions of the content before given the AR treatment. During the next stage, participants were given a brief training on how to control and use AR to avoid improper use and confusion. Firstly, the teacher guided participants by posing a problem on the related topic. Based on the problem given, the participants were required to conduct explorations on the topic by referring to AR application as shown in Fig.2. By using the provided AR application, they were freely to make any manipulation on the AR markers to understand the concepts where they required to deliberate, reflect and make inference on the problems given in the learning activity. Once the treatment with AR completed, each participant was required to sat for post-test to acquire the conceptions after the AR treatment given.



Figure 2. Student interacting with AR

RESULTS AND DISCUSSIONS

The conceptions of the participants were assessed before and after the AR treatment by analyzing their responses to the pre-test and post-test. The analysis used to classify the data was based on the categorization of the responses that classification into the scientific concepts (correct explanation-label as “a”) and misconception (incorrect explanation-label as “b”).

Table 3 shows the concepts understand by the participants on the movement of the earth, the moon and the sun before and after using AR. First, for the concept of rotation of the earth on its axis. Looking into the answers (pre-test) before the AR treatment showed that only 6 students (18%) were able to provide accurate answers while majority (82%) failed to provide the accurate answer. After the AR treatment, the findings demonstrated that all the students manage to provide an accurate answer on the scientific concept for this concept. Secondly, the concept of the earth rotate around the sun. The answer shown by the student before the AR treatment showed that only 3 students gave the correct answer while the majority (91%) gave the wrong answer, explained the event according to misconceptions that the earth rotate around the Moon. After a learning session with AR, majority of participants (85%) were able to provide the correct answers. Out of 31 students who gave incorrect answers before treatment, only 2 participants remained with this idea even after AR treatment session took place. In addition, the findings also show that no student were able to provide correct answer for the Moon's rotating on its axis and circulating around the Earth concept. But after the treatment, majority of the participants managed to provide the accurate answer.

Table 3. Student’s Conception about the Movement of the Earth, the Moon and the Sun

Conceptions	Pre-test	Post-test
	<i>f (%)</i>	<i>f (%)</i>
a) State the rotation of the earth on its axis		
- The Earth rotates on its axis from west to east ^a	6 (18)	34 (100)
- The Earth rotates on its axis from east to west ^b	28 (82)	0 (0)
b) State the Earth rotates on its axis and at the same time revolving around the Sun		
- While rotating on its axis, the Earth also revolve around the Sun ^a	3 (9)	29 (85)
- The Earth revolving around the Moon ^b	31 (91)	5 (15)
c) State the Moon rotates on its axis and at the same time revolving around the Earth		

- The moon takes 28 days to complete revolution around the Earth ^a	0 (0)	32 (94)
- The moon takes 365 days to complete circulation around the Earth ^b	33 (97)	2 (6)
- No response	1 (3)	0 (0)

a. Scientific Concept

b. Misconceptions

There are several explanations that can be made to support the findings. First of all, through 3D learning: AR application was developed using 3D objects as virtual models to represent learning content such as the earth, the moon and the sun that can enhance learning experience. With this unique ability of AR, it allows students to use 3D virtual objects to enrich the visual perception of the existing environment (Ozdemir et al., 2018). AR provides three-dimensional objects that are commonly seen objects in the real world into student learning. The information presented through texts and images in printed book in two-dimensional form loses the real-world elements and made the interpretation difficult for some students. The 3D animation virtual objects can be viewed, observed and manipulated from different perspectives to improve students' understanding (Safadel & White, 2018; Phon et al., 2019). Meanwhile, AR can also provide solutions to difficulties in studying the subject that require ability to visualize the phenomenon that is difficult to imagine such as the rotation of the earth, the moon and the sun as highlighted in this study.

CONCLUSION

In this investigation, the aim was to examine the effect of AR on students' conceptual change of scientific concepts. This study has found that before learning through AR, primary school students had some misconceptions on those topics. However, most primary school students were able to shifted from misconception to had a scientific understanding after learning through AR. The findings of this research show that the integration of AR in learning was considerable effective in facilitating conceptual change. Taken together, these findings suggest that the incorporation of AR into the teaching and learning process is required in order for students to acquire new conceptual knowledge and correct their misconceptions. This research extends our knowledge on the effect of AR in dispel student's misconception in scientific concept. The generalizability of these results is subject to certain limitations. For instance, the scientific concept used in this study were relatively limited to only one unit only. Therefore, further research is needed to account for the varying of scientific concepts.

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UNDERSTANDING UNIVERSITY STUDENTS' BEHAVIORAL INTENTION TO USE SOCIAL MEDIA FOR TEACHING AND LEARNING

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ABSTRACT

Nowadays, many universities and academicians use social media as learning tools for students. The media help students in terms providing a platform for sharing and discussing their interest, collaborate with peers and access to contents and learning materials. However, these applications may become a source of distraction, affect students' academic goals, enhance negative sharing, and may not clearly assist in learning performance. Despite technologies of social media gaining acceptance in universities all around the world, the study on factors of students' behavioural intention to use social media for collaborative learning have not been fully explored in Malaysia and useful insights are still needed to resolve this problem. Thus, this research examined influential factors on students' behavioural intention to use social media for active collaborative learning that affects teaching and learning. This study developed a theoretical model based on Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use Technology (UTAUT). A sample of 125 university students involves in this research. The structural equation modelling (SEM) was used to the survey data to test the corresponding hypotheses. The results of the statistical analysis show that both TAM and UTAUT were supported in their predictions of social media usage intention. The findings indicate that perceived usefulness, perceived ease of use, performance expectancy, social influence and facilitating conditions have a positive relationship with students' behavioral intention to use social media for teaching and learning. The findings also proved that seventeen hypotheses were supported while six hypotheses were rejected. The proposed research model is employed to explain the student's behavioral intention to use social media for collaborative learning to measure the student satisfaction to affect teaching and learning.

Keywords: Behavioral intention to use, Technology Acceptance Model, Social Media, Teaching and Learning

INTRODUCTION

Nowadays, we can find many social media sites like Facebook, Twitter, Instagram, Tagged, Myspace, Tumblr and YouTube. There are many different purposes of every person to have joined social media. People usually used social media to stay contacting with friends and families' members by posting their status updates, chatting, blogs, photos and a site for enjoyment and relaxation (Abdullah, 2013). Besides using them for social and entertainment purposes, social media also have been used in various fields like engineering (Begel et al., 2010) medical (Deiorio et al., 2012), educational (Gulbahar & Kalelioglu, 2010; Abdul Rahman et al., 2016) and also for teaching and learning (Anthony et al., 2019; AlAjmi et al., 2017; Roblyer et al., 2010; Thomas et al., 2013).

According to McLoughlin and Lee (2010), the term of social media refers as technologies that support social activities such as interaction, communication and collaboration. There are several social media services, which create big advantages for students learning including accessibility, usability, connectivity, content creation and sharing. This include many types of tools like resource sharing, blogging, social bookmarking, microblogging, social networking sites (SNS), media sharing tools and social tagging (Dabbagh & Kitsantas, 2012; Dabbagh & Reo, 2011). According to Hamutoglu et al. (2013), using SNSs in particular Facebook for education purpose can help students to get the information more effectively and efficiently. Besides that, social media technologies support educational activities if the students actively contribute the content, and participate in learning activities and effectively engaged in learning (Hamid et al., 2015; Junco, 2012; Mazman & Usluel, 2010; Leng et al., 2011).

The high number of social media usage today becomes an integral part in higher education. Studies have shown that previous researchers attracted to examine how the media social tools could be used for teaching and learning purpose. Most of the studies have explored the possibilities of social media for educational purposes (Bicen & Uzunboylu, 2013; Kabilan et al., 2010) and give a positive effect to students' learning performance (Al-Rahimi et al., 2013). Besides that, there are many educational institutions have taken advantages of social networking sites for sustaining their teaching and learning activities (Tinmaz, 2012) and they also adopted those technologies to get connected with their faculty members and students in order to accommodate them with better services (Al-Mukaini et al., 2014). These things occurred as social media technologies bring a crucial educational potential that encourage many educational activities such as information sharing, content generating, group discussion, communication, critical thinking and collaboration (Junco, 2012; Hamid et al., 2015).

Despite the social media gaining acceptance in universities around the world, the study on the behavioral intention of students in using social media is still unexplored fully in Malaysia (Kabilan et al., 2010). Recently, the number of related studies in Malaysian higher education institutions still not really wide and there is none that focused on students' behavioral intentions to use social media technologies to affect teaching and learning or proposed a conceptual framework in explaining the findings. Therefore, this study will investigate key factors that influence student's behavioral intention to use social media for teaching and learning. The study's findings on factors influencing social media use for teaching and learning in Malaysia may provide useful insights for other developing countries in this part of the world. Furthermore, by understanding the reasons and causes that influence students' behavioral intention in using social media for teaching and learning purpose can help academician to implement this new learning environment.

RESEARCH MODEL AND HYPOTHESES

This study will use Technology Acceptance Model (TAM) pioneered by Davis et al. (1989) integrated with Unified Theory of Acceptance and Usage of Technology (UTAUT) by Venkatesh et al. (2003). The work will focus on investigating the factors influencing students' behavioural intention in utilizing social media for the purpose of collaborative learning. This study also uses constructivism theory introduced by Vygotsky (1978) to support the basic idea and to provide a better understanding on investigating the factors on behavioural intention among university students.

In this study, the research model was formulated based on the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of technology (UTAUT) as illustrated in Figure 1. Both models were chosen because of this two models have been widely use as one of the most powerful models to study about user acceptance and usage of certain technology especially in information system context. TAM is chosen because of TAM has been tested empirically and supported through validations, applications and replications (Lee et al., 2005; Venkatesh, 2000) and TAM also was proved theoretical model to help explaining and predicting user behavior of information technology (Gates, 2015). Previous researchers constantly said that TAM was really important in enlightening and predicting the technology use in different situation (Dillon & Morris, 1996; Echeng et al., 2013; Elkaseh et al., 2014). Similar to TAM, the UTAUT was used to explain the acceptance and system usage behavior.

Various studies have used TAM (Al-Rahmi et al., 2018; Tawafak et al., 2018; Akar & Mardikyan, 2014; Ali et al., 2015; Muniasamy et al., 2015; Thongmak, 2014) and UTAUT (Echeng et al., 2013; Cao & Hong, 2011; Escobar-Rodriguez et al., 2014) separately to investigate the acceptance and usage of social media in higher learning institution across the world. However, studies that use both combination TAM and UTAUT in particular, are few. Plus, from the previous research, there were many inconsistencies that have been reported from the research results for the UTAUT relationship (Thomas et al., 2013). For example, the results showed positive effects between performance expectancy and behavioral intention (Nassoura, 2012; Yueh et al., 2015), meanwhile Jairak et al. (2009) found that there was no such effect in the result. However, Jairak et al. (2009) found that there were positive effects between attitude and performance expectancy whereas the results by Nassoura (2012) found negative effects. The inconsistencies may be because of the different sample size, the different level of culture and country and also different techniques for data analysis (Thomas et al., 2013).

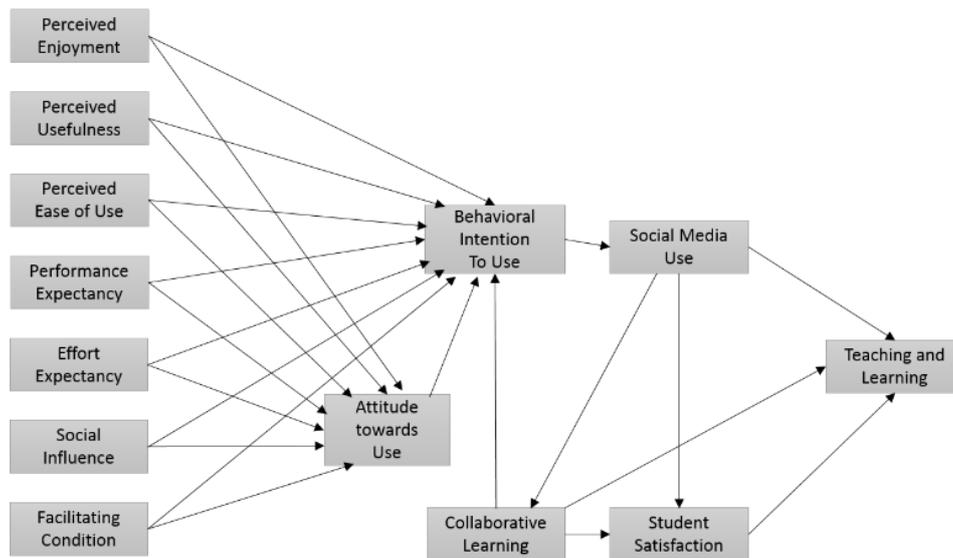


Figure 1. Research Model

According to Venkatesh (2000), the term perceived enjoyment is said to show the extent to which the action of using social media is perceived to be fun in its own right, apart from any performance effects getting from technology use. Many studies use enjoyment factor to represent intrinsic motivation in discussion of how intrinsic motivators influence individuals' IT acceptance behaviour (Yueh et al., 2015). When a technology is fun, people will be naturally motivated to implement it (Lu et al., 2009). After all of the above findings, this research hypothesized the following:

H1: Perceived enjoyment will have a positive impact on behavioral intention to use social media.

H2: Perceived enjoyment will have a positive impact on attitude to use social media

According to Davis (1989), perceived usefulness shows to which extent a student considers that using social media would develop their learning performance. When students found that the technology is useful for them, and then they will have the intention to implement it and bring them to the proper usage of social media. According to Venkatesh and Davis (2000), perceived usefulness has been continuously recognized as a crucial factor of behavior intention to use a system. In keeping with this, we intend the hypotheses as following:

H3: Perceived usefulness will have a positive impact on behavioral intention to use social media.

H4: Perceived usefulness will have a positive impact on attitude to use social media.

According to Davis et al. (1989), perceived ease of use is showing to what extend individual beliefs to adopt a specific technology or system and it will be free of efforts or any other physical and mental problems. Within the recent research, perceived ease of use is said to be student's perception on the extent of effort needed in using media technologies for learning activities. Therefore, we hypothesize the fifth and six hypotheses:

H5: Perceived ease of use will have a positive impact on behavioral intention to use social media.

H6: Perceived ease of use will have a positive impact on attitude to use social media.

According to Venkatesh et al. (2003), performance expectancy shows on what extend the student believes that using social media would help them in supporting their learning activities. Research results for performance expectancy have shown many inconsistencies (Thomas et al., 2013). Some researchers found that there was positive effect in performance expectancy on behavioral intention (Echeng et al., 2013; Arthur et al., 2013) meanwhile Jairak et al. (2009) found that there was no such effect. In line with that, we hypothesize the next hypotheses as following:

H7: Performance expectancy will have a positive impact on behavioral intention to use social media.

H8: Performance expectancy will have a positive impact on attitude to use social media.

Venkatesh et al. (2003) stated that effort expectancy is defined as to the degree to which students find it easy or difficult to accept and use social media. Regarding the usage of social media, prior researchers found the important correlation between effort expectancy and behavioral intention (Yueh et al., 2015; Arthur et al., 2013). According to the recent research, this research hypothesized as the following:

H9: Effort expectancy will have a positive impact on behavioral intention to use social media.

H10: Effort expectancy will have a positive impact on attitude to use social media.

Social influence relates to how colleagues, institution, course instructors and others to consider that the student should continue to use social media for learning (Venkatesh et al., 2003). Previous studies have documented how social influence contributes to one significant indicator to predict behavioral intentions of technology acceptance (Yueh et al., 2015; Kim & Malhotra, 2005). In line with that, this study hypothesized as the following:

H11: Social influence will have a positive impact on behavioral intention to use social media.

H12: Social influence will have a positive impact on attitude to use social media.

In this study, facilitating conditions describes a variety of things that are able to facilitate the use of social media such as knowledge and skills, device support, the availability of the social media application, as well as other things that need to use social media. This has been confirmed by some studies but Echeng et al. (2013) and Jairak et al. (2009) stated that there were positive effects in facilitating conditions. According to current research, this study hypothesized as the following:

H13: Facilitating conditions will have a positive impact on behavioral intention to use social media.

H14: Facilitating conditions will have a positive impact on attitude to use social media.

According to Ajzen and Fishbein (1980), attitude can be used to determine individual behavior. Venkatesh et al. (2003) said that the effect of attitude on behavioral intention is unauthentic and it occurs only when performance expectancy and effort expectancy are omitted from the model. However, Nassoura (2012) and Jairak et al. (2009) identified that there is a positive correlation between attitude with both performance expectancy and effort expectancy. In line with that, the hypothesis is proposed as following:

H15: Attitude towards using social media will have a positive impact on behavioral intention to use social media.

Venkatesh (2000) stated that behavioral intention to use is clarified as the students' intention whether to use or continuously using social media and will adopt the application in the future. The current research concludes that individuals who engage with a web system will positively view their interactions with the systems and also forms a high behavior intention in using it (Moon & Kim, 2001). Based on the above findings, the hypothesis is proposed as following:

H16: Behavioral intention to use will have a positive impact on social media use.

Some of the researchers determined the chance and potential of social media to promote learning by facilitating communication and information sharing, also support and encourages student engagement and collaboration (Junco, 2012; Moon & Kim, 2001; So & Brush, 2008). Previous findings have documented that collaborative learning is positively impact on student's satisfaction (Muniasamy et al., 2015; Al-Rahmi et al., 2015a; Al-Rahmi et al., 2015b). Hence, those hypotheses are proposed as following:

H17: Collaborative learning will have a positive impact on behavioral intention to use social media.

H18: Collaborative learning will have a positive impact on student satisfaction.

H19: Collaborative learning will have a positive impact on teaching and learning.

Social media brings a very crucial role in delivering knowledge equally not only for the students but also lecturers. As stated by extant researchers, social media is a precious tool that develops students' academic performance (Al-Rahimi et al., 2013; Selwyn, 2010). Moreover, Murphy and Lebars (Murphy & Lebars, 2008) also found that the integration of social media tools in learning developed many elements of learning in themselves like the student engagement with content, quality of assignments, and their learning of responsibility. Based on the earlier discussion, we take into account that social media gives a positive influence on teaching and learning, hence hypothesizing that:

H20: Social media use will have a positive impact on collaborative learning.

H21: Social media use will have a positive impact on student satisfaction.

H22: Social media use will have a positive impact on teaching and learning.

Student satisfaction is referring to the students' degree to consider that social media can accommodate them with the information needed. Most of the researcher understood that

satisfaction is based on the users' feeling after using a system (Liao et al., 2015; McKinney et al., 2002). According to Al-Rahmi et al. (2015), there is a significant impact between student satisfactions with student learning performance through the social media use as a medium for collaborative learning. Hence, a hypothesis is proposed as following:

H23: Student satisfaction has positive influence on teaching and learning.

METHODOLOGY AND DATA COLLECTION

The population in this research involves by the university students at Universiti Teknologi Malaysia. The data collected for this research was using the survey questionnaire that has been administered on 125 undergraduate students of Universiti Teknologi Malaysia. The respondents' range of age was between 18 to 34 years old. There were 57 males and 68 females that have been participated in this research as the sample. In order to draw the data, a quantitative approach was used in this research.

The researcher has developed the instrument based on the research's objectives and past literature review. The instrument was piloted and results indicated that value of Cronbach's alpha coefficient was 0.983. This signifying the instrument has good internal consistency and met the requirement of reliability, thus it is acceptable to be used. There were three parts that consisted in the complete instruments. Part 1 consists of students' personal demographic data including gender, age and course of study. Part 2 is about the social media used. The third part of questionnaire has thirteen sub-sections, as follows: perceived enjoyment, perceived ease of use, perceived usefulness, performance expectancy, effort expectancy, social influence, facilitating conditions, attitude towards use, behavioral intention to use, social media use, collaborative learning, student satisfaction and teaching and learning. The measurement of the constructs was based on five point Likert scales, which is 1 represents "Strongly Disagree" and 5 represents "Strongly Agree".

The questionnaires were administered to all students during the final class meeting of the course. IBM SPSS Statistic 21 was used for descriptive analysis, and the hypothesized relationships were tested using AMOS 23. The researcher carried out a descriptive statistical analysis with regards to the personal data of the respondents. A total of 125 undergraduate's students from two courses namely social science and science and technology. The analysis reveals that 82.4% of the respondents are from 21-24 age group, while 11.2% from 18-20 age group. Only 5.6% of the respondents are from 25-29 age group.

RESULTS AND ANALYSIS

Table 1 presents the results of hypothesis testing and Figure 2 represents the value of β -value for each factors. The results supported the proposed seventeen hypotheses supported and rejected the six remaining hypotheses. Specifically, the results indicated that perceived enjoyment ($\beta = 0.036$, $p < 0.001$) was found to negatively relate with behavioral intention to use. Thus, H1 is not supported. Moreover, perceived enjoyment ($\beta = 0.288$, $p < 0.001$) positively and significantly related with attitude towards using social media, and thus H2 is supported. Perceived usefulness

($\beta = 0.287, p < 0.001$), perceived ease of use ($\beta = 0.202, p < 0.001$), performance expectancy ($\beta = 0.147, p < 0.001$), social influence ($\beta = 0.331, p < 0.001$), facilitating conditions ($\beta = 0.240, p < 0.001$), and collaborative learning ($\beta = 0.452, p < 0.001$) were found positively related to behavioral intention. Thus, hypotheses H3, H5, H7, H12, H14 and H17 are supported. However, effort expectancy ($\beta = 0.073, p < 0.001$) and attitude towards using social media ($\beta = 0.185, p < 0.001$) were found not positively related to behavioral intention. Thus, H10 and H15 are not supported.

Next, perceived usefulness ($\beta = 0.090, p < 0.001$), perceived ease of use ($\beta = 0.152, p < 0.001$), performance expectancy ($\beta = 0.152, p < 0.001$), effort expectancy ($\beta = 0.196, p < 0.001$) were found positively related to attitude towards using social media. Thus, hypotheses H4, H6, H8 and H9 are supported. Meanwhile, social influence ($\beta = 0.196, p < 0.001$) and facilitating conditions ($\beta = 0.051, p < 0.001$) were found not positively related to attitude towards using social media. Thus, H11 and H13 are not supported. The findings also revealed that behavioral intention ($\beta = 0.977, p < 0.001$) was found has a positive relationship with social media use, and thus H16 is supported. Moreover, collaborative learning ($\beta = 0.275, p < 0.001$) and social media use ($\beta = 0.360, p < 0.001$) were found have relationship with students' satisfaction. Thus, hypotheses H18 and H21 are supported. Collaborative learning ($\beta = 0.073, p < 0.001$) was found not positively related to teaching and learning and thus, H19 is not supported. In contrast, both social media use ($\beta = 0.200, p < 0.001$), students' satisfaction ($\beta = 0.685, p < 0.001$) were found to be significant to teaching and learning. Thus, H22 and H23 are supported. Finally, social media use ($\beta = 0.849, p < 0.001$) was found has a positive relationship with collaborative learning (CL), and thus H20 is supported.

Pearson correlation coefficients at 89% confidence level were computed to test the relationship between teaching and learning with perceived enjoyment, perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention to use, attitude towards using social media, social media use, collaborative learning, and students' satisfaction. The results are presented in Table 2. According to the results, teaching and learning showed a strong correlation with student satisfaction ($r = 0.852, p < 0.001$), demonstrating that teaching and learning has a positive relationship with student satisfaction. The results showed high positive relationship between teaching and learning and social media use ($r = 0.763, p < 0.001$), performance expectancy ($r = 0.688, p < 0.001$), perceived ease of use ($r = 0.663, p < 0.001$), collaborative learning ($r = 0.658, p < 0.001$) and perceived usefulness ($r = 0.653, p < 0.001$). Meanwhile, the result showed moderate positive relationship between teaching and learning with three constructs which are behavioral intention to use ($r = 0.641, p < 0.001$), perceived enjoyment ($r = 0.633, p < 0.001$) and attitude towards using social media ($r = 0.619, p < 0.001$). But, the relationship between teaching and learning with social influence ($r = 0.490, p < 0.001$) and facilitating conditions ($r = 0.487, p < 0.001$) showed weaknesses correlation result. Finally, Pearson's correlation coefficient for teaching and learning in relation to effort expectancy was ($r = 0.399, P < 0.001$), showing a very weaknesses correlation.

Table 1. Regression Weight

H	Relationship	Estimate	SE	C.R	p	Result
H1	PE → BI	-.036	.071	-.505	.613	Not supported
H2	PE → AT	.288	.044	6.544	***	Supported
H3	PU → BI	.287	.057	5.036	***	Supported

H4	PU → AT	.090	.038	2.398	0.16	Supported
H5	PEOU → BI	.202	.064	3.168	0.02	Supported
H6	PEOU → AT	.152	.043	3.567	***	Supported
H7	PEX → BI	.147	.062	2.370	.018	Supported
H8	PEX → AT	.152	.042	3.620	***	Supported
H9	EE → BI	.196	.042	4.686	***	Supported
H10	EE → BI	-.073	.063	-1.148	2.51	Not supported
H11	SI → AT	.033	.040	.843	.399	Not supported
H12	SI → BI	.331	.059	5.573	***	Supported
H13	FC → AT	-.051	.055	-.927	.354	Not supported
H14	FC → BI	.240	.079	3.049	.002	Supported
H15	AT → BI	.185	.126	1.471	.141	Not supported
H16	BI → SMU	.977	.132	7.415	***	Supported
H17	CL → BI	-.452	.110	-4.106	***	Supported
H18	CL → SS	.275	.061	4.493	***	Supported
H19	CL → TL	.064	.063	1.018	.309	Not supported
H20	SMU → CL	.849	.106	7.973	***	Supported
H21	SMU → SS	.360	.075	4.828	***	Supported
H22	SMU → TL	.200	.075	2.668	.008	Supported
H23	SS → TL	.685	.086	7.933	***	Supported

Note: PE: Perceived Enjoyment, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, PEX: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, FC: Facilitating Conditions, AT: Attitude towards Use, BI: Behavioral Intention to Use, SMU: Social Media Use, CL: Collaborative Learning, SS: Student Satisfaction, TL: Teaching and Learning

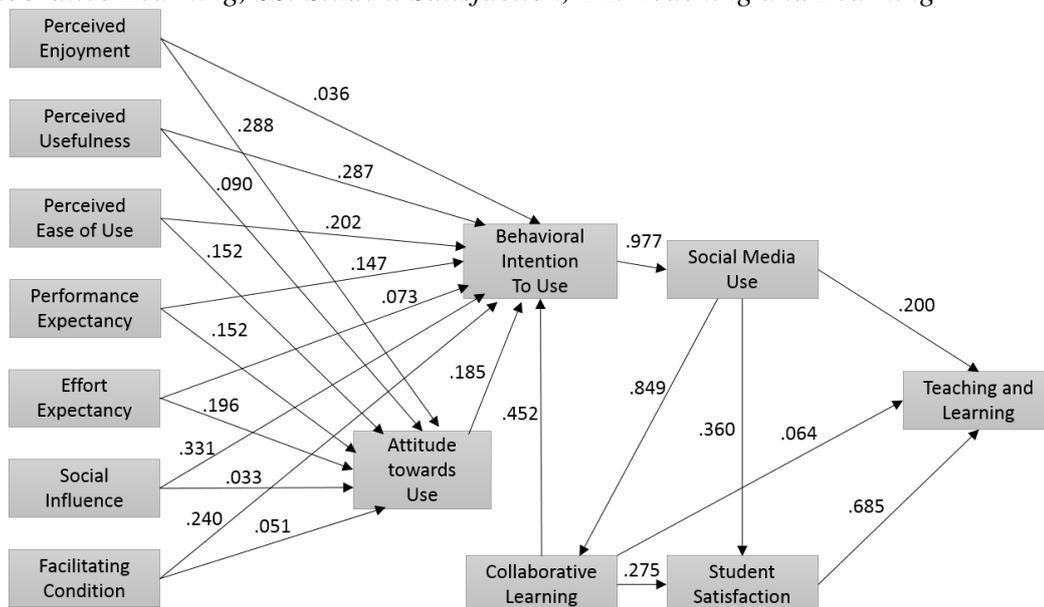


Figure 2. Graphical representation of β -value.

Table 2. Inter-Item Correlation Matrix

Factors	PE	PU	PEOU	PEX	EE	SI	FC	AT	BI	SMU	CL	SS	TL
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PE	1.000												
PU	.693	1.000											
PEOU	.639	.761	1.000										
PEX	.566	.761	.736	1.000									
EE	.482	.457	.632	.379	1.000								
SI	.447	.426	.435	.441	.330	1.000							
FC	.487	.515	.560	.434	.691	.546	1.000						
AT	.725	.710	.741	.666	.601	.442	.530	1.000					
BI	.586	.714	.696	.619	.505	.530	.603	.671	1.000				
SMU	.544	.714	.616	.712	.327	.507	.480	.564	.692	1.000			
CL	.384	.472	.448	.547	.227	.595	.368	.411	.446	.682	1.000		
SS	.563	.647	.665	.759	.430	.535	.565	.625	.667	.794	.701	1.000	
TL	.633	.653	.663	.688	.399	.490	.487	.619	.641	.763	.658	.852	1.000

Note: PE: Perceived Enjoyment, PU: Perceived Usefulness, PEOU: Perceived Ease of Use, PEX: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, FC: Facilitating Conditions, AT: Attitude towards Use, BI: Behavioral Intention to Use, SMU: Social Media Use, CL: Collaborative Learning, SS: Student Satisfaction, TL: Teaching and Learning

DISCUSSION

The hypotheses reflect the interrelationship between factors that may influence undergraduates' students' behavioral intention to use social media for teaching and learning. The results of the study provide support for the research model as presented in Figure 2 and the hypotheses regarding the directional linkage between the model variables. Thirteen predictors were examined in this study in term of behavioral intention to use social media for teaching and learning among undergraduates' students; perceived usefulness, perceived ease of use, perceived enjoyment, performance expectancy, effort expectancy, social influence, facilitating conditions, attitude towards using social media, behavioral intention to use, social media use, collaborative learning, student satisfaction and teaching and learning. According to the results, undergraduates' students' behavioral intention to use social media for teaching and learning was influenced by perceived usefulness, perceived ease of use, performance expectancy, social influence and facilitating conditions. The same results were found in the studies conducted by (Thongmak, 2014; Alhardi & Drew, 2014) which indicates that these five factors have positive relationships on behavioral intention to use and can predict students' intention of using social media for teaching and learning. However, behavioral intention to use social media for teaching and learning among undergraduates' students was not directly affected by perceived enjoyment, effort expectancy and attitude towards use. This is in line with Elkaseh et al., (2014) which indicates

that perceived enjoyment, effort expectancy and attitude towards use had no direct effect on university students' intention to use e-learning. Thus, this result indicates that perceived enjoyment, effort expectancy and attitude towards use have a negative effect on behavioral intention to use and it can't predict students' behavioral intention to use social media for teaching and learning purpose.

CONCLUSION AND FUTURE WORK

The model of this research comprises of students' behavioral intention to use social media for teaching and learning. The model was formulated based on the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of technology (UTAUT). The findings of the research confirmed 17 hypotheses and 6 hypotheses was rejected. The results revealed the positive relationship between perceived usefulness, perceived ease of use, performance expectancy, social influence and facilitating conditions with students' behavioral intention to use social media for teaching and learning but perceived enjoyment, effort expectancy and attitude towards use do not have effects. In future, we are planning to tackle another factor that gives effect on the students' behavioral intention to use social media for teaching and learning and examine why perceived enjoyment, effort expectancy and attitude towards use have no effect in Malaysian context.

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A REVIEW ON THE EFFECTIVENESS OF CURRENT INSTRUCTIONAL DESIGN PRACTICES AND STUDENT SATISFACTION UNDER BLENDED LEARNING ENVIRONMENT

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ABSTRACT

The innovation of educational tools has improved the learning approaches from traditional to blended learning modes in term of information and learning process. One of the factors that contribute to the effectiveness in blended learning mode is a quality of designing learning activities and the main reason of failure in this environment is due to unfamiliar practices of designing courses. This situation could affect student's satisfaction and subsequently, influences students' response to their learning and retention in their field of study. Therefore, the purpose of this paper is to review the current instructional design practices as well as student satisfaction under blended learning environment. Other than that, this paper also identifies factors influencing the quality of instructional design in blended learning and indicators contributing to the student's satisfaction in blended learning. This review could help to stimulate reflections on effective strategies for design and improve current instructional design for student's satisfaction under blended learning environment.

Keywords: Instructional design, Student satisfaction, Blended learning

INTRODUCTION

An improved learning approach called blended learning, effectively combines the traditional faceto-face learning and e-learning (or online learning), so that the benefits of both learning modes can be achieved (Cheung et al., 2010). Other than that, this learning approach is delivered in an interactively meaningful learning environment in terms of delivery modes, teaching models and learning styles

(Kaur, 2013) to ensure quality of education and produce active learners (Yusof et al., 2015). Three aspects of blended learning which: (i) the instructor takes control of the class based on concept of traditional learning; (ii) blended learning promotes self-learning at anytime and anywhere; and (iii) blended learning emphasizes on the pre- and post- class activities as well as online interaction (Cheung et al., 2010). According to Kaur (2013), blended learning can also be viewed from different perspectives in terms of holistic, educational, pragmatic, corporate training and chief learning officer. However, the integration between face-to-face learning with information technology cannot provide guarantee for creating an effective learning and teaching environment (Mabed and Koehler, 2012). This is due to the success or failure of an effective learning and teaching depends on the quality of designing learning activities (Boelens et al., 2017). Other than that, student satisfaction is also another key factors in the success of blended learning implementation. Measurement of student satisfaction is important in order to evaluate courses and programs as well as predict student attrition rate in the blended learning environment. This paper aims to review the instructional design and student satisfaction in the environment of blended learning. In this review, the following research questions are addressed: (i) what are the factors influencing the quality of instructional design in blended learning? and (ii) what are the indicators contributing to the student's satisfaction in blended learning?

INSTRUCTIONAL DESIGN IN BLENDED LEARNING

The most critical factor of blended learning approach is interaction and involvement of education among students, instructors and contents (Attaran and Zainuddin, 2018). To achieve learning outcomes in blended learning environment, McGee and Reis (2012) and Jayashanka et al. (2018) suggested that instructional designs involve instructor and students must not only work together in mixed delivery modes, but the instructors need also to be able to analyse the large volumes of student data generated through learning activities to inform, refine and customize their course designs. To derive the best way for teaching in the blended learning with supportive educational technologies, the instructor should include students' reflective discussion, interactive participation and active adaption to new learning environment. Cheung et al. (2010) proposed six processes for creating the quality of instructional design in blended learning: (i) create an overview for the course; (ii) redesign the lesson plan; (iii) prepare the lesson materials; (iv) perform research and prepare resources; (v) incorporate into learning management system; and (vi) review the created lessons and materials. To reflect the current demands for flexible learning environments in blended learning, Mullins (2014) suggested four processes for the quality of instructional design in blended learning: (i) interview; (ii) design; (iii) embed; and (iv) asses.

Students' workload is one of the factors influencing the quality of instructional design in blended learning. Weerasinghe (2018) suggested that the amount of time spend for each activity of all parallel courses should be calculated considering the number of credits allocated for the courses to avoid unnecessary workloads for the students. Besides, the activities should be supported through classroom lessons and online learning resources. Other than that, the instructors' attitudes toward the course would influence the quality of instruction (Cheng et al., 2010). Attaran and Zainuddin (2018) and

Weerasinghe (2018) stated that the instructions and examples provided at the classroom should be clear and comprehensible. This is because some contents provided by instructors are indeed texts without detail explanation or instruction.

Mozelius and Hettiarachchi (2017) suggested that the universities should encourage their instructor staffs to be more innovate by integrating ICT facilities into teaching practices. However, the instructors often have difficulties in adapting to new instructional delivery method due to lack skills of ICT (Cheung et al., 2010; McGee and Reis, 2012; Prokhorets et al., 2015). Furthermore, according to Kaur (2013) and Mullins (2014), low in time and budget allocation by universities are factors influencing the quality of instructional design in blended learning. Baragas and Sammaraie (2018) investigates the effects of students' engagement in multiple learning delivery modes towards their academic performance. The study found that student tends to consume more time when accessing supplementary online materials. Table 1 summarize factors influencing the quality of instructional design in blended learning.

STUDENT'S SATISFACTION IN BLENDED LEARNING

The widespread use of smartphones and mobile applications make online courses appealing to students who conduct coursework remotely, furthering the concept of learning anywhere and anyplace (Yang, 2017). Boelens et al. (2018) categorized the instructional design into two levels: institutional and classroom. At the institutional level, students are divided into several groups based on educational experiences while at the classroom level, different style of teaching is implemented to meet student's satisfaction. To determine the quality of blended learning implementation, student's satisfaction in blended learning implementation must be measured. Naaj et al. (2012) have identified five indicators contributing to student's satisfaction in blended learning. One of the indicators is instructor, which the components of this indicator are instructor availability and feedback/response time. The second indicator is technology, which the components of this indicator are accessibility and student proficiency towards technology. Administrative support as well as learning environment are also essential indicators to keep student involved and motivated in blended learning. Student's satisfaction is linked to student performance and positively associated with program completion rates and grade achievements. The degree of student's satisfaction and the likelihood of subsequent enrolment in online courses depend on how well courses are planned and taught.

Kalantarrashidi et al. (2015) have defined the indicators contributing to student's satisfaction in blended learning as subject or course content, teaching and learning approach, instructor, interaction and technology. Besides, the instructor's components have been characterized in term of gender, age, years of teaching, experience and teaching style. Kalantarrashidi et al. (2015) suggested that students' achievement, student and instructor motivation as well as attitude towards blended learning for future indicators contributing to student's satisfaction in blended learning.

Rahman et al. (2015) categorized the indicators contributing to student's satisfaction in blended learning into individual factors and situational factors. The individual factors are defined as ease of use and perceived value while situational factors are identified as learning climate and student-instructor interaction. Rahman et al. (2015) also reveals that the student's satisfaction towards blended learning will be increased if the learning is relevant, interesting, enjoyable, instructor support students as well as student get feedback from instructor.

Abbas (2018) suggested the student-student interaction, student-instructor interaction and student-content interaction as indicators contributing to student's satisfaction in blended learning which the blended learning will be effective if student get prompt feedback from instructor, open communication and instructor provide supplementary course materials.

Ismail (2018) found that content quality, teaching style and instructor, are indicators contributing to student's satisfaction in blended learning and there are no significant towards student's satisfaction for the program of study, genders and learning style. Ismail (2018) also recommends adapting the social communications tools to support students learning and lead to a high degree of satisfaction. Panes (2019) implemented HELAM model and found that learners' perspectives, instructors' attitude, content quality and service support are indicators contributing to student's satisfaction in blended learning. Table 2 summarize the existing indicators that contribute to the students' satisfaction in blended learning.

CONCLUSION

This paper provides review on instructional design and student's satisfaction under blended learning environment. Identifying factors that influencing the quality of instructional design in blended learning environment are important to provide effectiveness in blended learning implementation. Student's satisfaction is also important since it influences students' response to their learning and retention in their field of study. The major factors that affect learning effectiveness are satisfaction with learning and teaching innovation, which these factors give impacts on student learning outcomes.

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Table 1. Factors influencing the quality of instructional design in blended learning.

Factors	Authors	Descriptions
Course design	McGee and Reis (2012) and Jayashanka et al. (2018)	Instructors analyse student data generated through learning activities to inform, refine and customize their course designs.
		Instructor should include students' reflective discussion, interactive participation and active adaption
	Cheung et al. (2010)	Six processes for creating course design: (i) create an overview for the course; (ii) redesign the lesson plan; (iii) prepare the lesson materials; (iv) perform research and prepare resources; (v) incorporate into learning management system; and (vi) review the created lessons and materials.
	Mullins (2014)	Four processes for creating course design: (i) interview; (ii) design; (iii) embed; and (iv) asses.
Student's workload	Weerasinghe (2018)	The amount of time spend for each activity of all parallel courses should be calculated considering the number of credits allocated for the courses
Instructors' attitudes	Cheng et al. (2010)	Quality of instruction depends on detail descriptions or examples of instructions
	Attaran and Zainuddin (2018) and Weerasinghe (2018)	The provided instructions and examples at the classroom should be clear and comprehensible.
ICT facilities/ skills	Cheung et al. (2010), McGee and Reis (2012) and Prokhorets et al. (2015)	Instructors often have difficulties in adapting to new instructional delivery method due to lack skills of ICT
	Kaur (2013) and Mullins (2014)	Low in time and budget allocation by universities can degrade the quality of instructional design in blended learning
Students' engagement	Baragas and Sammaraie (2018)	Student tends to consume more time when accessing supplementary online materials.

Table 2. Indicators contributing to student satisfaction.

Authors	Indicators of student satisfaction											
	Instructor	Administrative support	Interaction	Instruction	Course Material/ Content quality	Teaching approach	System/ Technology Quality	Learning Environment	Student's Achievement	Motivation	Attitude	ICT Literacy
Naaj et al. (2012)	/	/	/	/			/	/				
Kalantarrashidi et al. (2015)	/		/		/	/	/					
Rahman et al. (2015)	/	/	/			/	/					
Abbas (2018)			/									
Ismail (2018)	/				/	/						
Panes (2019)	/				/							/

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USAGE OF METHODS AND TOOLS IN TEACHING AND LEARNING: UPM STORY

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ABSTRACT

Teaching methods and tools are the staple of an educator. Diversified options could be chosen according to the needs of the teaching delivery. Specifically, the choice depends highly on the nature of the course and the competency of the educator in utilising the methods and tools so that the learning outcome could be achieved. This paper presents the results of a survey conducted among the academicians at the Universiti Putra Malaysia (UPM), a public university in Malaysia. The survey consisted on the overview of the functions used by the respondents in the Blended Learning Assistive Technology and System (PutraBLAST), a moodle-based learning management system used in UPM. The survey also collected the teaching methods used and external tools besides PutraBLAST. The results reported a healthy practice of variation in the teaching method, which can be used in designing future training programs in UPM.

Keywords: Innovation in Teaching and Learning, Academic Development, PutraBLAST

INTRODUCTION

Innovative pedagogy is one of the most important factors in influencing the Program Outcomes attainment. Various teaching methods could be applied according to the needs of the course and the students. Designing the learning delivery with technology integration also depends on the convenience of the instructor in practising the selected tool. This indicates the role played by the professional development centre at the university in equipping its academic staffs with suitable competencies, besides the instructor's own effort to improve knowledge and skills regarding teaching efficiency.

Many studies have addressed technology mediated learning as it is integral in today's education system. The works can be grouped as the multi-facet of determinant study on the factors influencing the usage of the technology (e.g., YouTube) as complementary teaching tool (Moghavvemi et al. 2018; Shu and Gu 2018), satisfactory level of practise (Khan, Khan, and Turi 2017), motivations in tools usage (Law, Geng, and Li 2019; Manasijević Dragan1 et al. 2016), competency study on tools usage (Chow, Tse, and Armatas 2018), review on tools adoption (Nor and Kasim 2015; Grossman et al. 2017; Khan, Khan, and Turi 2017), experience sharing (Back et al. 2019) and the effect of mediating factor towards student success (Krasilnikov and Smirnova 2017; Kumar and Pande 2017; Baragash and Al-Samarraie 2018).

Despite numerous similar works, a study to understand the usage of teaching methods and tools at a specific institution is needed so it could be an input towards designing the professional development programme. This paper presents the design and result of a survey conducted at Universiti Putra Malaysia (UPM) to understand the current practise among the instructors. UPM is one the public universities in Malaysia which has a high number of innovative instructors. The staffs are active participants in various teaching and learning competitions and the university has won many awards through the bright talents. At UPM, the Centre for Academic Development (CADE) is responsible for the competency development of the academic related purpose. The survey is one of the various data-driven analysis approaches practiced by CADE's management.

This survey has been developed, implemented and analysed by a team formed to develop a transformation program on innovative delivery in teaching and learning, thus the focus of the study is towards activities as part of delivery and the e-learning tools used. The program addresses the combination of innovative pedagogy and competency with e-learning tools as the approach to further improve UPM's teaching delivery practice to ensure that the graduates produced will be equipped with the future ready graduate attributes. The contributions of the study are two-fold:

- (a) Presenting the design of the online survey used to understand the current practice in teaching approach by UPM academic staffs
- (b) Discussion on the current practice in the teaching approach by UPM academic staffs

The paper discusses the survey design in the second section and the results are presented in the third section. The conclusion and future works are discussed in the final section.

RELATED WORKS

Blended learning (Vo, Zhu, and Diep 2017; Al-samarraie and Saeed 2018; Boelens, Wever, and Voet 2017; Baragash and Al-Samarraie 2018; Nor and Kasim 2015) is an essential of enhanced the teaching delivery which requires both face-to-face learning and online learning. Tools such as Web 2.0 (e.g., Blendspace), Moodle and Blackboard enabled videos and other learning materials that were not clearly deliberated or unavailable in the text references to be uploaded by the educators. It also allows learning to be conducted by the student at their convenience, not just within classroom meeting. However, the success of blended learning depends on the pedagogy competency of the instructor. This section presents the literature that relates to innovative teaching delivery and PutraBLAST. These are intertwined, but for a neat discussion they are presented as separate sections.

Innovative Teaching Delivery

Although didactic lectures are a well-known form of teaching, in preparing graduates who are future ready newer pedagogical techniques, educational technology and innovative teaching skills should be added into an instructor's teaching repertoire (Shorey et al. 2018). A compendium of useful tools and techniques to ensure that the teaching and learning session becomes more engaging, more interactive, and more effective could be applied including flipped classroom, active learning and online teaching (Davis et al. 2018).

21st Century Pedagogical Techniques revolves around preparing students with the future ready (6Cs) skills comprising creativity, critical thinking and problem solving, communication, collaboration, citizenship and characteristic (Kay K. 2011). Digital literacy complements effective instructional design for 21st Century learning experience where sustaining participation through the students could be done through gamification, synchronous communication using webinar and interactive content delivery through embedded assessment in videos. Instructors should also e

equipped with the knowledge to provide adaptive and personalized teaching. Facilitating discussions and scaffolding the teaching through suitable activities could contribute towards effective learning.

Although there are many technological gimmicks flooding instructor's daily routine, pedagogy still top the list of instructors' essence (Sivarajah et al. 2018). This means that competency to deliver the course content so that the learning outcome is achieved needs rethinking. Selection of the suitable technology (both digital and non-digital) is a must to execute effectively the activity both in the classroom and virtually. Therefore, creativity and innovative skills among instructors are compulsory so they could produce students possessing 6Cs skills.

For example, to conduct mix-and-match activity during a lesson about machine learning algorithms in an Artificial Intelligence course, the instructors could either do it traditionally: spread cardboards written with the name of the algorithms and the types of problem it can solved, and then ask the students to move around the classroom to match them, or create an online quiz or games for the same purpose. The instructor should be wise to know when to choose the suitable method and might also mix both to ensure high participation and memory retention among the students. Most importantly, the learning outcome is achieved. Results from the assessment should be monitored so that continuous alignment and quality improvement should be performed to ensure high quality graduates.

PutraBlast

PutraBLAST is the second version of learning management system used in UPM. It is one of the component in the Putra Learning Hub (Ismail et al. 2017) which is developed by CAde. Putra Learning Hub consists of PutraBLAST, PutraMOOC, PutraOCW, BLASTarc (Content Archiving System), OscaR (Online Survey and Collective Report for Teaching Evaluation, Lab Survey, Blended Learning), Putra e-Training, e-Learning@UPM Youtube Channel and e-Learning@UPM on Social Media.

Several works have studied about PutraBLAST including its usage to support Flipped Classroom (Shukri and Abedin 2017), its application for HIEPS (Nasir, Yusoff, and Ali 2018) and a study that employed Pearson correlation coefficient method to explore the relationship between performance expectancy, effort expectancy, social influence and facilitating condition (independent variables) and postgraduate students' intention to use PutraBLAST (Samaila, Abdulfattah, and Amir 2017). The contribution of institutional factors to course satisfaction with perceived learning as a mediator among student in Malaysian research universities by using PutraBLAST as one of the case study is conducted in (Amoozegar et al. 2017).

Compared to the above research, this study is scoped specifically on the usage of PutraBLAST and the opinions of its current implementation. The focus of the study is also different, which is to gain insights for devising an academic development program.

USAGE OF TEACHING AND LEARNING METHODS AND TOOLS

This section presents the design of the survey used as the instrument to observe the current practice of innovative pedagogy in UPM. The content of the survey is elaborated followed by the

results and analysis.

Design

The survey is prepared and distributed online through various channel of communications for the duration of fourteen days in early September 2018. 205 responses were received which represents 12% of the total academic staffs' population in UPM. The survey consisted of five parts namely delivery, activity, assessment, platform and demography. For each part, the respondents are asked to select the functions in PutraBLAST that they have used before. They are also asked to select the teaching tools used for delivery (e.g., YouTube, infographic) they have used in their assigned course(s).

There are 14 types of activities being observed which are "Case Study, Problem-based Learning/Project-oriented Problem-based Learning, Modular Approach, Independent Project, Field Trips, Portfolio development, Class presentation, Role Play, Group Discussion, Peer mentoring of other students, Reflective diaries/learning journal, Buzz groups (short discussion in twos), Rounds Giving turns to individual students to talk, and Student producing mind maps in class". These activities are selected as the combination of the approaches listed in the High Impact Educational Practice Malaysia (HIEPS) (Nasir, Yusoff, and Ali 2018). Besides this, the survey also collects information about the familiarity of using Poplet, Padlet, Trello, Kahoot and Webinar as the tools for activity which are among the common tools being shared through CADe's innovative pedagogy training modules.

The survey also collects information on the tools used for assessment such as SurveyMonkey and Mentimeter. Information on alternative blended learning platform is also requested before a section on demographics information collection such as gender, years of service and name of faculty. The responses are collected through checkboxes and text boxes. The survey also collects information about the comments about PutraBLAST and suggestions of improvements.

Results and Analysis

The results of the survey are analysed according to several themes which are (i) Years of teaching experience where three categories are used (0-3 years, 4-6 years, 7-9 years, and over 10 years), (ii) Salutation, (iii) Faculty. Descriptive statistics is applied to obtain the minimum, maximum and average number of variations are used within and across themes. The ANOVA test is also utilized for the analysis purpose to measure the significance of difference within and across themes.

The main purpose of the analysis is to understand the current practice of the UPM instructors in their delivery, activity and assessment routine. It is also to relate with the relevance of the innovative pedagogy training modules delivered by CADe. This survey is also used as an instrument to observe the consistency of the general population of UPM's instructors with the group of excellent academic staffs who always champion UPM through various teaching and learning awards competition.

a) Delivery

The result in Table 1 is consistent with the common observation performed on semester basis regarding PutraBLAST usage conducted by CADe. The URL usage indicates that UPM instructors are equipped with connected learning approach. This is supported by the results

displayed in Figure 1 where YouTube is the most commonly used for delivery besides the Microsoft Office suite. Besides the tools displayed in Figure 1, the survey also collected that a numerous variation of tools is used such as Blendspace, Prezi, Mentimeter, Quizizz, Edmodo and Padlet. These data are consistent with the content of the innovative pedagogy training module by CADe (preference of tools for teaching and learning did not differ across academics with different years of teaching experience ($P>0.05$)).

Table 1. PutraBLAST Functions for Delivery

Function	Number
PutraBLAST - Fungsian File	183
PutraBLAST - Fungsian Page	73
PutraBLAST - Fungsian URL	132
PutraBLAST - Fungsian File and PutraBLAST - Fungsian Page and PutraBLAST - Fungsian URL	58

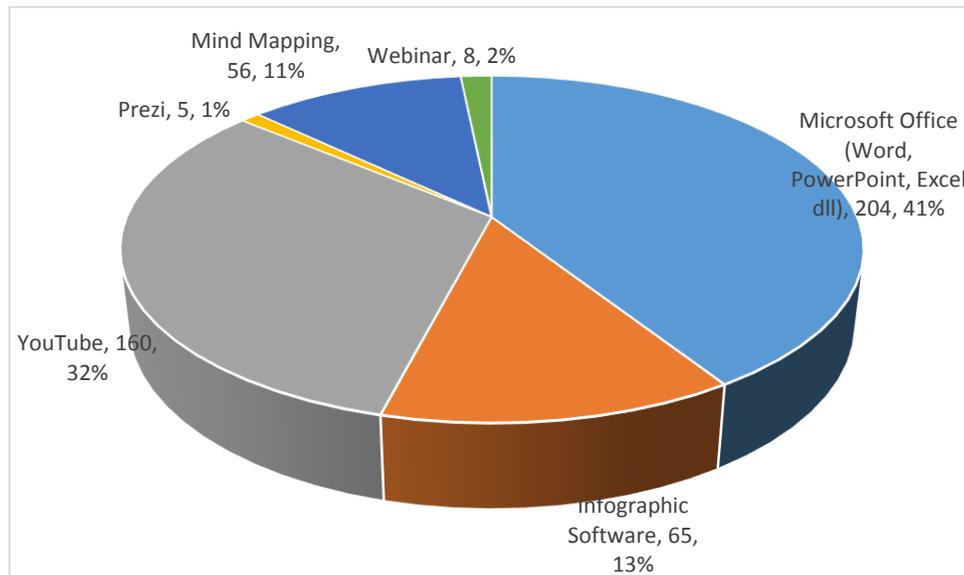


Figure 1. Tools used for delivery purposes

b) Activity

Figure 2 shows that besides file the usage of file as the most common activity approach, forum and chat are the most commonly used. External tools and chat are also used well which indicate that the UPM’s instructors are already well trained in using online tools for activity facilitation. Both results are consistent with the common CADe’s blended learning reporting results every semester.

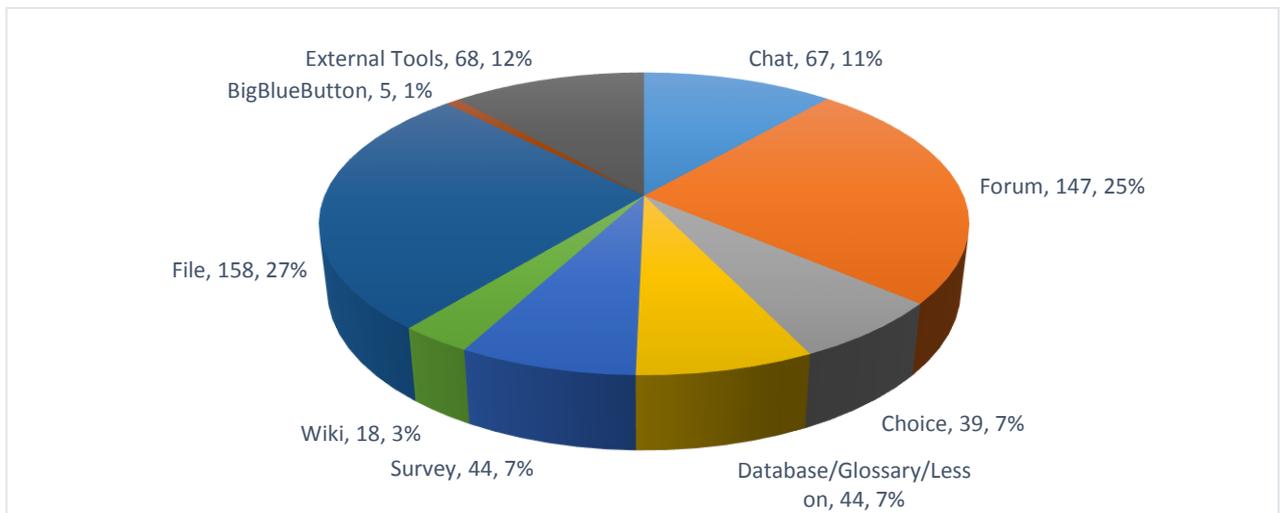


Figure 2. Activity approaches through PutraBLAST

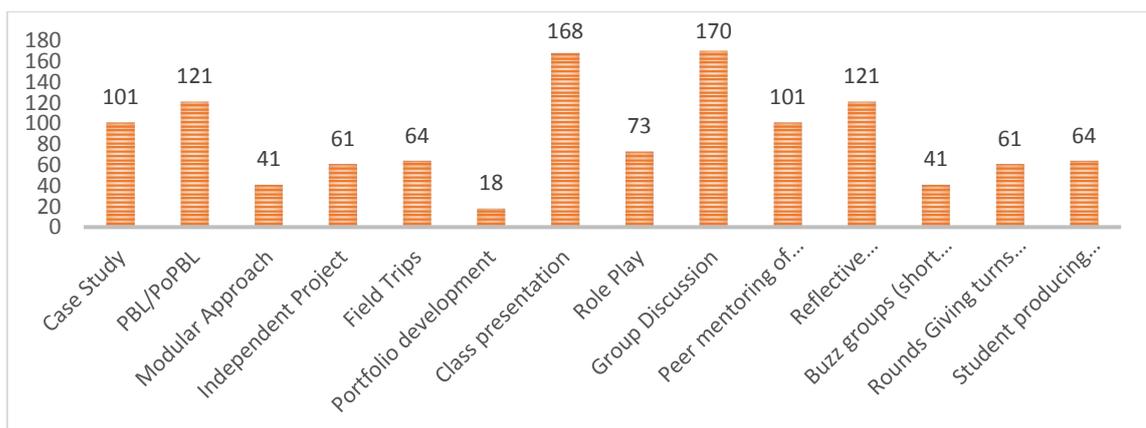


Figure 3. Teaching techniques applied for activity purposes

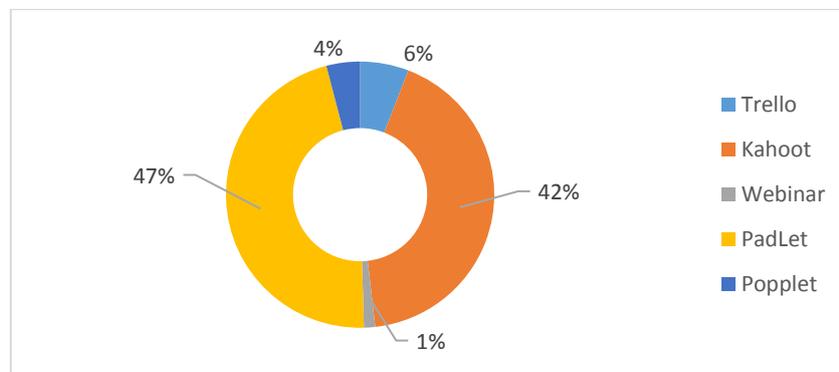


Figure 4. External tools used for activity purposes

Figure 3 shows that group discussion (82.9% respondents applied this technique) is the mostly used technique. This is followed closely by class presentation (82%) and the third most used approach is PBL/PoPBL (59% usage). This observation is also consistent with the discipline cluster-based analysis. Figure 4 shows that more than 50% of respondents have used PadLet followed closely by Kahoot. The results shown in Figure 3 and Figure 4 confirm the Teaching Assessment Survey’s result conducted by CADe every semester among graduating students on their satisfaction level of variations of teaching approaches used by the instructor.

This could be further supported by Figure 5 which shows the statistics of activities variation performed by each service experience category where in UPM on average an respondents applies 4.9 types of approaches, with a minimum of 1 type and a maximum of 14. The average score signifies that the gap across each years of service is little with a minimum of 4.6 types and a maximum of 5.5 across the years of service. For the 0-3 year category, the instructor with the highest number of approaches used is from the Faculty of Medical and Health Sciences, while a respondent with title “Dr” from the Faculty of Educational Studies topped the 4-6 years category. For the 7-9 year category, a “Dr.” from the Faculty of Computer Science and Information Technology has used 13 approaches. In the >10 year category, the maximum number of approaches used is 14, by a “Dr” from the Faculty of Ecology and an associate professor from the Faculty of Engineering.

	AVERAGE	MINIMUM	MAXIMUM	NUM PARTICIPANTS
OVERALL	4.9	1	14	205
0-3 YEARS	4.6	1	14 Dr FPSK	57
4-6 YEARS	5.0	1	14 Dr. FPP	49
7-9 YEARS	5.5	1	13 Dr. FSKTM	26
>10 YEARS	4.9	1	14 Dr., Assoc. Prof. Fekologi, FK	73

Figure 5. Statistics of activity approaches used across years of service

The results from Figure 3 to Figure 5 could be used by CADe to develop training content with more variations of techniques for activity such as gallery walk, round robin and Think-Pair-Share. Although there are respondents who have entered extra information to share on the other teaching techniques not listed in the survey’s checkboxes, the number of this kind of respondents is low. This

also means that CADe could take this opportunity to disseminate information on this kind of techniques. Analysing the results according to the discipline cluster, years of service and salutation also allows input to design program specific to various categories. This could also to encourage active learning implementation in the teaching delivery.

c) Assessment

For the assessment part, three options have been listed for the respondents which are PutraBLAST-Quiz, PutraBLAST-Assignment and 'Tidak Berkaitan' (irrelevant). Confirming the norms, the assignment and quiz are the mostly used assessment tools, as shown in Table 2. 109 (more than 50% of the total population) respondents said they have used both tools.

Table 2. Assessment tools used in PutraBLAST

PutraBLAST- Quiz	PutraBLAST- Assignment	PutraBLAST-Quiz and PutraBLAST-Assignment
169	133	109

There 16% of respondents who have ticked 'Tidak Berkaitan'. There is 1 person who has ticked PutraBLAST-Assignment and 'Tidak Berkaitan'. There are 32 respondents who ticked 'Tidak Berkaitan' and they are using alternative tools including Quizizz, Quizlet, Survey Monkey, Kahoot, Cengage Now, Testmoz, EdPuzzle, Easy Test maker, Google Form, Excel, Mentimeter. Some of these respondents also mentioned using traditional approaches for assessment purpose. The comments of this group to PutraBlast is a mix of positive and negative opinions. Some commented that PutraBLAST is good, but only if the accessibility issue is solved. However, contradictory comment has also been collected from the same group, which stated that PutraBLAST is simple and could be used by instructors in various backgrounds. Other negative comments are such as it is complicated and not user friendly while some complaints about slow connections. These inputs are taken by CADe to be addressed through the upgraded version of PutraBLAST.

d) Platform

Various alternative systems have been used by the respondents such as Edmodo, Pearson, Padlet, Eagle Navigator, Google Drive and Dropbox.

CONCLUSION

This paper presents the design, results and analysis from a survey conducted to understand the current practice in the teaching approach and the usage of PutraBLAST. The survey has been designed to collect information about the delivery, activity and assessment practice by UPM's instructors. The collected data are analysed to identify the current situation and status to be the input towards designing the innovative delivery transformation in teaching and learning. The transformation program is going to be implemented through a series of various activities combining townhalls, roadshows, trainings, and forum. Reference materials are produced such as guidelines, playbook and mobile applications. The results are also used in developing suitable training modules

at CAde such as through the Technology Enhanced Active Learning course, besides addressing the identified concerns through the PutraBLAST trainings.

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ONLINE LEARNING STUDY IN DIVORCE CASES MANAGEMENT: A CASE STUDY AT “PEJABAT AGAMA ISLAM KUANTAN”

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ABSTRACT

Divorce cases among Muslims in Malaysia is still in a high ratio statistics. This issue significantly affects the social progress of the nation. In many cases, the divorcee and their children are struggling mentally and emotionally in adapting with the new environment after the divorce. Many studies have been conducted about the divorce in Malaysia; most seems to focus on the factors that lead to the divorce; others focus on the processes of the divorce and ways to prevent it. Less study found to focus on post-divorce help, let it be alone to discuss about the post-divorce support centre. Therefore, a new proposed online divorce support management system has been proposed by the researchers to overcome the problems. The system highlights the potential of online learning as one of the proposed mechanism in managing divorce cases. Based on some interviews conducted at Kuantan Islamic Religious Office [Pejabat Agama Islam Kuantan], the concept of online learning is very novel and practical to be implemented by the religious office.

Keywords: Online learning study, divorce case management, “Pejabat Agama Islam Kuantan”

INTRODUCTION

Marriage is encouraged in Islam. It is an act to please Allah because it is in accordance with His commandments that husband and wife should love and help each other to continue the human

race as well as rear and nurse their children to become true servants of Allāh. Allāh says in the Qur’ān says: “*And among His signs is that He created for you mates from among yourselves, that you may find tranquility with them. And He has put love and mercy between your (heart). Verily there are signs for people who reflect*”, al-Qur’ān, 30: 21¹. He says again: “*Marry those among you who are single, or the virtuous ones among your slaves, male or female. If they are poor, Allah will enrich them out of His Bounty, and Allāh is Ample-giving, Knowing*”- al-Qur’ān, 24:32 adapted from¹. The Prophet Muhammad encouraged marriage, he said: “*O young people! Whoever among you can marry, should marry, because it helps him lower his gaze and guard his modesty, and whoever is not able to marry, should fast, as fasting diminishes his sexual power.*” - Ṣaḥīḥ Muslim, ḥadīth no: 1400²; Ṣaḥīḥ al-Bukhārī, ḥadīth no: 5065³.

Islām has set the rules, laws and statutes in order to maintain the happiness and welfare of the family institution. Divorce is a lawful thing, but is most hated by Allāh, the Prophet said: The Prophet said: “*The most hated of permissible things to Allah is divorce*” - Sunan Abī Dāud, , ḥadīth no: 2178⁴; Sunan Ibn Mājah, , ḥadīth no: 2018⁵. The spouses should avoid divorce as much as possible. If they have difficulties and problems they should try to work out their differences and seek help from others especially from their own their relatives. However, if the differences are irreconcilable, then divorce is permissible, but it should be done in a decent manner. The impact of divorce could bring negative effects on the individuals and their children are facing more.

It is reported by **Department of Statistics**⁶ that the number of Muslim marriages recorded in 2017 was 134,008 decreased 6.1 per cent as compared to 142,712 (2016); hence the number of divorces improved by 3.2 per cent from 51,642 (2016) to 49,965 (2017). However, the crude divorce rate (CDR) remained at 1.6 per 1,000 population and consequently, CDR among Muslim population is still high.

The government, through Islamic Development Department of Malaysia [Jabatan Kemajuan Islam Malaysia, JAKIM]⁷ has introduced pre-marriage course, which is carried out with the help of state religious departments, NGOs and other associations. However, there is no education after the divorce; whereby the divorce is a real phenomenon in Malaysia. It should be given appropriate attention by all parties, particularly the state governments which do have jurisdiction over Islamic affairs in their respective states.

PROBLEM STATEMENT

Lack of study focusing the usage of online divorce support management system. Hence, this paper highlights the potential of online learning as one of the proposed mechanism in managing divorce cases.

LITERATURE REVIEW

A reality known to all that a divorce causes many negative problems to all parties involved; particularly to the children of the divorcees such as poor academic, social, and psychological outcomes⁸. A variety of protective factors can increase the likelihood of long-term positive

psychological adjustment⁹. In Malaysia, many studies have been conducted about the Muslim divorce; most seems to focus on the factors of the divorce and ways to prevent it. There are some studies focusing on post-divorce support in certain aspects such as on the law enforcement¹⁰, but less study found to focus on post-divorce support help, let it be alone to discuss about the post-divorce support centre. The main question remains is “how to educate those needed parties such as the divorcees and children to get related support advice?”. This lack may lead to chaos, distress & many other social problems, particularly on the children of divorced couples.

OBJECTIVE OF THE STUDY

This study aims to determine the potential of online learning as one of the proposed mechanism in managing divorce cases.

METHODOLOGY

This qualitative study uses interview method whereby the researchers have interviewed the *Qādi*¹ and *Timbalan Qādi* of Kuantan to get the information about the existing issues related to divorce cases. In short, in a session for a couple, a counsellor needs to spend at least three hours by listening and taking important notes. With the increasing trend of divorce cases, the counselling session delay many cases since there are limited qualified counsellors. Both respond positively when we propose the online platform for the divorcees and their children to get the needed help in coping their respective needs. This online platform for sure will help all parties involved.

To verify the qualitative findings, we performed quantitative analysis of the academic works from Google Scholars and Scopus. The reason for using Google Scholars is it wider coverage of scholarly works including websites. We used a software tool known as Harzing Publish or Perish that available for free download from it official website. The phrases we use in retrieving scholar works from the tool are:

Specific:

Title words: “divorce malaysia”

Keywords: “online, support, muslim”

General:

Title words: “divorce”

Keywords: “online, support, muslim”

RESULTS

¹ *Qādi* is the head of the Islamic Religious Office Department.

For Google Scholars, the retrieved data shows that the specific search only results three (3) papers related to the search. Meanwhile the general search shows that there are 281 papers.

The screenshot shows a Google Scholar search interface. The search terms are 'divorce malaysia [title], online support muslim'. The search results table shows three papers:

Source	Papers	Cites	Cites/y...	h	g	hl,no...	hl,ann...	acc...	Search date	Cache date	Las...
Google Sc...	3	0	0.00	0	0	0	0.00	0	08/20/2019	08/20/2019	0

The results list includes:

- INIH Norris, NI Zul...: Divorce Trends among the Malay Community in Perlis, Malaysia over a Ten Year Period (2006- 2015)
- K Ibrahim, MHM S...: The Challenges in Enforcing Post Divorce Order of Native Court in East Malaysia
- M Makhtar, KA As...: Children's Right to Education: Financial Neglect after Divorce in Muslim Marriage in Malaysia

Figure 1: Specific search (Malaysia)

The screenshot shows a Google Scholar search interface. The search terms are 'divorce [title], online support muslim'. The search results table shows 281 papers:

Source	Papers	Cites	Cites/y...	h	g	hl,no...	hl,ann...	acc...	Search date	Cache date	Las...
Google Sc...	281	3920	76.86	29	60	23	0.45	12	08/20/2019	08/20/2019	0

The results list includes:

- A Buchler, A Latif: Judicial encounters with Islamic and Middle Eastern family law in Switzerland from a private internationa...
- A Cherlin: Introduction to the special collection on separation, divorce, repartnering, and remarriage around the w...
- A Lakhous: Divorce Islamic Style
- A Lamrabet: The Principles of Divorce in the Qur'an
- A Mashhour: Islamic law and gender equality: Could there be a common ground?: A study of divorce and polygamy i...
- A Nurdin: Mut'ah and Iddah: Post-divorce Payment Practices in Aceh
- A Shahid: Post-divorce maintenance for Muslim women in Pakistan and Bangladesh: A comparative perspective
- A Shahid: Post-Divorce Maintenance Rights for Muslim Women in Pakistan and Iran: Making the Case for Law Ref...
- A Tegegne, A Moll...: Marital Dissatisfaction, Coping Mechanisms, and the Likelihood of Divorce among Selected Districts of Ji...
- A Thadathil, S Sri...: Divorce, Families and Adolescents in India: A Review of Research
- A Wang: The Role of Spiritual Struggle and Attachment in Emerging Adults' Adjustment to Parental Divorce
- A Winik: Romantic attachment and the adult offspring of divorce: Terole of peers and parents
- AA Olaniyi: Analytical study of the causal factors of divorce in African Homes
- AA Sytner: Help-Seeking and the Efficacy of Rabbinic Interventions Amid Divorce in the Orthodox Jewish Community
- AB Dogarawa: Marriage and Divorce in Islam
- AE Rauch: Young Adult's Level of Differentiation and Experience of Parental Divorce: Impact on Relationship Satisfa...

Figure 2: General search

However, the three (3) papers which shown above actually do not related to the online support divorce management. The first paper is about the divorce trends among the Malay community in Perlis¹¹, the second is about the challenges in enforcing post-divorce order¹² and the third paper is about the financial neglect after divorce¹⁰. For Scopus search, the retrieved data shows that there is no publication related to it in Malaysia.

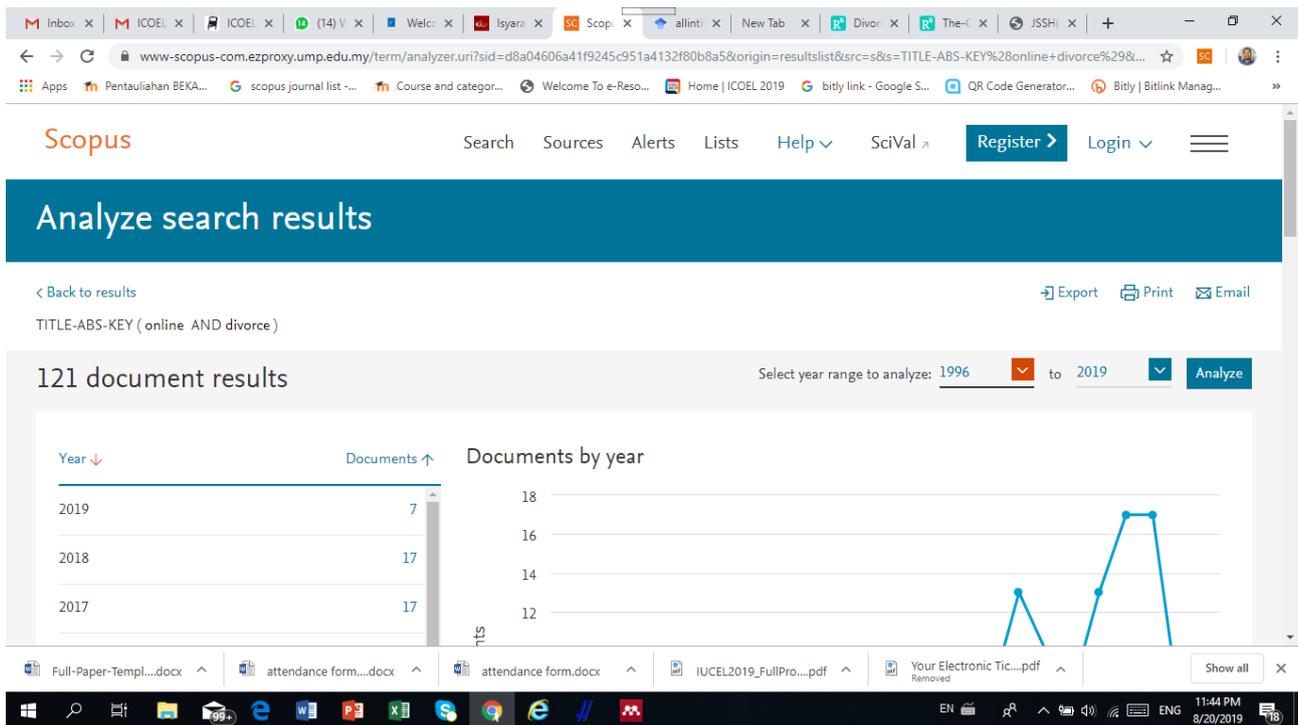


Figure 3: Online divorce search in Scopus

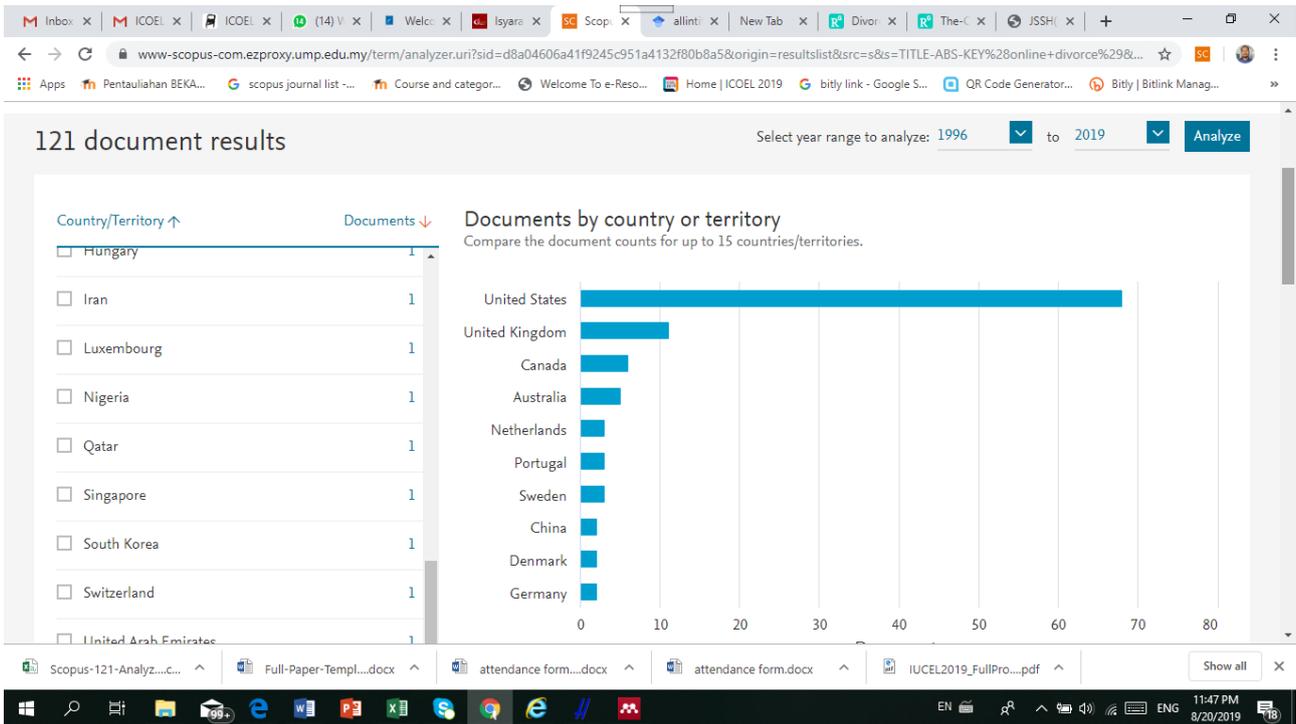


Figure 4: Documents by country

DISCUSSION

In fact, the interviews conducted on 15th July 2018 (with the Qādi of Kuantan) and 16th of July 2019 (with the Deputy of Qādi), confirm that the responsibility of the Religious Office Department ends when the couple officially declared as divorcees. There is no official support help or programme for the divorcees, except if they want to make complaints about the ex-husband or ex-wife who does not fulfill obligations or claims that have been agreed in the court.



Figure 1: Existing process flow in managing divorce cases in Malaysia¹³

Therefore, this new proposed process flow for Kuantan religious department is introduced. Compared to existing process flow of the state religious departments as in Figure 1; this new process at the beginning includes “e-Kufu’ Assessment”¹⁴. This assessment can give computerized prediction on the main factors of the divorce objectively. This software helps any couples who intend to file a divorce to get the first picture of their main factor/s in the shaky relationship.

With this new help, the couples do not need to go to the compulsory counselling session prior to the divorce application. However, if the couple insist to go to the counselling session, then the counsellor has known the points to focus in dealing with the couple since e-Kufu’ software has shown the factors of the divorce.

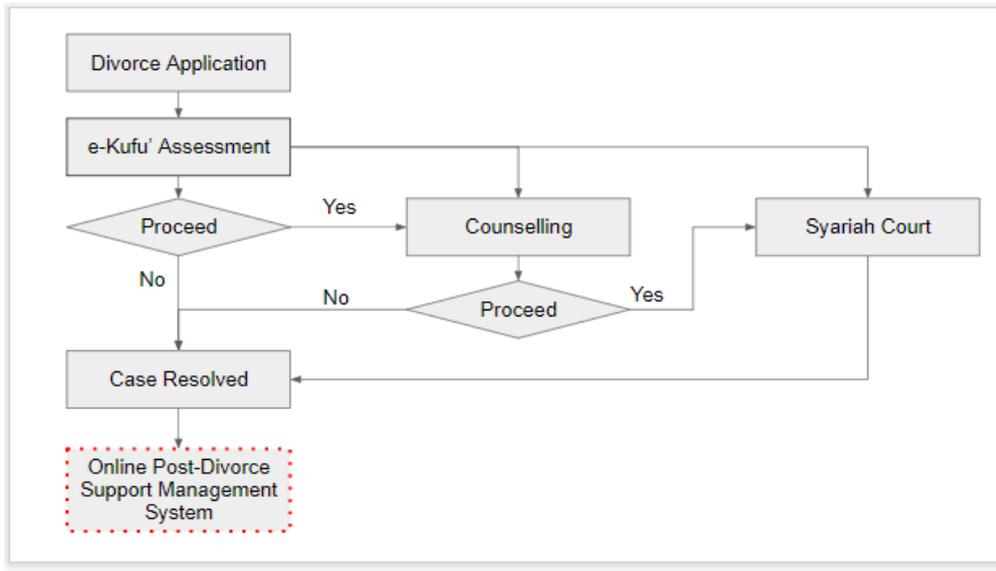


Figure 2: The new proposed process flow by the researchers

CONCLUSION

It seems that the best existing solution provided by Kuantan Islamic Religious Office, as well as the other state Islamic religious offices is the counselling session. This solution has proven is not practical much for people nowadays who are busy with their job and responsibilities. The traditional way is a long cost-consuming process which requires much patience and money from the claimants. The procedure becomes harder if the former husband/ wife refuses to cooperate and take responsibility. The impact would be on children who are forced to enter labour force before they enter adulthood since the group is the most affected individuals in many aspects such as the social, mental, emotional and financial. Protecting the best interests of all parties involved would be rather easier with the help of online learning which being integrated in the divorce support management system.

Religious departments should not only responsible for the registration process of marriage and divorce of Muslim couples. Its role should also be extended in guiding those who have been divorced, their children and family members.

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EMOTIONAL ENGAGEMENT INDEX: A NOVEL TOOL TO MEASURE EMOTIONAL ENGAGEMENT IN BLENDED LEARNING

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ABSTRACT

Emotional engagement is one of the core elements for implementing impactful learning experience in education as well as professional training. This element however is often been reported through self-administered questionnaire or psychometric approach. That approach may not capable to represent the context of student's emotion in each session of the class. As a result, there is lack of indicator that measure this affective domain in consistent, simple and systematic manner. This study proposed a simple online attendance that include emotional icon or emoji as a graphical clue for students to indicate their feelings in the class during attendance signing process. The population or number of students in this study is 45. Student emotion data from each attended face-to-face session has been analyzed in formulating an emotional engagement index for each student in class. The index is a ration value from the frequency of the emotion against total class session in a semester. Based on the index, this study adopts a simple linear regression method and found that there is a positive relationship between emotion and the attainment of course learning outcomes with $r = 0.4557$ for the cognitive domain. The proposed emotional index formulated based on emoji data is a novel approach for educators to measure student emotional engagement in blended learning environment.

Keywords: Emotional engagement, emotional index, learning outcomes

INTRODUCTION

The Malaysia national education philosophy¹ states that;

“Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving high level of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society and the nation at large.”

The idea of emotion has been addressed in the national education policy. Generally, the emphasize is academic is more on the intellectual or cognitive capacity, either through education innovation adoption or conventional assessment system. However, there is a lack of practical and impactful approach to assess the emotional part of student well-being. Assuming student capable to learn effectively without considering the influence of emotional part would violate the national education philosophy. Therefore, the aim of this study is to investigate a practical approach in assessing student’s emotional engagement in blended learning environment.

LITERATURE REVIEW

Student Engagement

In blended learning strategy, physical presence of both teacher and student is still required as defined² by the term itself. Blended learning can be easily understood as combination of face-to-face and online learning. There are claims that blended learning has an impact on student engagement³⁻⁶, academic performance⁷ and learning outcomes⁸. Implementation of blended learning is critical for higher education. According to Malaysia e-learning policy known as DEPAN 2.0⁹, certain percentage of the course offered by higher education institution should implement blended learning approach within three phases. With the success and effectiveness of flipped classroom¹⁰, the needs of strategic impactful student engagement in face-to-face is critical towards the culture of smart university^{11,12}. Student engagement can be conceptualized as integration of three interrelated dimensions which are cognitive engagement, emotional engagement and behavioral engagement. While there are many literatures on student engagement in online learning, there is limited research on student engagement in face-to-face approach. Therefore, the first research question in this study is:

RQ1: What is the differences in term of number of studies on student engagement in blended learning between face-to-face and online learning approach?

Emotional Engagement

Emotional engagement is a very interesting topic of research not only in education but also in business¹³⁻¹⁵. In education, it is often been reported through self-administered questionnaire or psychometric approach. Previous study¹⁶ reported that this approach has its own limitation in presenting the context in accurate manner. This self-reported approach may not capable to represent the context of student’s emotion in each session of the class, if it is been measured through typical survey approach. The use of emotional icon or emoticon¹⁷ in social media has been widely accepted by many people who use Internet. This suggest that emoticon or also called as emoji is a very practical medium to capture student’s emotion in class instead of using psychometric instruments. Although measuring student’s emotion through psychometric

instrument is an old and widely adopted practice by researchers, it is not practical to be used to measure in contextual and high frequent event like class session. Based on limitation of psychometrics-based instrument, we found from the literature¹⁸ the potential used of emotional icon or emoji. Recent study¹⁹ claims that emoji should be integrated in educational communication due to its potential to enhance social-constructivist pedagogy. Inspired by the studies²⁰⁻²² revealing the advantages of emoji as visual communication, we adopt emoji one of the components in our instrument. The use of emoji may resolve the way how the data can be captured effectively, but what new insights this emoji data can offer in pedagogy domain. Therefore, the second research question of this study is:

RQ2: Is there any relationship between student emotional engagement with course learning outcomes attainment?

Student Attendance System

The best teaching and learning context to measure student engagement is during face-to-face session. This is justified with literature²³ that claim face-to-face or in class activities comes with “more engagement” and “immediate feedback” which are foundation for student to progress in learning. But measurement and statistical methodologies are yet another challenges highlighted by Fredricks and his team²⁴ regarding student engagement. Since face-to-face learning approach is part of blended learning, generally student attendance or absence is a very practical indicator in assessing student engagement²⁵ and academic performance²⁶. The student attendance can be used as a direct representation of student behaviour engagement in the course. Conventional student attendance only capture student identify either student’s signature or the instructor writes a note by calling student’s name in the class, which is not productive nor smart. There are many studies on student attendance system that integrate biometrics²⁷, Quick Response or QR code²⁸, Radio Frequency Identification (RFID)^{29,30} and voice recognition³¹. Most of the study is focusing on the technological aspect and less emphasize on the student engagement particularly emotional engagement. With more online services offered through cloud computing technology, there is a promising opportunity how this matured and global scale adopted technology can be used to create a simple and smart attendance system that incorporate components of emotional engagement. Our third research question of this study is:

RQ3: What is the model of attendance system that incorporate emotional engagement data?

Based on critical needs of student emotional engagement in class, the potential of emoji and student attendance system, this study integrates these three components in order to measure student emotional engagement effectively and contextual manner for blended learning environment. Therefore, the aim of this study is to formulate and test an emotional engagement index in measuring student emotional engagement in blended learning environment in face-to-face session.

METHODOLOGY

Participants and Procedure

The data were collected from the students who enrolled in a course conducted by the author that been offered at Semester 2 in 2018/2019 session. Table 1 indicates the profile of the target population.

Table 1. Participants of study

Course Name	Data Analytics & Visualization
Student Size	46 (Male:20; Female:26)
Enrolment duration	28 Jan 2019 – 26 May 2019
Number of week	14 weeks
Number of lecture session	1 session per week (2 hours)
Number of laboratory session	1 session per week (2 hours)
Total face-to-face session for student	28 sessions
Course Learning Outcomes	<p>CO1 <i>Analyze the concept of data analytics and visualization in various applications (Cognitive domain)</i></p> <p>CO2 <i>Construct a visualization application by implementing data analytics and visualization techniques.</i></p> <p>CO3 <i>Shows the ability for independence learning and propose the suitable solutions to facilitate stakeholder decision making.</i></p>

The procedure adopted in this study for data collection are based on quantitative method. We collect student emotion data by using cloud-based smart attendance system which include emotional icon or emoticon every class or laboratory session. Figure 1 shows the process flow of the data collection procedure.

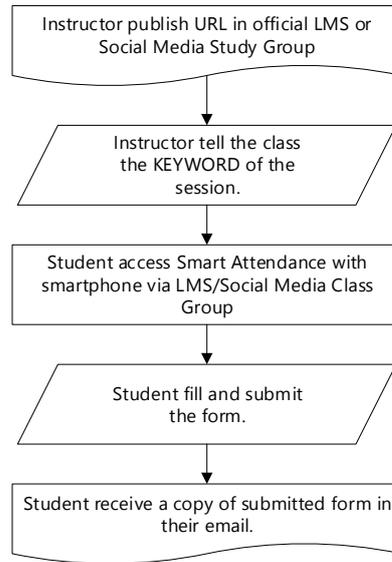


Figure 1. Data Collection Procedure

Instrument

Instruments used in this study in order to answer the research questions are summarized in Table 2.

Table 2. Instruments adopted in study

Research question	Instrument
RQ1	Harzing’s Publish or Perish software tool
RQ2	Emotional Engagement Index
RQ3	Cloud-based Smart Attendance

The formulation of the emotional engagement index is based on the following calculation model: -

$$E = \frac{\sum(emoji \times Emoji\ scale)}{maximum\ class\ session} \tag{1}$$

The emotion scale used to represent the the degree of positive engagement is illustrated in Table 3.

Table 3. Emoji scale

Emoji	Emotion description	Scale
	Student feel great with the class learning experience.	4
	Student feel ordinary with the class learning experience.	3
	Student feel unknown with the class learning experience.	2
	Student feel bad with the class learning experience.	1

We designed a simple online form on the cloud services which used as student attendance form as our instrument in this study. There are items of emotion which represented by emoji. In each class or laboratory session, student needs to fill the form by using their smartphone or computer as a replacement on manual attendance taking process. Figure 2 shows the visual model of the instrument used in this study.

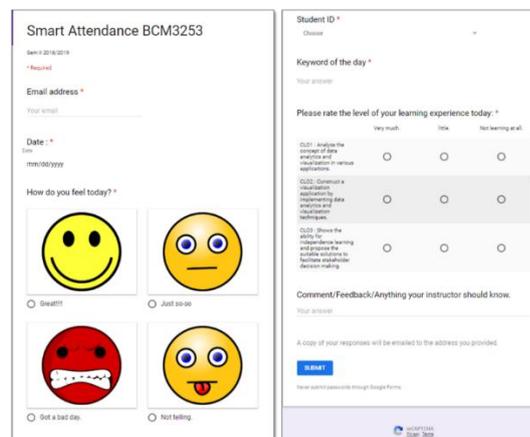


Figure 2 Visual Model of the Attendance Form used as Instrument

MAIN RESULTS

Result 1: Research Gap Analysis of Student Engagement in Blended Learning

Table 4 shows our initial findings from Google Scholars database on the lack of studies on student engagement in face-to-face approach. To acquire this data, we used *Harzing's Publish or Perish* software tool to retrieve metadata of academic publications. Although face-to-face is older than online learning approach in education, the difference values of the *Year First* indexed is

seven years later than the online learning is quite surprising. This result shows that there is a big gap in research on student engagement between face-to-face and online learning. Although online learning approach compliment the limitation of face-to-face approach, a complete student engagement in term of cognitive, emotional and behaviour best to happen during face-to-face learning session. This gap suggests our study has potential contribution to the research on blended learning.

Table 4. Research gap on student engagement in blended learning

Query	student engagement "face- to-face" [title]	student engagement "online learning" [title]	Difference
Papers	16	144	128
Citations	28	2581	2553
Year First	2007	2000	7
Year Last	2019	2019	0
Years	12	19	7
Cites per Year	2.33	135.84	133.51
Cites per Paper	1.75	17.92	16.17
Cites per Author	10	1263.05	1253.05
Query Date & Time	7/13/2019 13:25	7/13/2019 13:36	-

Result 2: Relationship of Emotional Engagement with Course Learning Outcomes Attainment

In order to investigate the relationship of emotional engagement with the course learning outcomes attainment in RQ2, we adopt a simple linear regression to find the value of Pearson correlation coefficient (PCC). The emotional engagement index is then calculated based on the equation (1). Table 5 shows the result of analysis between previous CGPA, emotional engagement index, course learning outcomes attainment from assessment and perceived attainment from rating scale parameters.

Table 5. PPC value of Emotional Engagement with Course Learning Outcomes

Parameters	CGPA	Actual			Self-Rating		
		CO1	CO2	CO3	CO1	CO2	CO3
Emotional Engagement	0.3950	0.4557	0.4364	0.3577	0.9669	0.9642	0.9554

CGPA		0.5331	0.5024	0.4065	0.3273	0.3356	0.3421
CO1 (Actual)			0.8596	0.8308	0.4397	0.4438	0.4276
CO2 (Actual)				0.8752	0.4117	0.4205	0.4249
CO3 (Actual)					0.3344	0.3429	0.3306
CO1(Self-Rating)						0.9966	0.9859
CO2 (Self-Rating)							0.9911

Based on the Table 5, there is strong positive correlation between student emotional engagement with the all course learning outcomes in the self-rating category. This indicates student emotional engagement highly influence their contextual perception on the attainment of the learning outcomes during the class or face-to-face session. This novel approach in measuring emotional engagement in context is the first time been reported through this study. Despite weak positive correlation on actual course learning outcomes attainment, this result indicates that student emotional engagement is significance on the actual attainment of learning outcomes. This is justified with the calculated probability or p -values shown in Table 6. In this case, we adopt the common value of α which is 0.05.

Table 6. Significance of Emotional Engagement with Course Learning Outcomes

	Emotional Engagement Index						
	CGPA	Actual			Self-Rating		
		CO1	CO2	CO3	CO1	CO2	CO3
Pearson Coefficient	0.3950	0.4557	0.4364	0.3577	0.9669	0.9642	0.9554
n	45	45	45	45	45	45	45
p -value	0.0072	0.0017	0.0027	0.0159	0.0000	0.0000	0.0000
Significance	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: $\alpha = 0.05$

DISCUSSION

Finding #1

RQ1: What is the differences in term of number of studies on student engagement in blended learning between face-to-face and online learning approach?

Based on the results in Table 4, there is an interesting research publication pattern in on student engagement between face-to-face and online learning approach. There are more research studies on online learning as compare to face-to-face approach. This perhaps due to limitation of effective data

acquisition method comparing to online learning and this will influence the duration and motivation of conducting study. The difference in term of number of studies on student engagement in face-to-face and online learning is not that critical as we consider the number of publication years for both cases. However, the number of total citations shows a big difference of study in student engagement in face-to-face and online learning. This interesting citation pattern might be the reason why study on student engagement in face-to-face has little attention by the researchers as compare to online learning. Citation has a direct impact on the calculation of h-index, a metrics in measuring the productivity of researchers³². This obvious research gap can be minimized with our model of smart attendance to effectively gathering data on student engagement in face-to-face approach.

Findings #2

RQ2: Is there any relationship between student emotional engagement with course learning outcomes attainment?

There is positive relationship between student emotional engagement with the course learning outcomes attainment. Table 5 shows the learning outcomes attainment from the self-rating has high positive correlation on student learning outcomes. Although the self-rating indicates student perception during the class session and it is not a formal assessment, perception also play an important part in student learning by promoting cognitive engagement of student with the course. This self-rating also important as a feedback for the instructor to improvise his teaching practice and verify the impact of the conducted teaching approach. For the actual course learning outcomes attainment through course assessments, there is weak positive correlation with emotional engagement. The overall score of course assessment is measured at the end of the semester might not be in close context for the emotional engagement. Although course assessment has better validity as compare to self-rating approach, the emotional engagement during learning process is best measured in context as emotion³³ itself is fluctuate over the time. Perhaps this is an explanation why the actual course learning outcomes attainment measured with course assessment has lower correlation values comparing to self-rating approach. This study might offer a key information on how emotional engagement can be and should be measured in contextual manner.

Findings #3

RQ3: What is the model of attendance system that incorporate emotional engagement data?

This study adopted emoji-based attendance system to incorporate emotional engagement data. Designed in cloud-based environment which accessible through smartphone, the acquiring emotional engagement data can be simplified and co-functioning or embedded in attendance taking process. Emotional data is difficult to acquire and some study on emotion require some dedicated and special sensors^{34,35}. The model of attendance system is simple and practical since it is deployed in cloud infrastructure using Google cloud service (Google Forms and Google Sheet). Unlike other emotion-

based data acquisition system, our attendance system does not require any additional hardware infrastructure and complex software configuration. Perhaps our model optimally the usage of campus Internet access and student digital devices. Therefore, our model of emoji-based attendance system has potential research contribution for facilitating educator and researcher conducting study on student engagement in face-to-face and blended learning environment.

CONCLUSION

Student emotional engagement index in blended learning approach particularly in face-to-face has a potential impact on student learning outcomes. Impactful learning experience should be measured in contextual manner especially on emotional engagement. Without proper and effective measurement strategy, how institution can manage student emotional engagement when it is not measured. With emoji-based attendance system, collecting student emotional data within attendance taking process can be adopted in consistent, simple and systematic manner while offer a new insight of attendance data. More contextual analysis can be made on student emotional engagement with emotional engagement index. The index formulated based on emoji data is a novel approach for educators to measure student emotional engagement in blended learning environment.

For future research, sentiment analysis can be adopted to perform text analysis in the reflection or comments by students. It then can be further associate with contextual emotion and overall emotional engagement index of student learning experience in blended learning environment.

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ON THE SELECTION OF CULMINATING COURSES FOR OUTCOME-BASED EDUCATION EVALUATION AT ENGINEERING EDUCATION

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ABSTRACT

In many engineering programmes in Malaysia, the tendency is to compute the Programme Outcomes (POs) attainment from first until last semesters for every student and each course. The average PO is then computed at the end of the semester/programme for each student/cohort. Weightages at the course and/or programme level are used to finalize the final POs achievement. However, it produces numbers which carries no significant meaning. An outcome is not a collection or average of previous learning experiences, but a manifestation of what learners can do once they have had and completed all of those experiences. The previous POs assessment at Kulliyah of Engineering (KOE), IIUM, by measuring and averaging POs across courses is not supported by the current practice by ABET. PO or student outcomes in ABET terms are statements that describe what students are expected to know and be able to do by the time of graduation. Outcomes are high-quality ‘culminating’ demonstrations of significant learning in experiences, literally at the end or after the end. This paper presents the OBE framework at KOE-IIUM which categorize course into enabling and culminating courses, describes the process of selecting culminating courses from the engineering curriculum and provides a strategic POs evaluation for each culminating courses using rubrics.

Keywords: Outcome-Based Education; Programme Outcomes; Graduate Attributes; Culminating Courses; Enabling Courses;

INTRODUCTION

In Malaysia, outcome-based education (OBE) has become mandatory as stated by Malaysia Quality Agency (MQA). For engineering education, International Engineering Alliance (IEA) has set the graduate attributes and professional competencies as the basis for engineering accreditation across Washington accord signatories [1]. In Malaysia, Engineering Accreditation Council (EAC), Board of Engineers Malaysia (BEM) has primary responsibilities to set policy and conduct approval and

accreditation evaluations [2]. OBE can be referred to as a method of curriculum design and constructive alignment that focuses on what students can actually do after they are taught. In OBE, the curriculum was driven by the final outcomes the students should display at the end of their course.

The four essential principles of OBE has been developed in [3] and is shown in Figure 1. The first principle is *clarity of focus*, in which teachers must be clearly focused on what they want learners to ultimately be able to do successfully. The second principle is *designing back*, in which the starting point for all curriculum design must be a clear definition of the significant learning that students are able to achieve by the end of their formal education. The third principle is *high expectation*, in which teachers must establish high, challenging standards of performance to encourage students to engage deeply with the issues about which they are learning. The last principle is *expanded opportunities*, in which most students can achieve high standards if they are given appropriate opportunities. In engineering education, the last principle is significantly related with active learning [4, 5].

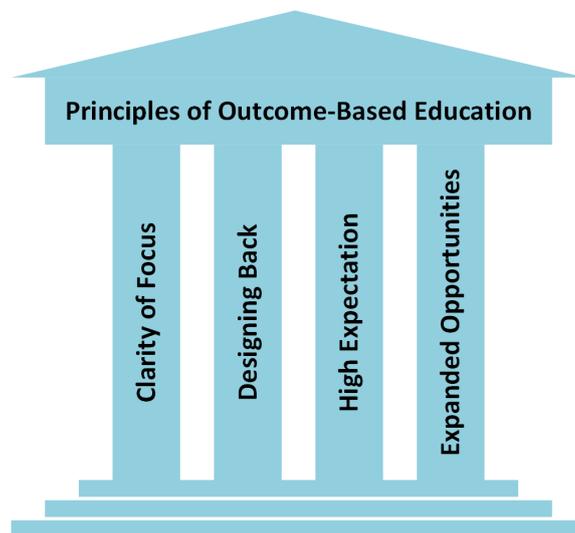


Figure 1. Principles of OBE

First, this paper will describe the graduate attributes or programme outcomes (PO) as defined by IEA/EAC [1, 2] and as adopted by KOE-IIUM [6]. Then, the mapping of knowledge profile to the programme outcomes was extracted from [1], in which it clearly shows that certain PO has more knowledge profile than the others. The current implementation of OBE framework at KOE-IIUM will be explained, in which courses were categorized into enabling and culminating courses. The POs measurement is then conducted at the selected culminating courses.

PROGRAMME OUTCOMES COMPARISON

Programme outcomes (PO) described what student are expected to know and be able to perform or attain by the time of graduation. It relates with the skills, knowledge, and behaviour that students must be able to acquire through the programme. Table 1 shows the PO in short form (keyword) and its differentiating characteristics [1].

Table 1. PO’s keywords and its differentiating characteristics

PO	Keywords	Differentiating Characteristics
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PO1	Engineering knowledge	Breadth and depth of education and type of knowledge, both theoretical and practical
PO2	Problem analysis	Complexity analysis
PO3	Design/development of solutions	Breadth and uniqueness of engineering problems, i.e. the extent to which problems are original and to which solutions have previously been identified or codified
PO4	Investigation	Breadth and depth of investigation and experimentation
PO5	Modern tool usage	Level of understanding of the appropriateness of the tool
PO6	The engineer and society	Level of knowledge and responsibility
PO7	Environment and sustainability	Type of solutions
PO8	Ethics	Understanding and level of practice
PO9	Individual and team work	Role and diversity of team
PO10	Communication	Level of communication according to type of activities performed
PO11	Project management and finance	Level of management required for differing types of activity
PO12	Lifelong learning	Preparation for and depth of continuing learning

Table 2. PO Comparison between IEA[1], EAC[2], and KOE-IIUM [6].

PO	International Engineering Alliance Version 3 2013 Engineering Accreditation Council 2017	Kulliyyah of Engineering 2018
1	Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.	Apply knowledge of mathematics, sciences, engineering fundamentals and an engineering specialization to the solution of complex engineering problems
2	Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)	Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences
3	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)	Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and <i>sustainability issues</i>
4	Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	Conduct investigation into complex problems, <i>displaying creativeness</i> , using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions
5	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)	Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to <i>complex engineering activities</i> , with an understanding of the limitations
6	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to

	relevant to professional engineering practice and solutions to complex engineering problems. (WK7)	professional engineering practice and solutions to complex engineering problems
7	Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)	Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts
8	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)	Apply professional ethics <i>with Islamic values</i> and commit to responsibilities and norms of professional engineering code of practices
9	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.	*PO10: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings
10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	*PO9: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
11	Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	*PO12: Demonstrate knowledge and understanding of engineering management and <i>financial principles</i> and apply these to one's own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and <i>identify opportunities of entrepreneurship</i>
12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	*PO11: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Table 2 shows the programme outcomes (or graduate attributes) between IEA/EAC [1, 2], and KOE-IIUM [6]. The institution of higher learning (IHL) has the freedom to add or modify the attributes (highlighted using italics at Table 2) as long as it captures the differentiating characteristics. For example, PO3 (design) of KOE-IIUM includes the sustainability issues, PO8 (ethics) of KOE-IIUM highlights the professional ethics with Islamic values, and PO11 (project management and finance) of KOE-IIUM includes the entrepreneurship. Note that, PO9 and PO10, PO11 and PO12 stated different characteristics between IEA/EAC and KOE-IIUM. In the future, the PO of KOE-IIUM will be aligned to the PO of IEA/EAC. In our paper, we will refer the PO numbering with specific keywords according to the IEC/EAC [1, 2]. PO1 to PO5 are the main attributes of engineering education related to technical, analysis, and design parts. PO6 to PO8 related to ethics, society, safety, and environment. Lastly, PO9 to PO12 related to the required skills of an engineering graduate.

MAPPING OF KNOWLEDGE PROFILE TO PROGRAMME OUTCOMES

Knowledge profile of the Washington accord (WK), as shown in Table 3, is an indication on volume of learning and the attributes against which graduates must be able to perform [1, 2]. Each Institute of Higher Learning (IHL) has freedom to design programmes with different detailed structure, learning pathways, and modes of delivery.

Table 3. Knowledge Profiles of an Engineer according to Washington Accord [1]

WK	Keywords	Description
WK1	Natural sciences	A systematic, theory-based understanding of the natural sciences applicable to the discipline.
WK2	Mathematics	Conceptually-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.
WK3	Engineering fundamentals	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Specialist knowledge	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Engineering design	Knowledge that supports engineering design in a practice area.
WK6	Engineering practice	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Comprehension	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.

WK8 Research literature Engagement with selected knowledge in the research literature of the discipline.

Table 4 illustrates the relation between PO and knowledge profile (WK) extracted from [1]. As seen in Table 4, PO1 and PO2 covers more knowledge profile (WK) compared to the other POs. It can be concluded that courses which mapped to PO1 and PO2 should properly measure WK1 to WK4. Due to the nature of the course, the WK measurement needs to be spread to one or more courses. Moreover, WK1 to WK4 should have different rubrics to measure student outcomes on natural sciences, mathematics, engineering fundamentals, and specialist knowledge. It is interesting to note that PO9 to PO12 do not map to any knowledge profiles, as PO9 to PO12 is related with the skills that student needs to acquired.

Table 4. Relation between PO and Knowledge Profile (WK)

Engineering Knowledge	Engineering Knowledge	Problem Analysis	Design / Development of Solutions	Investigation	Modern Tool Usage	The Engineer and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management and Finance	Life Long Learning
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
WK1: Natural Sciences	✓	✓										
WK2: Mathematics	✓	✓										
WK3: Engineering fundamentals	✓	✓										
WK4: Specialist knowledge	✓	✓										
WK5: Engineering design			✓									
WK6: Engineering practice					✓							
WK7: Comprehension						✓	✓	✓				
WK8: Research literature				✓								

OUTCOME-BASED EDUCATION FRAMEWORK AT KOE-IIUM

In Malaysia, the tendency is to compute the POs attainment from first until last semester for every student and each course. The average PO is then computed at the end of the semester/programme for each student/cohort. Weightages at the course and/or programme level are used to finalize the final POs achievement. It produces numbers which carries no significant meaning [7, 8]. An outcome is

not a collection or average of previous learning experiences, but a manifestation of what learners can do once they have had and completed all of those experiences.

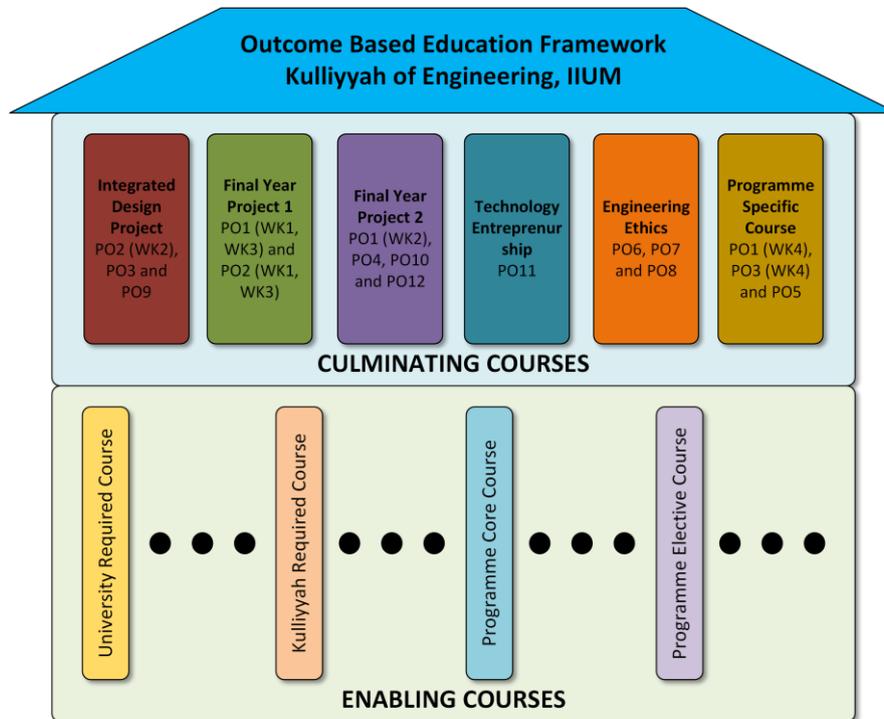


Figure 2. OBE Framework at KOE-IIUM

The previous POs assessment at KOE-IIUM by measuring and averaging POs across courses is not supported by the current practice by ABET [9]. PO or student outcomes in ABET terms are statements that describe what students are expected to know and be able to do by the time of graduation. In 1994, Spady [3] also mentioned that outcomes are high-quality ‘culminating’ demonstrations of significant learning in experiences, literally at the end or after the end.

On the outcome-based education (OBE) implementation at KOE-IIUM, courses will be categorized as enabling courses and culminating courses. The culminating courses will measure the actual POs attainments, while the enabling courses, at the course level, will be used as the progress indicator towards the achievement of POs. Figure 2 shows the current KOE OBE framework which clearly indicates the enabling courses and culminating courses.

CULMINATING COURSES AND PROGRAMME OUTCOMES MEASUREMENT

Each culminating courses evaluated one or more POs with the related bloom taxonomy and complex engineering problems, as shown in Table 5 and 6. While the enabling courses are courses other than culminating courses in the curriculum that helps us to develop, nurture, and cultivate the outcomes required at the end of programme. The final year project (FYP) might cover all the POs and could be selected as the only culminating course. However, to fairly distribute PO measurement so it will not be a burden for the course instructor, six courses were selected as shown in Table 5,

while the programme specific course is selected by the nine programmes owner themselves. Culminating courses are selected such that it can effectively measure the culminating experience.

Table 5. Selected Culminating Courses at KOE-IIUM

No	Courses			Engineering	Problem	Design /	Investigation	Modern Tool	The	Environment	Ethics	Individual	Communicat	Project	Life Long
	Code	Name	C h.	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	P O10	P O11	P O12
1	ECIE3300	Integrated Design Project	3		✓ W K2	✓		✓	✓	✓		✓	✓		✓
2	ECIE4398	Final Year Project I	3	✓ W K1 W K3	✓ W K1 W K3			✓	✓	✓	✓		✓		
3	ECIE4399	Final Year Project II	3	✓ W K2		✓	✓	✓	✓	✓	✓		✓		✓
4	MANU4211	Technology Entrepreneurship	2	✓					✓					✓	
5	GENE4300	Engineering Ethics from Islamic Perspective	3						✓	✓	✓				
6	XXX X	Programme specific course	3	✓ W K4	✓ W K4			✓							

Table 6. Programme Specific Culminating Courses

No	Programme	Culminating Course
1	Biotechnology Engineering	BTEN 4323 Bioprocess Control and Instrumentation
2	Electronics-Computer and Information Engineering	ECIE 4314 Operating Systems

3	Communication Engineering	ECOM 4314 Wireless Communication
4	Aerospace Engineering	MECH 4326 Aerospace Vehicle Design
5	Automotive Engineering	MECH 4313 Power Train Systems Design
6	Mechatronics Engineering	MCTE 4352 Robotics
7	Materials Engineering	MATR 3315 Materials Selection and Design
8	Manufacturing Engineering	MANU 4315 Computer Integrated Manufacturing
9	Civil Engineering	CIVE 4221 Construction and Project Management

Many factors contributed to a grade, therefore it is almost impossible to make inferences on the programme outcome achievement [10]. For programme outcome assessment, a numeric score that is directly linked to students' performance on specific performance criteria can be used as evidence. The student work (assignments/projects/case studies) related to the specific performance can be scored as a part of the course work and may even contribute to the course grade. Reporting the percentage of students who score at each of the performance levels provides meaningful data.

A generic rubric for PO measurement mostly adopted from [11] was proposed. It will be used for measuring PO achievement. These generic rubrics could be further added, reduced, modified to cater the specific learning outcomes of the particular courses [12]. The PO measurement will be conducted using assignments, projects, or case studies targeted specifically for particular POs for culminating courses other than FYP1, FYP2, and IDP.

Each culminating course will evaluate one or more POs as shown in Table 5. Note that, although the culminating course might map to several POs, but only selected POs highlighted in Table 5 will be measured. All the POs in culminating course will be used for traditional grading, and selected POs of that particular course will be used for PO attainment.

As evident in Table 4, PO1 and PO2 have four knowledge profiles (WK1 to WK4). For PO1, WK1 (natural sciences) will be measured in IDP, WK2 (mathematics) will be measured in FYP2 in the form of mathematical modelling and equations, WK3 (engineering fundamentals) will be measured in FYP1, and WK4 (specialist knowledge) will be measured in the programme specific course (see Table 6). For PO2, WK1 will be measured in FYP1, WK2 will be measured in Integrated Design Project (IDP) in the form of statistics analysis and experimental result evaluation, WK3 will be measured in FYP2, and WK4 will be measured in the programme specific course. WK1 to WK2 rubrics can be developed and later on combined (but not averaged) to indicate PO1 and PO2 attainments.

The Technology Entrepreneurship is two credit hours course, therefore it only measured PO11 that contains two components which is project management and finance. FYP1 will measure PO1 and PO2 as it focuses on critical literature review. FYP2 will measure the most POs, i.e. PO1 (engineering knowledge in the form of mathematical modelling of engineering phenomena), PO4 (investigation of the experimental results), PO9 (presentation and written report), and PO12 (good literature review and attending FYP seminar).

The IDP is the capstone project course that will measure PO2 (problem analysis), PO3 (engineering design), and PO9 (individual and team work). The Engineering Ethics from Islamic Prospective course will measure PO6 (the engineer and society), PO 7 (environmental and sustainability), and PO8 (ethics). Lastly, the programme specific course will measure PO1 (specialist engineering knowledge), PO2 (specialist problem analysis), and PO5 (modern tool usage).

In [9], it is stated that collecting evidence in lower-level courses would be helpful in understanding student strengths and weaknesses related to any given outcome. This would enable lecturers to reinforce and emphasize those concepts where students were weak prior to the culminating experience. POs measurement in culminating courses is not a mechanism to certifying that students can graduate. The use of traditional grades and cumulative grade point average (CGPA) remains the important certification process. POs assessment for each student or cohort is used by the programme owner to provide information about strengths and weaknesses in the curriculum, not in individual or batch of students. The measured POs will provide a feedback for the Continuous Quality Improvement (CQI) process on where improvements need to be made.

CONCLUSIONS

This paper has presented the OBE framework implemented at KOE, IIUM, in which culminating courses were selected to measure POs attainment. The enabling courses have significant role to nurture the PO achievement and will be used as the progress indicator towards the achievement of POs. Measuring and averaging POs across courses and semesters is not supported by the current practice by ABET. To measure the POs attainment, rubrics will be developed by setting the proper performance criteria. We have carefully selected six courses to measure all the twelve POs. Finally, the measured POs will provide a feedback for CQI process on where improvements need to be made.

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A REVIEW ON SECURITY AND PRIVACY ISSUES IN E-LEARNING AND THE MAPREDUCE APPROACH

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ABSTRACT

E-learning is very useful and extensively used nowadays for the learners and teachers in education lines for the process of teaching and learning via an electronic device. E-learning usually uses the network as an access medium, and it is exposing to the threats. Using the Internet leaves indelible tracks, such as log files, cookies and posts and effects on the privacy based on information as well. Therefore, the actions against security incidents increased since network-connected devices. Log files are generated at every level of the computing infrastructure and represent a valuable source of information in detecting attacks. Thus, log files are big volume and velocity needed for the higher in data processing time. The log files are very large and complex structure but required to diagnosing the system security. MapReduce is a promising parallel programming model for processing large data. Then, we proposed e-Learning using MapReduce algorithm in protecting the security and privacy of eLearning. The methodology is started with the literature study, then comparing each result of the previous works and the last part is the result. The description of the proposed solutions discussed. A comparative study on this topic has been done as an approach to focus on the security issues in e-learning. The expected results show that the proposed solution of MapReduce will enhance the security and privacy issues in e-Learning. Furthermore, the result expected can reduce the processing time and more efficient in facing the problems of the logged data, which is a big size in e-Learning.

Keywords: e-learning, security and privacy, MapReduce, Hadoop, Big Data

INTRODUCTION

The electronic learning system is known as e-learning and widely used in many schools, especially in higher education institution (HEI), and in some company [1] for the learning purposes. It provides a convenient environment, and usually, the learning process is in virtual form and using various tools, whether it is mobile or not [2]. E-learning becomes more important, and it is transforming from the teacher driven to student-driven [4], which is change the traditional way

through vertical relation to horizontal relation [3]. E-learning arose in 1990 over the world, which earlier developed in the USA and Europe [3].

There are lots of elements that discussed e-learning, yet this paper emphasizes on the several parts like e-learning's background, types, and categories of e-learning. The issues are about the design of e-learning, implementation, security, and privacy, strategic management, the e-learning elements, about awareness and other issues like political, financial, and individual. But the most important and frequently issues are related to the security and privacy in e-learning. Under these big issues, this paper focuses on the security elements, the threats, vulnerabilities, and the recommendations as to the proposed solutions. Thus, it motivated us to construct a research question such as follow;

RQ1: What are the critical issues regarding the security and privacy in e-Learning?

Then, we intend to achieve the objective of to identify the privacy and security issue in e-Learning and propose an approach in order to overcome the issue. At the end of this paper, the comparison of the issues among researches has been carried out and summarized the most important aspects in e-learning and its security and privacy. Other than that, the most frequently discussed among researchers about the threats and vulnerabilities have been identified. Hence, the comparison of the literature review will present as the method to overcome the issues of security and privacy in e-Learning. The paper organization is as follows. Firstly, section 1 describes the introduction of this research work. The second section is the foundation and background of the research work. Then, the next section provides the methodology and description of the security and privacy issues in e-Learning. The final section is the discussion and conclusion of this research work.

FOUNDATION

e-Learning Background

E-learning is used extensively nowadays, and it has many benefits, whether to the students or learner and the teachers, lecturers, and tutors. These features allow anyone; especially students able to learn and get or give the resources etc. anytime anywhere and when necessary. It eases for stakeholders such as students, administrator and tutors or teachers. The HEI absolute use e-learning to facilitate both sides between students and instructors. It summarized that e-learning is rich with the learning resources and materials.

E-learning has happened in terms of the transformation of teaching and learning, it has traditionally been dominated by the teacher where they will teach and students to gain knowledge with e-learning, but dominated by students and they should be attempt and initiative to get knowledge of e-learning [4]. Yunus and Zamzuri stated that e-learning is a “process of teaching and learning by using all sorts of electronically enabled technologies to enhance teaching and learning” [13]. E-learning is a modern information medium and technology and seems like a new technology of communication mechanism [4].

E-learning is an education system, and the most popular one and well known is Moodle (Modular Object-Oriented Dynamic Learning Environment) apart from others [1][6]. It is using the human-computer interaction (HCI) approach [11] which allows two-way communication and ease to the learners and teachers. E-learning is whether an open-source or commercial software which contains the learning module and lessons [11]. E-learning services are just simple but powerful services; indeed, it provided with convenience to all users (learners or teachers). E-learning application accessed via the internet involve the use of electronic devices and ICT [3].

It is about knowledge and skills using electronic media technology and the medium perhaps using the internet, intranet or extranet, audio and videotape, satellite TVC, CD-ROM, web application system and so on [5]. The users may control e-learning use from beginning to end for the learning process, and it is providing the best facilities to a particular student.

Types of e-Learning

There are three types of e-learning under the specifications and requirements of every institution that uses it. The learning management system LMS is viable and focus on managing learners [6]. LCMS is the learning content management system (LCMS), and ELMS is for education learning management system. LCMS is more about managing content development. An ELM also developed for online learning, and normally to the instructor always builds course content and can communicate with learners or students [6].

There are several open source ELMS, for example, Moodle, Claroline, and Atutor. But the usage of Moodle is broader use and better specifications. It's more interactive and easier to use by users. Claroline is also more compact, flexible, and stable. ATutor has also been developed to increase the use of the e-learning system. It has several features that ease users, such as e-learning activities, workgroups, blogs, and content tracking features [6]. E-learning divided into two categories: synchronous and asynchronous. E-learning in asynchronous is usually assisted by several media like email and discussion boards as a medium to provide two-way communications service improved between learner and instructor (perhaps not online and at the same time) [6].

The process of send and receive the e-learning materials, performed at any time. It is more flexible and eases to all users of e-learning. Synchronous is concurrency process that occurs between instructor and learner at the same time and support media such as video conferencing and chat. The benefits compared to a traditional classroom in which they are more independent and are not bound to attend the class and appropriate for the location or geographical factors (student or instructor are away from HEI can also interact through e-learning).

Issues in e-Learning

Various issues already exist in e-learning, especially at the level of HEI, a few critical issues discuss in section III. From the point of implementation, the elements discussed were technology, m-learning (mobile), grid and cloud computing, privacy, key initiatives, web 2.0, strategic management and mobile environment enhancement [7][8][11]. E-learning is an electronic technology, which contained the skills and knowledge [6] using electronic media and ICT. This situation makes the various issues that arise with medium and new technologies in the ICT world. In terms of design and development, various techniques can be used to enhance both the limitations that exist. For example, XML and metadata. These elements used as techniques in the development process of e-learning [3].

Besides that, the security awareness also is one of the important elements and recommendation in e-learning. The users of e-learning application system should be noticed and are one of the important roles in e-learning to make it protected and secured. E-learning has many benefits to learners and the instructor, but when it involves ICT and technology as mentioned above; most of the e-learning system has been attacked by a variety of threats. The security and

privacy issues in e-learning reported such as affecting the security thread, vulnerabilities, privacy and security, security attack and others [9] [11] [10] [11] [6]. E-learning used network then it is typically exposed to the threats. Threats are security issues in e-learning, and then need further improvement of awareness in e-learning. These issues reviewed to reduce the probability of attack from e-learning thread [12].

Other than that, the Learning Management System (LMS) is an e-learning system based on the user adaptive learning environment and self-study abilities [1]. It is designed to improve the concept of auto-learning activities with learning contents delivery method. It involves the examination of the practical effectiveness of self-study e-learning abilities in this. The main users of e-learning system are the learners and instructor, and the most important element is the instructor needs to generate interactions between two parties directly between the instructor and the learners. It involves an approach that combines pedagogical and technical knowledge [2]. Thus, it involves motivation of the teaching process and individual instructor teaching style; such as the individual attitude. Among the criteria important to be emphasized is to support the needs of teachers to improve the motivation of teaching [2]. In the process of implementing e-learning systems, some issues have emerged, such as the level of readiness in using e-learning system. It comprises the financial element, individual and political issues to ensure the success of e-learning systems. A study is conducted to investigate the implementation of e-learning in higher education institution (HEI) [13].

Based on the concept of learning and teaching, the traditional approach involves long deductive, usually spontaneous, and oral instruction. Very rarely occur independently as the guidance-free approach is through e-learning. Based on studies, the issue of combining traditional and modern methods in e-learning is the best practice and preferred by many students, especially the Distance Learning Institute (DLI) [14].

METHODOLOGY

E-learning is logically located everywhere and involves many users at one time and multiple concurrent transactions. All content within the e-learning delivered via the Internet, intranet/extranet, audio/video, satellite, CD-ROM, and others [10]. Various medium to access e-learning allows several of attacks and vulnerabilities. There are several types of security elements that need to be the focus. Thus, to perform this research work, a methodology is required and describes as follows.

Therefore, this research work follows this methodology. It started with the case study description. Then, the data collected from the method of a literature review from the previous research works. The next phase is the comparative study on the research works with the significant approaches to overcome the security and privacy issues. The findings of the previous research works motivate us to propose the MapReduce algorithm as an approach to the raise issues in e-Learning.

Security and Privacy Issues

Although e-learning provides online education and course with non-stop interaction between learner and coach so that the security element focuses on examples such as confidentiality, integrity, and availability of e-learning content. Apart from that, e-learning access control and non-repudiation should be taken into consideration to reduce and prevent the attacker. E-learning

application normally uses the Extension Markup Language (XML), and SOAP that is a simple object access protocol [15]. The elements of security and privacy for e-learning such as are the use of SSL and HTTPS, which is a traditional security technology [15]; important to focus since development. It uses encryption methods; encrypt all message and transferred between two ports in communication e-learning.

In the presence of various threats and strong protection of user privacy information in e-learning should be dealt with a variety of possible hijacking [15]. Figure 1 shows the basic requirement for security elements in e-learning consisted of each e-learning application system [5][10]. Other than that, the important elements need to consider as security issues in e-learning, which is consisting of access control to e-learning, authentication, data integrity, and content protection in e-learning [5]. Usually, the e-learning application system also contains HTML and JavaScript (JS). The HTML and JS are the factors which can be guessed by the attackers or hackers to attack the e-learning application system [5].

Threads and Vulnerabilities

There are a lot of threads and vulnerabilities since e-learning is using the network and accessed via any electronic devices [5]. Thus, nowadays, m-learning (mobile learning) is arising; communication technology and develops because of the popularity of mobile technology or smartphone [3]. There are several categories of threats and vulnerabilities attack the e-learning system such as conducted by hackers, the classic threats, web threats, wireless threats, new technology threats, intrusion issues, and errors and malicious attacks.



Figure 1. A basic requirement for security

The most threats attack the e-learning system is Cross Site Scripting (XSS) such as a denial of service (DoS), web application defacement, access the sensitive information and alter the browser functionality [5]. Other than XSS attack, there is SQL injection attack on e-learning, which is bypassing the authentication and look such a humble attack. It usually attacks the application layer and, on the client-side [5].

There are the vulnerabilities of brute force; attacking the e-learning system with guessing the username and password [6]. Hijacking the e-learning is an act in term of taking control in the user session. And both attacks can change the content in e-learning systems or sensitive information

of e-learning users, especially students and teachers, or even weakness in the web-based application [5].

It may take advantage of the weakness that occurs with social engineering such as "spam, malware, hacking, denial of service, phishing, click fraud, and violation" as stated by Satria Mandala, A. H. Abdullah, and A. S. Ismail [6].

Other vulnerabilities usually in e-learning such as no security update patch, secured coding is not used during the development process of e-learning or new technology of vulnerabilities which not expected and no further protection [6]. Many cases involving internet and cybercrime, which is obtained by a valid report [16]; it stated that due to carelessness by the users and usually by email. The threats attacked by the hacker, which is doing the illegitimate business to steal identities such as credit card info and other sensitive information [16] [5]. The medium is usually via spam mail, and the users do not know about that.

The common and classic threats are by guessing the weak password, and the attackers send viruses to the users' computer or device [16]. Besides that, the attacker may send the worms and phishing, to attack the e-learning system or the device. The web threats normally attack the e-learning system by XSS, SQL injection and session hijacking as discussed before, then cross-site request forgery, man-in-the-middle, input validation attack [11] [5] [6]. All these threats may damage to the web (e-learning web application) and the services to the users [5].

For the wireless threats, the cryptanalysis attacks the e-learning system (wireless) with the technique of the WEP algorithm. For the new trend and technology of threats and vulnerabilities, the electronic device such as smartphone will be connected to the wireless and perhaps initiate with the hacker's device (such as a computer). It will harm the e-learning or the device itself.

Furthermore, the discussion on the intrusion issues, the issue of remote injection such as SQL injection direct to the net page also happened. The search engine act with the dissimilar searches, an intruder will get the username and password [5]. Other than that, the intruder may use the password cracking to decryption the e-learning systems. There is a lot of intrusions include the prediction of web session id. Web indexing also may reveal all the functions in the e-learning system such as database address connection, and scripting. The e-learning web application also can be defacement by the intruders to modify the content of the application or the sensitive data or the web-based application itself [6] [5].

Other than that, the information leakage and HTTP response splitting [11] issues recorded as well. It involves the e-learning accountability, errors and malicious attacks, accountability of e-learning, personal information, vandalism, plagiarism, and violation of privacy, information theft, and spying on cyberspace.

Approaches

There are lots of approaches to avoid the attacker of e-learning, and it is such as recommendations and solutions for the problems or issues that arise as discussed above. One recommendation is session security [5]; it uses session id, validate the id, prevent 'remember me,' expired session, etc. [5]. Some of the researchers use the tracking system called Newspaper and N-stalker; the tracking process to

identify the threads such as XSS, SQL injection, and password send over HTTP [5]. It is some remote injection and indexing session id (guess), decryption, and dissimilar searches [6] [16] [11].

The e-learning application system also contains the security element such as in the Moodle, which uses two cookies. There are Moodle session and Moodle test. Then it has SSL tunnels on login service- secure socket layer [5] [6]. Other than that, also can use user privacy protection, content protection, and web-based application protection; removal attack, geometric attack, cryptographic attack, cryptographic attack, and protocol attack [6].

If the developer uses the same and standard platform for the development of e-learning application system, the possibility of security breaches and intrusion is very high. The vulnerabilities such as SQL injection, XSS, and information leakage as discussed before, the researchers use the approach of the effective testing vector to detect all these vulnerabilities [11]. By giving the scoring system for weaknesses such as the experiment on four types of open source e-learning application system comprises Moodle, a-Tutor, e-Front, and Commsy. It is giving the analysis of this experiment and based on several types of vulnerabilities. The result discussed in the next chapter on comparative study.

Other than that, to prevent user privacy, this paper proposed a Hippocratic DB structure (HDB), which is containing ten principles HDB. To protect content in e-learning, it uses digital right management (DRM) contains four levels [6]. For the web-based protection, it is proposed use network filtering system contain firewall and VPN remote access [6] [15]. The cases of internet and cybercrime happened, and the researchers found that e-learning software called Risk-aware is proposed to raise the awareness of thread (security) for all the e-learning users [16]. In the e-learning approach, it is using electronic media, broadcast, and package-based media as a medium for teaching and learning process [3].

To protect the user privacy and security on e-learning, the researcher also proposed the tracking system either using computer-mediated communication (CMC) tools to observe all the students' activities. Other than that, the researcher is also focusing on the importance of understanding all the security and privacy issues [17] [9] [16]. The problems of security in any web application such as e-learning can use the approach of increasing the elements of authorization and authentication at the entry points and control the sessions on dynamic nature. To ensure the security elements of confidentiality, integrity, availability, and non-repudiation, the researcher proposed the protection against manipulation such as encryption, digital signature, and firewall [10] [5].

For the issues of the model and operational risk, direct interconnection, software and hardware platform, network environment, and system collaboration happen in e-learning system; the researcher proposed using the domain-specific approach with the conventional method. It is more usability, flexibility, and suitable for the enterprise [15]. Other solutions by controlling the packet losses, packet delays, and bandwidths which is to secure the authorization and authentication in e-learning, it also uses the concept of VPN and firewall using precompiled patterns [15].

Based on the architecture of e-learning systems, it is possible to use multi-architecture layers for getting the trust boundaries. The approaches are using the construction of the dependency graph, estimate computer vulnerabilities, the probability of security breaches, and the analysis of security. The researcher also considered the aspects of security that required to inspect started in the earlier stage of development of the e-learning application system [5]. The developer focus on all the security elements and its' mechanism to ensure the e-learning system is protected and secured.

The security vulnerabilities and issues on e-learning software make the researchers giving ideas on strong protection of privacy data to protect from possible hijacking. Under the web application security consortium (WASC) project, the technique of auto scanning and assessment has been used to test the software package; two procedures which are a black box and white box [11]. The problem of security risk and malicious attacks in e-learning solved by some methods that have proposed in [15]. The awareness of threats should be exposed and provided to the e-learning users. Therefore, the developer of e-learning application should follow and focus on the model and operational risk [15].

Comparative Study

Table I presented the comparison among the previous works about the security elements in e-learning such as the issues and problems, the proposed solutions and recommendations, and the research findings.

Table 1. Comparison of security elements in e-learning

Issues and problems	Recommendation/ Solutions	Findings	Citation
User privacy and trust interaction between user and provider. Three types of vulnerabilities attacks which are a web application, content, and user privacy. SQL injection, XSS, Broken authentication and session, Misconfiguration, Failure on restricted URL access, Invalidated, Men-in-middle, Session hijacking, Cross-site request forgery, Input validation attack	User privacy protection, content protection, web-based application protection, the scoring system for weaknesses, software checking the vulnerabilities (newspaper and netStalker)	Reduce the probability of attacks on the e-learning system Testing on four e-learning platforms and each platform has advantage and disadvantage in security elements	[6] [11] [5]
Security and privacy issues (include data protection)	User tracking process CMC tools Awareness of understanding security and privacy issues	Increase user awareness on security elements in e-learning	[9][17]
User authentication and authorization	The designer should reduce the entry points to decrease the security risks	Cannot implement in e-learning	[10] [5]

<p>Entry point Dynamic nature (sessions) Manipulation Security vulnerabilities on the E-learning system</p>	<p>Encryption, digital signature, and firewall on the e-learning system Focus on security elements such as increasing the confidentiality, availability, integrity, and non- repudiation Apply the security aspects for e- learning systems</p>	<p>(factors of geographical locations and number of users are multiple). It will produce a secured e- learning system (implement all the mechanisms)</p>	
<p>Model and operational risks Direct interconnection Software and hardware platforms Network environment System collaboration</p>	<p>Domain-specific approach; a conventional method which is showing the possibility threats Controlling the packet losses, packet delays, and bandwidth. Multiple architecture layers with trust boundaries; construct the dependency graph, estimate vulnerabilities, probability of security breaches and security breaches</p>	<p>Improvement of security elements to follow the recommendation. Learning content management is affecting developers since the development process</p>	[15]
<p>Threads and unaware of the danger in e-learning; hackers, DoS, brute- force, classic threats, ARP poisoning, spam emails, phishing. Crucial on raising awareness and curiosity. Wireless threats and new technology threats</p>	<p>Using Risk-aware software on e- learning framework Generates personalized test Presenting personalized recommendations and solutions WEP algorithm for cryptanalysis</p>	<p>The immersive environment on e- learning to acquire security culture</p>	[16]
<p>Intrusion issues; remote injection, decryption system, guess web session id, web application defacement, alter browser functionality, info leakage, HTTP response splitting</p>	<p>User privacy protection; privacy- enhancing identity management (PIM), credentials and policies for e-learning material, Hippocratic Database structure (HDB) Content protection; Digital Right Management (DRM) Web-based application protection; VPN, Firewall, intrusion block system (IBS), an intrusion detection system (IDS)</p>	<p>Expected to increase the security elements for the e- learning vulnerabilities. Devoted to solving the problems and issues in security</p>	[6]

<p>Personal data protection issues are related to instructional design and e-learning. Aim to understand the online data protection-related issues that instructors or instructional designers encounter rather than reiterating that users must be aware of the informative and persistent characteristics of online data.</p>	<p>Data protection as a subject matter in the pedagogical design</p> <p>direct instruction with information technology</p> <p>applied dialectics to alter pre-service teachers' perception of privacy</p>	<p>Privacy-aware e-learning environment to reinforce users' senses of the right to informational privacy. Heading toward multifarious pedagogies of data protection</p>	<p>[18]</p>
<p>Dangers of honest-but-curious, malicious, knowledgeable, and network and nodes access adversaries and show how they can impact a MapReduce computation</p>	<p>MapReduce computation executed in public or hybrid clouds with the Hadoop cluster framework and the HDFS.</p> <p>Mappers-reduces used with the data-computations, it's integrity. And correctness-freshness</p>	<p>The data transmission and data storage protected using encryption mechanisms; authentication and authorization solutions based on the existing secret key and integrated systems</p>	<p>[20]</p>

Discussion

The result from the experiment of auto scanning and assessment on e-learning using tracking and scoring system (from netpaker and net stalker) [11] shows that it may detect 80-96% vulnerabilities. The system is a good approach to increase the protection of security for e-learning and gives the benefit to all practitioners of e-learning application system such as students and teachers. The threats, vulnerabilities, intrusion, security breaches, and attacks issues discussed, and it may affect the data, content, or the structure itself of the e-learning application system. It may harm the computer or device (now people or the e-learning users use the smartphone widely) and difficult to all parties to use e-learning does not matter for any purpose and function important element to focus on and overcome with recommendations to protect the e-learning system.

Table 2. Comparison of the MapReduce algorithm in e-Learning studies

The security aspects are very general and subjective to discuss further, but it summarized that it is about the e-learning systems, which is important and very useful for all. Rather than that, the best recommendations and solutions difficult to determine because of different threats and vulnerabilities. Table II presented the comparison of the MapReduce algorithm in e-Learning regarding some issues such as security and privacy. The proposed solution indicated that the MapReduce algorithm is one of the most popular and preferably chosen by the researchers nowadays. Some of the research works applied the MapReduce algorithm in the e-learning; several of them used it in a database, etc.

But, this research work focused on the security and privacy issues in e-Learning. Hence, we proposed the eLearning security enhancement with MapReduce algorithm for this research work. This MapReduce algorithm is suggested and used as the proposed solution for the security and privacy issues in e-Learning to enhance it. Figure 2 presented the execution on the e-Learning for the security purposes using the MapReduce algorithm. MapReduce [20] solves these issues and executes parallel processing using a cluster of computing nodes over large-scale data, but without considering security and privacy of data and computations.

Citation	Hadoop Cluster	MapReduce	HDFS	EL	Security Issues	Log File
[20]	✓	✓	✓	✗	✓	✗
[21]	✗	✓	✗	✗	✗	✗
[22]	✓	✓	✗	✗	✗	✗
[23]	✓	✓	✓	✗	✓	✗
[24]	✗	✓	✗	✗	✗	✓
[25]	✓	✓	✗	✗	✓	✓
[26]	✗	✓	✗	✗	✓	✗

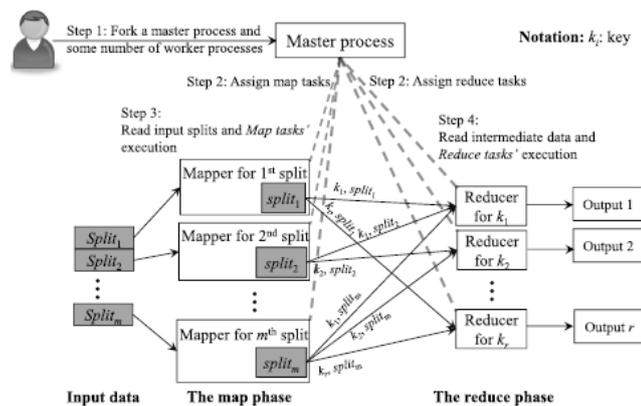


Figure 1. MapReduce algorithm and how it works

It will be used together with the Hadoop cluster framework and will describe in the next figures with the explanations. A master process forked by the user-defined program and worker will be processed at different nodes and depicted in Figure 2. The input data processed in the map phase, where the map function is applied to data and produces intermediate outputs A tuple of a relational database or a node in a graph is called a mapper. The Reduce phase provides the final output of MapReduce computations.

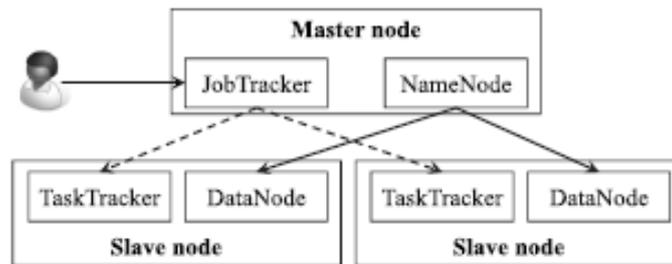


Figure 1. Structure of Hadoop cluster for e-Learning
Source: [20]

There are several nodes and described as follows. NameNode and DataNodes provide a distributed file system, called Hadoop Distributed File System, which supports read, write and delete operations on files, and create and delete operations on directories. NameNode manages the cluster metadata and DataNodes, which store the data. Figure 3 depicted the structure of Hadoop cluster to be used together with the MapReduce algorithm in e-Learning for the security and privacy enhancement. It bases on the one master node and two slave nodes [20]. Data partitioned into small-sized splits that are replicated and distributed to several nodes. Thus, each split data transferred in a secure and private environment. The condition such as replicated and distributed nature constitutes unique challenges in terms of data storage security, as compared to a system that holds the whole data in a single place.

The security in e-Learning proposed by using the MapReduce algorithm with computations, and it is highly nature. Thus, distributed processing over replicated data has a higher probability for attacks as compared to a centralized system, since attackers have a much wider range of targets to choose. A single adversarial mapper or reducer, out of several mappers and reducers, may provide wrong outputs, copy data for future usage, modify input data, leak confidential data to a third party, or send the whole data to another user [20].

A log file takes the form of a classical text file, chronologically representing all the events that have affected a system. The different formats of log-files generated. These different formats are because of the diversity of devices and software. This difference appears in the number of parameters and fields recorded in each log file and the format of these parameters. The log files of the e-Learning will be checked using the MapReduce algorithm and Hadoop cluster framework. we centralized the generated log files to disable intruders from deleting their traces and improve cloud security by enabling the possibility of finding correlations between user behaviour and predicting new attacks [23][24][25]

CONCLUSION

As a conclusion, this paper reviewed the e-learning and the related issues. Other than that, this paper reviewed the security and privacy aspects in e-learning, the threads, and vulnerabilities and the

possible solutions or recommendations in facing the issues. The security on e-Learning becomes one of the important elements for all the e-users to enhance the security in e-learning. Perhaps it can be discussed further to make it easier to implement and to protect the e-learning system. The issues are very wide to discuss, but it consists the e-Learning design issues, implementation, security and privacy, the strategic management, the elements such as teacher's need and self-study ability. Other than that, it is consisting of the proposed approach in using MapReduce algorithm to be applied in e-Learning.

What are the most important elements that the researchers need to focus? It based on the architecture of e-learning application system, the development of the application system which is to add on the security protections, and the environment of e-learning itself which is over the network and attract the hackers and intruders to attack the e-learning system. Thus, the recommendations help to overcome the issues of e-Learning security and privacy.

MapReduce computations while the impersonated user tariffed for data storage, the communication cost, and computation time. Hence, if an attacker compromises enough nodes in a Hadoop cluster, it may fail the whole MapReduce framework and the network overload in e-Learning.

From the comparison has been made in this paper, what are the most frequent threats and vulnerabilities attack the e-learning? Rather than that, what is the most dangerous to the e-learning systems? Perhaps it seems that all the issues discussed by most of the researchers such as the threads like SQL injection, XSS, and others are critical of e-learning security issues. We proposed to use the MapReduce algorithm for the log files for e-Learning to improve and enhance the security of e-Learning and for the users as well. The future works suggested as follows; the implementation of the MapReduce for the existing e-Learning such as Moodle in one HEI as the case study and with the experimentation phase. The experimental results will obtain, and analysis will perform as the validation and verification process of the MapReduce algorithm in e-Learning.

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KEBERKESANAN PENGGUNAAN PLATFORM MOOC DALAM KURSUS FALSAFAH ILMU DI UMK

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Pendahuluan

Di Malaysia, Kementerian Pendidikan telah mengenal pasti set kemahiran abad ke-21 yang disesuaikan dengan konteks tempatan dapat menyediakan warga Malaysia yang kalis masa hadapan dan boleh bersaing pada peringkat antarabangsa (Tapsir & Puteh, 2018). Untuk itu, pendidikan ditumpu kepada matlamat untuk melahirkan pelajar yang seimbang, bersemangat ingin tahu, berprinsip, bermaklumat, patriotik, serta mempunyai kemahiran berfikir, berkomunikasi serta bekerja secara berpasukan.

Universiti sebagai institusi pendidikan di peringkat tinggi harus menyediakan peluang pendidikan dengan kurikulum berasaskan projek yang autentik (Rahim, 2019) dengan keadaan kehidupan sebenar, melibatkan pelajar menangani dan menyelesaikan masalah kehidupan sebenar serta isu yang penting dalam kehidupan sejagat (Maria, 2018). Pendidikan yang diberikan harus meningkatkan pengetahuan dan kreativiti pelajar dan pada masa yang sama membolehkan pelajar berfikir, menaakul, membuat keputusan yang bijak, bekerja sebagai ahli pasukan dan melihat perhubungan dan perkaitan antara ilmu yang dipelajari merentas kurikulum (Sirat, 2018).

Dalam rangka mencapai matlamat ini, proses pembelajaran harus diadakan menggunakan pelbagai strategi dan platform seperti penggunaan web tools 2.0, alternative assessment, dan sebagainya (Rhoads, 2015 & Rose Alinda, 2018). Sejajar dengan itu, Universiti Malaysia Kelantan menggunakan platform *Massive Open Online Courses* (MOOC) dalam kursus Falsafah Ilmu untuk merealisasikan matlamat tersebut. Setelah pembelajaran secara MOOC dijalankan sepenuhnya, satu kajian perlu dijalankan bagi mengkaji keberkesanan kaedah tersebut. Oleh itu, kajian ini dijalankan bagi menjawab persoalan tersebut.

Kursus Falsafah Ilmu merupakan kursus wajib universiti di Universiti Malaysia Kelantan yang mula diperkenalkan sejak tahun 2007 dan ditawarkan di peringkat Ijazah Sarjana Muda

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sebagai kursus pengajian umum wajib lulus untuk graduasi. Selepas enam tahun kursus ini ditawarkan, pada tahun 2013 penerbitan buku teks pertama untuk tujuan pengajaran telah berjaya dihasilkan berjudul ‘Falsafah Ilmu: Pencarian Hakikat Makna dan Kebijaksanaan’.

Kursus ini juga telah ditawarkan di Universiti Pendidikan Sultan Idris (UPSI) menggunakan buku teks yang dihasilkan tersebut. Penambahbaikan berterusan telah dilaksanakan terhadap kandungan kursus ini dan pada tahun 2016, buku teks terbaharu berjudul ‘Wacana Falsafah Ilmu: Dinamika dan Perspektif’ berjaya diterbitkan. Jumlah pelajar yang mengikuti kursus ini pada setiap sesi akademik dianggarkan berjumlah 1500 pelajar.

Bidang ilmu yang terlalu spesifik menyebabkan ilmu falsafah terpinggir dan dilihat tidak penting dalam kurikulum di peringkat pengajian tinggi. Bertitik tolak daripada realiti tersebut, kursus Falsafah Ilmu diperkenalkan bertujuan melahirkan pelajar yang berkeupayaan untuk berfikir secara falsafah iaitu berfikir secara menyeluruh, integral dan radikal (Richard & Linda, 2016). Pelajar diberikan kefahaman bahawa falsafah sebagai ‘*the mother of all knowledge*’ perlu dipelajari supaya proses pembelajaran di universiti bermakna pelajar menghayati dan ‘menikmati’ segala ilmu yang dipelajari di universiti (Hamid, 2014).

Satu penyelidikan di bawah geran RAGS (*Research Acculturation Grant Scheme*) telah dijalankan oleh para pensyarah Falsafah Ilmu UMK pada tahun 2014 mengenai keberkesanan pelaksanaan pengajaran kursus Falsafah Ilmu di universiti-universiti di Pantai Timur Semenanjung Malaysia. Hasil penyelidikan ini mendapati bahawa kursus ini memberi kesan kepada pembinaan sahsiah dan membentuk pemikiran global dalam kalangan pelajar.

Bermula 2015, inisiatif awal pembangunan platform MOOC Falsafah Ilmu telah dilaksanakan selaras dengan lonjakan ke-9 Pelan Pembangunan Pendidikan Malaysia-Pendidikan Tinggi (PPPM-PT) yang menekankan kepada pembelajaran dalam talian peringkat global (*Globalised Online Learning*). MOOC Falsafah Ilmu diintegrasikan dengan platform e-Campus UMK yang diguna pakai sebagai *Learning Management System* di UMK. MOOC Falsafah Ilmu disasarkan untuk mencapai matlamat *e-learning* pada peringkat lokal dan global selaras dengan agenda pendidikan tinggi negara pada abad ke-21 (MoE, 2015).

Pada semester Februari 2017, MOOC Falsafah Ilmu dilaksanakan sepenuhnya dalam proses pengajaran dan pembelajaran. Setelah berjaya dilaksanakan, terdapat beberapa persoalan yang timbul: bagaimanakah dengan persediaan pelajar mengikuti kursus secara online ini? Berapa ramaikah yang mengikuti keseluruhan modul MOOC Falsafah Ilmu tersebut? dan, bagaimanakah kursus MOOC Falsafah Ilmu dapat memberi kefahaman kepada pelajar berbanding dengan kaedah pembelajaran di dalam kuliah yang biasa diamalkan? Bertitik tolak daripada persoalan-persoalan ini, satu kajian telah dirangka bagi mendapatkan jawapan tersebut.

Objektif kajian

Kajian ini bertujuan untuk:

1. Menilai keberkesanan pembelajaran MOOC Falsafah Ilmu dalam memahami kursus Falsafah Ilmu.
2. Menilai keberkesanan pembelajaran MOOC Falsafah Ilmu dalam memahami falsafah dalam kehidupan pelajar.
3. Menilai keberkesanan pembelajaran MOOC Falsafah Ilmu dalam memahami perkaitan antara falsafah ilmu dan bidang pengajian pelajar.

Metodologi Kajian

Data-data yang diperoleh daripada borang kaji selidik yang telah diedarkan kepada responden dianalisis dengan menggunakan perisian *Statistical Package for the Social Sciences* (SPSS) dan *Microsoft Excel*. Data mentah yang diperoleh daripada responden dianalisis dan dibincangkan dalam bentuk statistik deskriptif yang memperlihatkan kekerapan. Pengkaji akan menganalisis dan membincangkan dapatan kajian ini melalui aspek kekerapan terhadap pemahaman mereka (Creswell, 2014).

Graf kekerapan *Pre-Test* dan *Post-Test* bersama Graf Markah Keputusan Ujian dihasilkan sebagai panduan analisis. Graf kekerapan dibentangkan sebagai hasil dapatan kajian. Proses *Pre-Test* dan *Post-Test* merupakan satu alat penilaian yang digunakan untuk mengkaji pengetahuan terdahulu pelajar dan untuk menilai sejauh mana mereka telah mempelajari kursus yang diberikan. Proses ini digunakan sebagai alat penilaian dalam banyak aplikasi pendidikan (Monsen, 2017). Beberapa rujukan tambahan juga telah dibuat bagi menyokong penulisan analisa dan dapatan kajian.

Responden dikehendaki mengisi 12 item soal selidik sebelum dan selepas kursus Falsafah Ilmu dengan satu set soalan yang berkaitan dengan kefahaman dan penghayatan kursus Falsafah Ilmu, manfaat kursus Falsafah Ilmu dan juga kesan kursus Falsafah Ilmu terhadap kehidupan pelajar. Soal selidik diberikan dan dikumpulkan oleh pensyarah Universiti Malaysia Kelantan.

Soal selidik terdiri daripada 12 soalan. Soalan Q001-0012 ialah soalan pelbagai pilihan daripada skala 1 hingga skala 5. *Pre-Test* dan *Post-Test* ini adalah untuk menilai pengetahuan yang komprehensif telah diberikan oleh pelajar sebelum dan selepas kursus Falsafah Ilmu yang disediakan oleh pihak universiti.

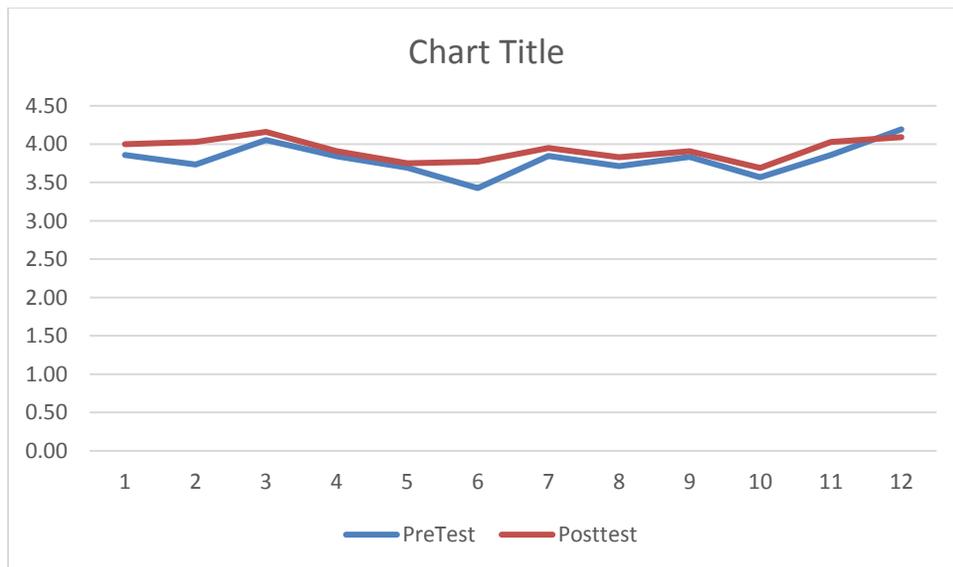
Kajian ini menggunakan reka bentuk *quasi-experimental* dengan *Pre-Test* dan *Post-Test* dalam satu kumpulan kawalan. Populasi kajian ini seramai 150 orang pelajar di Universiti Malaysia Kelantan daripada Fakulti Industri Asas Tani (FIAT), Fakulti Sains Bumi (FSB) dan

Fakulti Bio-Kejuruteraan & Teknologi (FBKT) yang mengambil subjek Falsafah Ilmu menduduki ujian *Pre & Post-Test*. Soalan *Pre-Test* diedarkan pada minggu kedua perkuliahan pada semester September 2018/2019. Manakala soalan *Post-Test* diedarkan pada minggu terakhir perkuliahan, iaitu minggu ke -14. Kajian ini menentukan sama ada pembelajaran maya melalui MOOC Falsafah Ilmu membantu proses pembelajaran bagi subjek Falsafah Ilmu. Data yang terhasil kemudiannya dianalisis menggunakan kaedah analisis kandungan (*content analysis*) dan menggunakan prosedur statistik dalam perisian SPSS.

Hasil Kajian

NO.	SOALAN	KEKERAPAN PRE-TEST					KEKERAPAN POST-TEST				
		1	2	3	4	5	1	2	3	4	5
1	Saya memahami dan dapat menghuraikan istilah 'falsafah' dengan baik.	-	0. 67	23. 33	65. 33	10. 67	-	-	18. 67	62. 67	18. 67
2	Saya memahami dan menghayati kursus falsafah Ilmu dengan baik.	-	2. 00	32. 00	56. 67	9.3 3	-	-	16. 00	65. 33	18. 67
3	Kursus Falsafah Ilmu memberi manfaat yang banyak kepada kehidupan saya.	-	2. 00	16. 67	55. 33	26. 00	-	2. 67	6.6 7	62. 67	28. 00
4	Pengetahuan mengenai Falsafah Ilmu memberi kesan yang banyak kepada kehidupan saya.	-	3. 33	30. 00	46. 00	20. 67	-	2. 00	18. 67	65. 33	14. 00
5	Kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan kehidupan saya sebagai mahasiswa di UMK	-	6. 00	31. 33	50. 00	12. 67	2. 00	-	28. 00	60. 67	9.3 3
6	Kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan bidang pengkhususan saya sekarang	1. 33	6. 00	49. 33	35. 33	8.0 0	2. 00	-	26. 00	62. 67	9.3 3
7	Saya mampu menghubungkaitkan ilmu dan kemahiran yang dipelajari di UMK untuk menyelesaikan sesuatu permasalahan dalam kehidupan peribadi dan masyarakat	-	2. 67	24. 67	58. 00	14. 67	-	4. 67	12. 00	67. 33	16. 00

8	Kehidupan saya kini penuh bermakna di universiti	2.67	3.33	26.67	54.67	12.67	2.00	2.00	23.33	56.00	16.67
9	Saya kini mampu menghayati proses pembudayaan ilmu dalam kehidupan	-	2.00	22.67	65.33	10.00	2.00	-	16.67	67.33	14.00
10	Saya mempunyai tahap pemikiran kritikal yang tinggi	0.67	2.00	44.67	45.33	7.33	-	4.67	32.67	51.33	11.33
11	Kursus Falsafah Ilmu patut diajar kepada pelajar universiti.	3.33	6.00	20.67	38.00	32.00	-	4.67	11.33	60.67	23.33
12	Pensyarah saya berjaya melaksanakan pengajaran secara berkesan sehingga saya mampu menguasai kursus Falsafah Ilmu dengan baik	-	0.67	10.00	58.67	30.67	-	-	9.33	72.00	18.67



Jadual di atas menunjukkan taburan min bagi *Pre -Test* dan *Post- Test*. Jadual menunjukkan peningkatan jumlah min kepada semua soalan *Post-Test*, melainkan soalan yang terakhir.

Berdasarkan jadual di atas, didapati daripada 150 orang responden dalam kajian ini majoriti soalan *Pre-Test* bersetuju bahawa pensyarah berjaya melaksanakan pengajaran secara berkesan sehingga pelajar mampu menguasai kursus Falsafah Ilmu dengan baik dengan nilai min pada tahap yang tertinggi iaitu 4.19. Manakala *Post-Test* nilai tertinggi adalah 2.31 dengan majoriti

responden menyatakan kursus Falsafah Ilmu memberi manfaat yang banyak kepada kehidupan pelajar.

Perbincangan dan Cadangan

Memahami dan dapat menghuraikan istilah falsafah dengan baik	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	0	0	0	0
Tidak Setuju	1	0.67	0	0
Kurang Pasti	35	23.33	28	18.67
Setuju	98	65.33	94	62.67
Sangat setuju	16	10.67	28	18.67

Jadual 1: Memahami dan dapat menghuraikan istilah 'falsafah' dengan baik

Jadual di atas menunjukkan peratusan tertinggi bagi *Pre-Test* adalah setuju iaitu 65.33% atau seramai 98 orang pelajar yang mengatakan setuju bahawasanya mereka memahami dan dapat menghuraikan istilah 'falsafah' dengan baik. Setelah *Post-Test* dijalankan peratusan setuju masih lagi yang tertinggi iaitu 62.67 % iaitu seramai 94 orang. Walaupun peratusan semakin menurun bagi skala setuju, akan tetapi peratusan bagi skala sangat setuju meningkat daripada 10.67% kepada 18.67%.

Memahami dan menghayati kursus Falsafah Ilmu dengan baik	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	0	0	0	0
Tidak Setuju	3	2	0	0
Kurang Pasti	48	32	24	16
Setuju	85	56.67	98	65.33
Sangat setuju	14	9.33	28	18.67

Jadual 2: Memahami dan menghayati kursus Falsafah Ilmu dengan baik

Berdasarkan Jadual 2 menunjukkan peratusan tertinggi bagi *Pre-Test* adalah 56.67 atau 85 orang pelajar berpendapat bersetuju bahawa mereka memahami dan menghayati kursus Falsafah Ilmu dengan baik. Peratusan *Post-Test* setelah selesai kursus Falsafah Ilmu peratusan yang tertinggi

adalah setuju iaitu meningkat kepada 65.33% seramai 98 orang pelajar. Dapat dilihat peratusan kurang pasti semakin menurun daripada 32% kepada 16%.

Kursus Falsafah Ilmu memberi manfaat yang banyak kepada kehidupan pelajar	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	0	0	0	0
Tidak Setuju	3	2	4	2.67
Kurang Pasti	25	16.67	10	6.67
Setuju	83	55.33	94	62.67
Sangat setuju	39	26	42	28

Jadual 3: Kursus Falsafah Ilmu memberi manfaat yang banyak kepada kehidupan pelajar

Jadual 3 *Pre-Test* menunjukkan bahawa bilangan tertinggi seramai 83 orang responden (55.33%) bersetuju bahawa kursus Falsafah Ilmu memberi manfaat yang banyak kepada kehidupan pelajar. Bagi keputusan *Post-Test*, peratusan yang tertinggi adalah peratusan bersetuju iaitu meningkat kepada 94 orang bersamaan dengan 62.67%. Lebih daripada separuh responden bersetuju dan sangat bersetuju bahawa kursus falsafah ilmu memberi manfaat yang banyak kepada kehidupan mereka.

Pengetahuan mengenai Falsafah Ilmu memberi kesan yang banyak kepada kehidupan pelajar	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	0	0	0	0
Tidak Setuju	5	3.33	3	2
Kurang Pasti	45	30	28	18.67
Setuju	69	46	98	65.33
Sangat setuju	31	20.67	21	14

Jadual 4: Pengetahuan mengenai Falsafah Ilmu memberi kesan yang banyak kepada kehidupan pelajar

Dapatan soal selidik *Pre-Test* mendapati seramai 69 orang responden bersamaan 46% bersetuju bahawa pengetahuan mengenai Falsafah Ilmu memberi kesan yang banyak kepada kehidupan pelajar dan meningkat kepada 65.33% iaitu seramai 98 orang bersetuju selepas selesai menjalani kursus Falsafah Ilmu.

Kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan kehidupan pelajar sebagai mahasiswa di UMK	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	0	0	3	2
Tidak Setuju	9	6	0	0
Kurang Pasti	47	31.33	42	28
Setuju	75	50	91	60.67
Sangat setuju	19	12.67	14	9.33

Jadual 5: Kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan kehidupan pelajar sebagai mahasiswa di UMK

Dalam jadual 5, *Pre-Test* menunjukkan separuh daripada responden iaitu 50% atau 75 orang bersetuju bahawa kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan kehidupan pelajar sebagai mahasiswa di UMK ditambah pula seramai 19 orang menyatakan sangat setuju menjadikan peratusan yang bersetuju seramai 94 orang. Peratusan tertinggi *Post-Test* adalah setuju iaitu sebanyak 60.67% bersamaan dengan 91 orang responden.

Kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan bidang pengkhususan pelajar	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	2	1.33	3	2
Tidak Setuju	9	6	0	0
Kurang Pasti	74	49.33	39	26
Setuju	53	35.33	94	62.67
Sangat setuju	12	8	14	9.33

Jadual 6: Kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan bidang pengkhususan

pelajar

Berdasarkan soal selidik yang telah dijalankan, didapati bahawa hampir separuh daripada responden (49.33%) ketika *Pre-Test* menyatakan kurang pasti sama ada kursus Falsafah Ilmu mempunyai kaitan yang rapat dengan bidang pengkhususan pelajar. Akan tetapi selepas kursus Falsafah Ilmu berakahir dan dijalankan *Post-Test*, peratusan tertinggi adalah setuju dengan kekerapan sebanyak 94 responden bersamaan dengan 62.67%.

Mampu menghubungkan ilmu dan kemahiran yang dipelajari di UMK untuk menyelesaikan sesuatu permasalahan dalam kehidupan peribadi dan masyarakat.	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	0	0	0	0
Tidak Setuju	4	2.67	7	4.67
Kurang Pasti	37	24.67	18	12
Setuju	87	58	101	67.33
Sangat setuju	22	14.67	24	16

Jadual 7: Mampu menghubungkan ilmu dan kemahiran yang dipelajari di UMK untuk menyelesaikan sesuatu permasalahan dalam kehidupan peribadi dan masyarakat

Dalam jadual 7, menunjukkan majoriti responden bagi *Pre-Test* adalah 58% atau sebanyak 87 orang memilih setuju bahawa mereka mampu menghubungkan ilmu dan kemahiran yang dipelajari di UMK untuk menyelesaikan sesuatu permasalahan dalam kehidupan peribadi dan masyarakat. Manakala bagi *Post-Test*, peningkatan berlaku kepada 101 orang iaitu sebanyak 67.33% mengatakan setuju. Peratusan tersebut adalah tertinggi bagi peratusan *Post-Test*.

Kehidupan pelajar kini penuh bermakna di univervisiti.	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	4	2.67	3	2
Tidak Setuju	5	3.33	3	2
Kurang Pasti	40	26.67	35	23.33

Setuju	82	54.67	84	56
Sangat setuju	19	12.67	25	16.67

Jadual 8: Kehidupan pelajar kini penuh bermakna di universiti

Jadual 8 menjelaskan bilangan kekerapan dan peratusan responden berkaitan dengan kehidupan pelajar kini penuh bermakna di universiti. Peratusan tertinggi bagi *Pre-Test* adalah setuju iaitu sebanyak 54.67% seramai 82 orang responden dan peratusan terendah pula adalah sangat tidak setuju iaitu sebanyak 2.67% seramai 4 orang responden. Bagi peratusan *Post-Test* tidak banyak perubahan yang berlaku. Peratusan tertinggi adalah setuju bahawa kehidupan pelajar kini penuh bermakna di universiti iaitu sebanyak 56% atau 84 orang responden. Manakala yang terendah dengan kekerapan 3 orang responden iaitu 2% daripada jumlah responden.

Pelajar mampu menghayati proses pembudayaan ilmu dalam kehidupan.	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	0	0	3	2
Tidak Setuju	3	2	0	0
Kurang Pasti	34	22.67	25	16.67
Setuju	98	65.33	101	67.33
Sangat setuju	15	10	21	14

Jadual 9: Pelajar mampu menghayati proses pembudayaan ilmu dalam kehidupan

Jadual 9 menunjukkan kemampuan pelajar dalam menghayati proses pembudayaan ilmu dalam kehidupan. Sebanyak 65.33% bersamaan 98 orang responden bersetuju bahawa pelajar mampu menghayati proses pembudayaan ilmu dalam kehidupan. Peratusan tersebut adalah tertinggi ketika *Pre-Test* dijalankan. Begitu juga dengan keputusan *Post-Test*, peratusan setuju adalah yang paling tinggi iaitu meningkat kepada 67.33% seramai 101 orang.

Mempunyai tahap pemikiran kritikal yang tinggi.	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	1	0.67	0	0
Tidak Setuju	3	2	7	4.67
Kurang Pasti	67	44.67	49	32.67

Setuju	68	45.33	77	51.33
Sangat setuju	11	7.33	17	11.33

Jadual 10: Tahap pemikiran kritikal yang tinggi

Berdasarkan jadual 10, didapati peratusan keputusan bagi *Pre-Test* kurang pasti dan setuju hampir sama iaitu sebanyak 44.67% kurang pasti mereka mempunyai tahap pemikiran yang kritikal yang tidak atau tidak. Manakala 45.33% bersetuju bahawa mereka mempunyai tahap pemikiran kritikal yang tinggi. Akan tetapi, setelah kursus Falsafah Ilmu dijalankan, keputusan *Post-Test* bagi bersetuju mereka mempunyai tahap pemikiran kritikal yang tinggi meningkat kepada 51.33% iaitu seramai 77 orang. Tambahan pula responden yang sangat setuju sebanyak 11.33%.

Kursus Falsafah Ilmu patut di ajar kepada pelajar universiti.	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak setuju	5	3.33	0	0
Tidak Setuju	9	6	7	4.67
Kurang Pasti	31	20.67	17	11.33
Setuju	57	38	91	60.67
Sangat setuju	48	32	35	23.33

Jadual 11: Kursus Falsafah Ilmu patut diajar kepada pelajar universiti

Gabungan jumlah responden *Pre-Test* yang setuju dan sangat setuju kursus Falsafah Ilmu patut diajar kepada pelajar universiti adalah sebanyak 105 orang iaitu 70% daripada keseluruhan responden. Jadual 11 menunjukkan terdapat 3.33% sangat tidak bersetuju ketika menjawab *Pre-Test*. Akan tetapi *Post-Test* menunjukkan keputusan 0% yang sangat tidak bersetuju bahawa kursus Falsafah Ilmu patut diajar kepada pelajar universiti. Peratusan tertinggi untuk *Post-Test* adalah peratusan setuju sebanyak 60.67% iaitu seramai 91 orang responden.

Pensyarah berjaya melaksanakan pengajaran secara berkesan sehingga pelajar mampu menguasai kursus Falsafah Ilmu dengan baik.	<i>Pre-Test</i>		<i>Post-Test</i>	
	Kekerapan	Peratus (%)	Kekerapan	Peratus (%)
Sangat tidak	0	0	0	0

setuju				
Tidak Setuju	1	0.67	0	0
Kurang Pasti	15	10	14	9.33
Setuju	88	58.67	108	72
Sangat setuju	46	30.67	28	18.67

Jadual 12: Pensyarah berjaya melaksanakan pengajaran secara berkesan sehingga pelajar mampu menguasai kursus Falsafah Ilmu dengan baik.

Dalam jadual 12, *Pre-Test* menunjukkan majoriti responden iaitu sebanyak 89.34% atau seramai 134 orang responden menyatakan setuju dan sangat setuju mengenai pensyarah berjaya melaksanakan pengajaran secara berkesan sehingga menguasai kursus Falsafah Ilmu dengan baik. *Post-Test* pula terdapat sedikit penambahan gabungan peratusan bagi setuju dan sangat setuju iaitu seramai 136 orang responden atau 90.67% berpendapat pensyarah berjaya melaksanakan pengajaran secara berkesan sehingga pelajar mampu menguasai kursus Falsafah Ilmu dengan baik.

Kesimpulan dan Cadangan

Hasil kajian ini menunjukkan perbezaan yang sangat ketara di antara *Pre & Post Test*. Oleh itu penggunaan kaedah ini amat berkesan dalam pembelajaran alaf baharu dan dapat meningkatkan kefahaman pelajar dalam mempelajari kursus Falsafah Ilmu di Universiti Malaysia Kelantan. Oleh yang demikian, dicadangkan agar pembelajaran menggunakan platform MOOC dalam kursus Falsafah Ilmu diteruskan dengan mengambil kira perubahan pengalaman pembelajaran yang sangat positif yang ditunjukkan oleh para pelajar sepanjang menggunakan kaedah tersebut.

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**A STUDY ON CRITICAL SUCCESS FACTORS (CSF) ON MOBILE LEARNING APPS
THAT ENHANCE LEARNING EXPERIENCE IN PRAYERS (SOLAT) AMONG
STUDENTS IN JOHORE RELIGIOUS SCHOOL**

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ABSTRACT

This paper discusses the critical success factors (CSF) of “Adik-Adik Solat” a Mobile Learning Apps for students to enhance their learning experience in Prayers (Solat). The design and development process need to consider several CSF in order to optimize the learning experience and engagement. This will allow the learning process becoming more fun and meaningful. It will also embrace the student’s skills on critical thinking, problem solving, creativity and many more positive aspects. To justify the objectives, the student’s engagement during learning session is observed to see the enhancement of students’ learning experience. This Mobile Learning Apps is very important as an innovation on learning and also as a social respond to instil faith and Islamic values towards young generation.

Keywords: Mobile Learning Apps, learning experience, collaborative learning, Education 4.0

INTRODUCTION

To be recognized as a successful believer of god, engrossed in solat is the key factor that has a positive impact on the individual’s prayers. Allah says in Surah Al - Mukminun 1-2 verse that: “*Successful indeed are the believers, those who humble themselves in their solat*”. The term solat is synonymous with prayer which means action worship Allah S.W.T. and for non-Muslims, the term prayer gives meaning to God [1]. Amongst Sufi members, the term solat is defined as “*facing the heart (soul) to Allah S.W.T. where it brings fear and grows in the soul of his greatness and power*” [2]. The term prayer also brings understanding of “*wishes*” [3] or “*wishes for good*” [4]. If referring in Tafsir al-

Quran Al-Karim, the term solat refers to the prayer bring peace, strength, persistence and confidence [5]. Therefore, solat can be formulated as surrender (soul) to Allah S.W.T., surrendered with all intentions, planted the greatness of His Greatness and His Ruler ship with sincerity and sincerity in some words and deeds that begin with the “Takbiratul Ihram” and end with greetings(Salam). It is really important as a Muslim to perform solat.

Students as early as 7 years of age in Johore Religious School has been taught about Solat. From our observation the way of teaching and learning method in Johore Religious School is still using conventional way. Since the government urged for the 21st Century Learning method (PAK-21) [6] should be taken place to enhance learning engagement and experience it is our social responsible to introduces new method an innovation for learning solat. We believe that by having innovation in education, it can change the situation. Thus, we decided to develop “Adik-Adik Solat” as a mobile learning Apps to enhance learning experience for solat. So that the knowledge of solat can be spread widely and effectively.

M-Learning is an educational system which engaging students to self-learning with their mobile devices, it is in line with the desire of the Education 4.0 concept that the learning process can be conducted anywhere and anytime. This allow the studies environment becoming more fun and more meaningful to the students. M-learning is growing in popularity due to technological developments in 21st Century Learning method (PAK-21) which promotes dynamic and creative method towards productive and have a critical thinking. M-learning exist in many different form for example audios, words and videos. There are two ways of M-Learning, the first one is asynchronous way which is a learning without an interaction such as preparing homework while watching a video. The other one is synchronous way which enable user to interact for example using an application where user enable to interact with the content or get a direct feedback from a teacher [7].

As to enhance the learning experience it is believed to have a collaborative learning styles taken place. Collaborative learning is an educational approach to teach and learn that involve a group of students (Gerlach, 1994). This method involving a group of student discussing with each other in order to achieve a significant result and a meaningful project. According to [8] Collaborative learning is a natural social act which the participant talk among themselves. This method creates an opportunity where a passive student involving themselves to the discussion, also a teacher can learn a few things from their student and student can achieve a meaningful study from the discussion. Collaborative learning allows students to co-operate with each other to strengthen their skills also develop their weaker skills [9].

To support the government with PAK-21, we decided to develop a mobile learning application as a new platform for our target user (7-9 years old) to learn about Solat. At the age of 7- 9 years old, the cognitive levels are called concrete operational stage, which is the students in this age become more concentrate of what they are doing [6]. In this module, we use Visual, Auditory and Kinesthetic Learning style (VAK) on how to recite the niat, perform wudhuk, solat and also simple games to enhance students experience learning better. We hope that, by developing this application, we will help the user to gain more knowledge and experience about solat.

METHODOLOGY



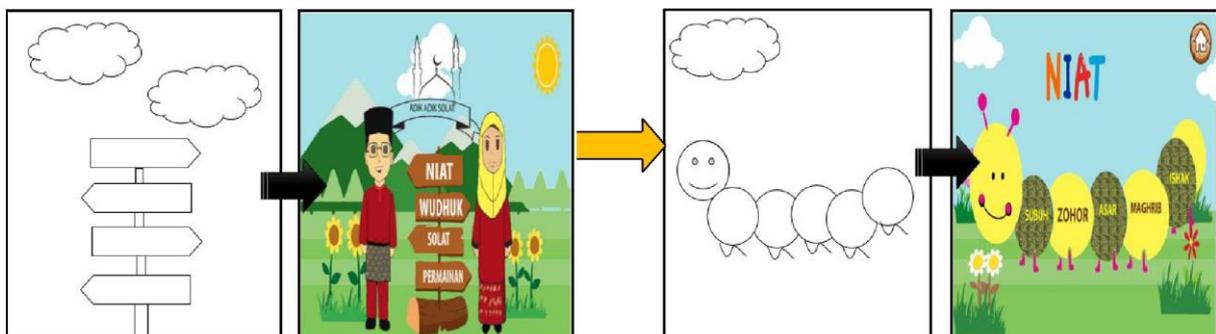
Figure 1. ADDIE Model

Methodology use to develop the application is ADDIE (Analysis, Design, Development, Implementation and Evaluation). This method uses to introduce an approach to instruction design that has a proven record of success [10]. In the first phase, which is an analysis is taken place to get the information regarding the user requirements and the Operating System(OS) that need to be analyze before developing the application. From the survey of Mobile Operating System Market Share in Malaysia it is found that 84.25 % is an Android’ user as shown in **Table 1**. This is due to the fact that Android is an open source and free licensing OS. With the spirit to penetrate more user and commercial value, the application was developed using android-based apps.

Table 1. Mobile Operating System Market Share Malaysia

Android	iOS	Unknown	Windows	Samsung	Series 40
84.25%	13.52%	1.65%	0.13%	0.12%	0.1%

In the second phase, the design of the storyboard and interfaces are taken place. It will illustrate the overall implementation of prototypes through story boarding methods. Storyboard design shown in **Figure 2**. The story board are separated to four parts based on the learning module. First part is on how to learn “*Niat*”. Second part is the application on learning how to perform “*Wudhuk*”. While for the third part is about “*Solat*” and the final part is games.



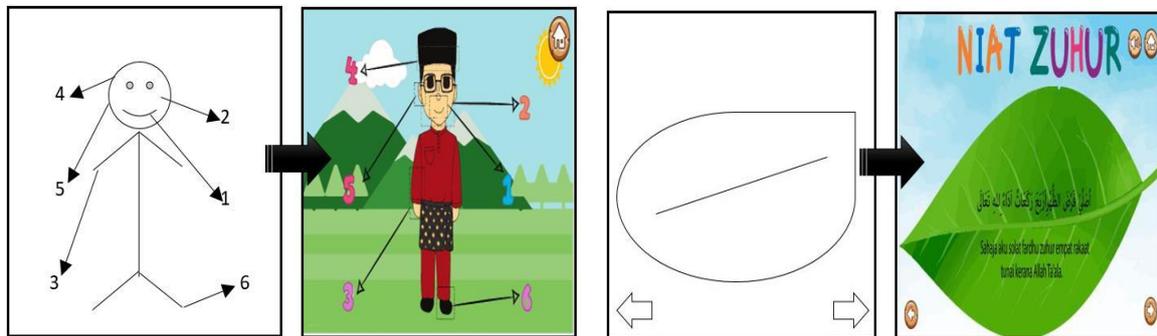


Figure 2. The Design and Storyboards

In the third phase is the development. The application is developed based on the information of specification and requirement obtained from the design phase. Certain software has been used in the development process such as using Adobe Animate CC.

In the fourth phase is implementation. The complete application will be testing to find out the error that might occur and improvements will be made. Then a survey was conducted to obtain feedback from users. The final phase is evaluating. In this phase the application will be assessed based on the capabilities and effectiveness of the application developed.

This Mobile Learning Apps is based on the user requirement as an indicator for the critical success factors to enhance student's learning experience. The factors that need to be considered was the use of attractive colour, the animation, graphic, the use of text and the use of audio. The first element is use of attractive colour. Colour is the important aspect after functionality in an application [11]. The human and computer interaction is heavily based on interaction with Graphical User Interface (GUI) elements and colour plays as an important role in the interaction. The combinations of attractive colour were use in designing the interface to make user interested in using the application. Second element is the use of animation in the application. With the animation inserted in the application, it will bring out the scene that can attract more attention from user especially kids while using the application. With the animation, it looks like a character is alive and moving. It is much better than look at a static character without any movement. Moreover, learning through animation has no age limit and it can be used for early childhood, in primary and high schools, and even in universities [12]. Using graphic in the application help user in better understanding during the learning process and also help them easy to remember. For example, use the picture of an animal as a button and when user click the button it will show how to spell the name of the animal. Use of text is important and must be able for user to understand what we want to tell user to do. So, the size and the type of text uses must be suitable and understandable. The last element is audio. It is important to provide the non-boring atmosphere while using the application. The use of audio also helps in presenting the information to user. Use of audio also can attract user when using fun and enjoyable audio.

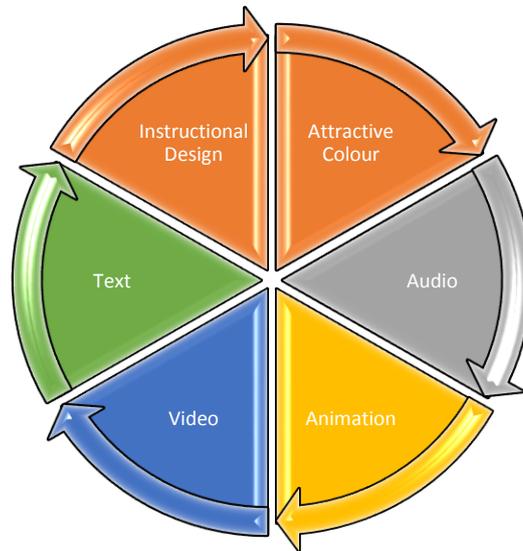


Figure 3. Critical Success Factors (CSF) On Mobile Learning Apps

RESULT AND DISCUSSION

Application testing is an investigation conducted to provide stakeholders with information about the quality of the application or software product or service under test. To validate this factors, we have some interview and observation to the students while using the apps. **Figure 4**, are list of the interview question that has been conducted. The result of the survey is as shown in **Figure 5**.

This test session was held at Sekolah Agama Sungai Suloh, involving 18 students. Before this testing session, a demonstration session was conducted with students and teachers. After the demonstration, a test session was conducted by the teacher to test the effectiveness of the students in the learning session using the application compared to traditional learning. As a result of the testing process for learning Niat, 90% reciting is satisfying. Analysis focuses on the level of learning engagement of users. As a result of the analysis, more than 95% of agree that the learning engagement increase due to the use of the application. Accordingly, the application makes them more interested in using it. This proves that the app is suitable to attract students to the learning process. We also look into usability factors because it is important to have an application that easy and able to be handle by the user with less instruction. Result shows 85% agree that usability of the apps is great. The result of the survey is as shown in **Figure 6**.

No.	QUESTIONS
1	Is learning Solat using Mobile Apps much easier to understand than conventional?
2	Is the reading provided easy for you to understand?
3	Is Mobile learning apps more fun than conventional learning?
4	Do these mobile learning apps help you to excel in prayer knowledge?
5	Is the font and size used in this application easy to understand?
6	Do the combination of character colours and application backgrounds make your child more appealing?
7	Does reading audio in this application help you to understand and learn easily?

- 8 Does the picture of prayer movement used in this application help you to better understand how to pray?
- 9 Will this application enhance your understanding of performing prayer?
- 10 Is the existence of these mobile learning apps really necessary for learning progress?
- 11 Are you having difficulty using this application?
- 12 Does the use of two languages, Arabic and followed by Malay, help you to better understand this learning?
- 13 Will this application benefit you in the future?
- 14 Do 2 different gender characters help the prayer process more effectively?
- 15 Does the existence of such an application improve the education level of our country?

Figure 4. List of the interview question that has been conducted.

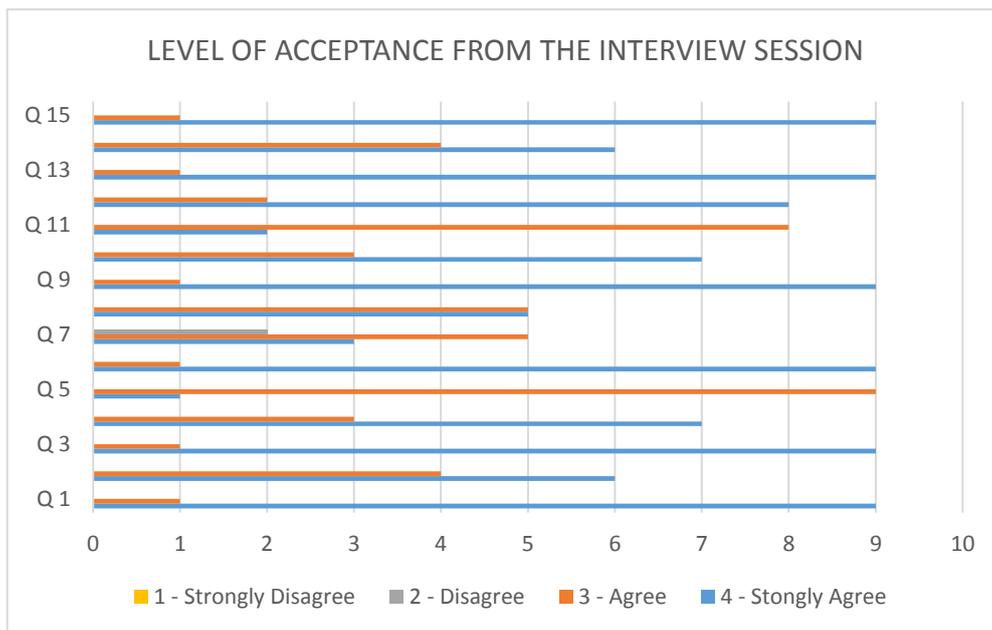


Figure 5. Result from The Interview Session

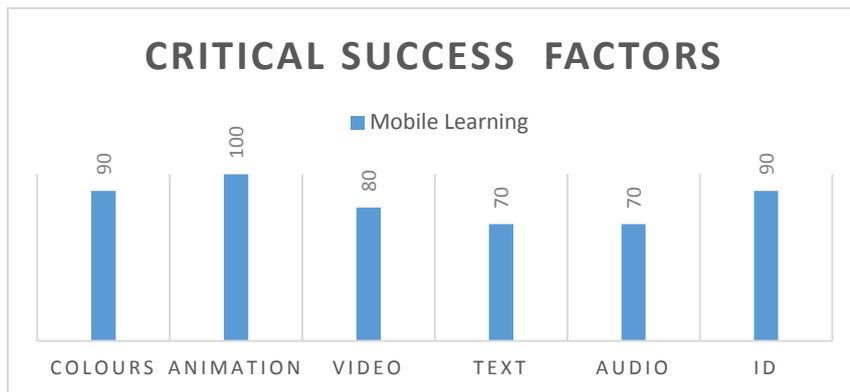


Figure 6. Percentage of Acceptance on CSF for Engaging User

CONCLUSION

By having understanding and importance of the CSF during the design and development process, we will have a mobile learning apps that will able to satisfy and conforms the end user needs. Adik-Adik Solat will help students to enhance their learning experience in learning solat.

This is due to the fact that students will become more engaged and will be highly motivated to learn. On top of that, it will also embrace the student's skills on critical thinking, problem solving, creativity and many more positive aspects. As a whole by having this innovation, students will have a new great perception on learning solat.

For the teachers, it will help the teacher to implement a new method of teaching solat. Via that, the teacher's passion on teaching solat will be increase. When students and teachers have been sparks with the positive environment it is believe the school / institution achievement and performance will also be increase.

As for the community, we will have a young generation with rich values of faith and self-esteem. As a whole this initiative will support the government on *Pelan Pendidikan Tinggi Nasional, Dasar e Pembelajaran Negara* in terms of e Content. Finally, least but not least, it will help the environment by reducing text book material (paper less).

Adik-Adik Solat can be commercialized to all Islamic School in Malaysia, Preschool and others in order to help teacher and students implementing a new approach in teaching and learning solat. Furthermore, it will also available in Google Playstore and can also be embed with Augmented Reality (AR) signage in the text books.

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IMPLEMENTATION OF E-LEARNING IN MALAYSIAN HIGHER INSTITUTIONS

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ABSTRACT

This study looks into the implementation of e-learning in the Malaysian Higher Institutions. A total of twenty (22) educational institutions were selected namely: five (5) public universities, ten (10) private universities and seven (7) College University/College. The main approach to data collection is focus group interview and document analysis based on the Thematic Analysis approach. The study found that issues pertaining to the implementation of e-learning in higher education institutions in Malaysia can be divided into six (6) main categories: infrastructure, infostructure and access, operating structure and governance governance, the development of e-content and pedagogy, professional training and development, cultural and other issues on the implementation of e-learning. The study ends with practical suggestions for e-elearning implementation in higher institutions.

Keywords: e-Learning, Higher Institutions, Future Learning, Qualitative.

INTRODUCTION

The current context of the globalised world which includes technological advancements, competitive forces, the digitization of digital education and the arrival of the Industrial Evolution 4.0 warrants Malaysia to be proactive in order to provide a variety of new education modules that meet market demands. To address the challenges of the education system's development, especially competing in the Industrial Revolution 4.0, it is crucial for educational providers to embrace change specifically in the area of teaching and learning. The establishment of the Malaysian e-Learning Center (MyCeL) in May 2017 is aimed at accelerating the growth of online and digital teaching methods by all public and private universities nationwide. MyCeL serves as a key center for planning, coordinating and monitoring the development of e-Learning and the implementation of initiatives undertaken by each higher education center across public and private universities, polytechnics and community colleges. In all these developments, the call to ensure that Malaysia's e-learning efforts are on the right track is greater than ever. Nevertheless, examining and assessing this (the status of Malaysia's e-learning at Public Universities, Polytechnics and BPTNs) is not an easy task. It involves a thorough examination of the management and administrative structures of the e-learning system that has been developed, the accessibility of the system, the usability and usage of the Open Learning platform and Learning Management System (LMS), the perspectives of the various stakeholders, the verification of the educational institutions teaching and learning processes and components, the validation from users, as well as detail enquiries about the Blended Learning status of the educational institutions such as the usage of MOOC.

This study is led by the Malaysian e-Learning Center (MyCeL) to investigate the status of e-learning implementation in Malaysian Higher Institutions. This study focuses on the structure of e-learning operations at selected institutions; The access level of e-learning system that has been developed; OpenLearning platform usage level compared to Learning Management System (LMS) developed by the institution; the involvement and commitment of students and lecturers towards e-

learning; verification of the whole process of R & D such as method of delivery and evaluation process; and Blended learning method through Massive Open Online Courses (MOOC) in the OpenLearning platform.

As outlined in Pillar 9 of the Malaysia Education Development Plan 2015-2025 (Higher Education), in order to achieve global online implementation, MoHE has set up the Malaysian e-Learning Centre (MyCeL) which was officially launched on July 27, 2017. MyCeL has been placed under the Research Planning and Policy Coordination Division of MoHE. Prior to the establishment of MyCeL, the e-learning agenda for public universities was mobilized by the Council of Coordinators of IPTA's e-Learning Coordinator (MEIPTA). To date, MEIPTA is actively supporting MyCeL for five (5) major initiatives - quality assurance, research and development, data hub, e-content and promotion, as well as networking. To date, MyCeL has carried out several initiatives such as the documentation of the National e-Learning Policy (DePAN) and completing two (2) e-learning audit reports involving public universities, private universities, university colleges, colleges, community colleges and polytechnics.

The MOOC platform in Malaysia used by public universities (up to 2018) is *OpenLearning.com*; where any interested or instructed lecturers would become e-content developers and develop their respective university's KPI. Or MOOC's platform is used by IPT to offer open online courses. The platform of *Openlearning.com* for Malaysia's MOOC is based on the proposal of the Main Committee of MOOC. In 2014, The Malaysian Higher Education Ministry recommends *OpenLearning.com* for four (4) MOOC pilot courses and the same platform continued to be used for the majority of Malaysia's MOOC courses on *OpenLearning.com* platform since it is free and is available for use as opposed to two (2) other tested platforms. However, the ministry does not limit only to *OpenLearning.com* if public universities want to offer their MOOC on another platform. There are also universities that use other MOOC platforms such as Futurelearn (University of Malaya) and Global Access Asia (UniMAP). In addition to MOOC, there are 14 public universities offering *Open Courseware* through the platform developed by their respective universities. Thus far, the Blended Learning and MOOC initiatives are placed at the ministry level. Other initiatives continue to run by the Public Universities but no specific reporting is made at the ministry level.

The main aim of this study is to investigate the prevalence of e-learning implementation (pedagogical, technological, interface design, evaluation, management, resource support, ethical, institutional, values and culture, and technical competencies) in Malaysia educational institutions (private universities, polytechnics, and BPTNs).

REVIEW OF LITERATURE

Economic, social and technological forces continue to change the global economy, and the way of life in organizations and the world. In specific, these forces have and continue to revolutionize teaching and learning in organizations. Urdan & Weggen (2000) related that technology, the rapid obsolescence of knowledge and training, the need for just-in-time training delivery, and the search for cost-effective ways to meet learning needs of a globally distributed work force have redefined the

processes that underlie design, development and delivery of training and education in the work place. In addition, Urdan & Weggen related that the need for different learning models due to skills gap and demographic changes and demand for flexible access of lifelong learning have played upon teaching and learning. In this teaching and learning evolution, however, several terms have been attached to characterize the innovation and creation that has been occurring. Some terms are: e-learning, distributed learning, online learning, web-based learning and distance learning.

According to Wahyu and Yahya (2006), the definition of 'e-learning' or electronic learning is often changing in line with technological advances and is often misinterpreted in educational promotion ads. In general, 'e-learning' is any teaching and learning that uses electronic networks (LAN, WAN or internet) to deliver content, interaction or facilitating content. Internet, Intranets, satellites, audio / video tapes, interactive TVs and CD ROMs are part of the electronic media referred to in this category. Therefore, the concept of e-learning is widespread, not just online. The development of e-learning in Malaysia is relatively new compared to the western and neighboring countries such as Singapore (Wahyu and Yahya , 2006).

Education using electronic media or e-learning has been around for a long time implemented in educational institutions in Malaysia especially higher education institutions in line with the development of information technology to move into the education arena. Demand for e-learning is expected to continue to increase as the government wants to inculcate a lifelong learning culture (DePAN, 2010). Introducing and using electronic media in teaching and learning is an action taken by the government to realize learning lifetime. In addition, e-learning also enables students to access resources education more broadly and is self-directed learning as well enabling collaboration with other students of different generations, countries, cultures and background (Embi, M. Wahab, Sulaiman & Atan, 2010).

Khan's e-learning framework was developed as a response to questions from readers requesting to see exemplars of effective Web-based instruction as defined in Web-Based Instruction (2005). The framework does not constitute a model because it does not prescribe a specific process for developing educational technology environments. However, it does take into consideration the design, development, delivery, and evaluation of web-based and hybrid instruction and can provide guidance in: planning and designing educational technology and blended-learning material organizing resources for educational technology, blended, and simulated virtual-learning environments designing distributed learning systems for corporations, public and private universities, virtual universities and cyber schools designing Learning Management Systems and comprehensive authoring systems evaluating educational technology, blended-learning courses, and programs evaluating educational technology authoring tools/systems, LMS and LCMS. The framework consists of eight dimensions, sometimes referred to as factors. Each dimension represents a category of issues that need to be considered in order to create successful experiences. The framework offers a practical

and detailed checklist to serve as a self-assessment instrument for institutions to evaluate their educational technology readiness or their opportunities for growth.

METHODOLOGY

Thematic Analysis (Braun and Clarke, 2018) of the Qualitative research methodology will be the core approach used in this study. Thematic Analysis is one of the most common forms of analysis in qualitative research. It emphasizes pinpointing, examining, and recording patterns (or "themes") within data. Themes are patterns across data sets that are important to the description of a phenomenon and are associated to a specific research question. Subsequently, thematic coding will be employed for data gathering and analysis. In this study, 8 themes from Khan's (2001) e-learning framework will be used as guides during data gathering. The eight themes are Pedagogical, Technological, Interface design, Evaluation, Management, Resource Support, Ethical and Institutional.

MAIN FINDINGS

The findings as shown in Table 1 shows that all public and private universities have good infrastructure. However, for the cluster of college and university colleges, 3 (42.86%) of these clusters have high infrastructure, 2 (28.57%) are moderate and 2 (28.57%) are low. Additionally, the majority of universities provide training related to e-learning as part of their respective academic training and development programs. However, not all Malaysian universities are at the same level of readiness to develop e-content. For Internet access, it is found that most Public and University colleges / universities have access to internet access with moderate and weak access. For private universities, 90% have high internet access.

Universities	Infrastructure, Infostructure and Access			Operational Structure and Governance				e-Content Development & Pedagogy	Professional Training & Development	Culture			
	Infrastructure	Infostructure	Access	Management Support & Engagement	e-Learning Unit	Support of IT Unit	Community of Practice			Knowledge	Attitude	Readiness	Skills
Public	Good	Good	Average	Good	Average	Average	Good	Good	Good	Good	Good	Good	Good
Private	Good	Good	Average	Good	Average	Average	Good	Good	Good	Good	Good	Good	Good
Colleges	3 Good	2 Average	2 Fair	Good	Poor	Good	Good	Good	Good	Good	Good	Good	Good

Good	Good
Average	Average
Fair	Fair
Poor	Poor

Table 1: General findings of the e-Learning Implementation Audit Review at Public Universities, Private Universities and Colleges Universities in Malaysia

The survey findings related to the operational structure for the implementation of e-learning at the university can be broken down into four (4) main items ie (i) the involvement of top management of IPT, (ii) the need to create a unit or center that manages e-learning, major support requirements from IPT information technology units / divisions and (iv) the relevant units / divisions as well as the existence of a community of practice (Community of practice (COP)) e-learning. For public universities, all universities show satisfactory status for all items except only one (1) university only achieves a poorer status for the creation of a practicing community. Additionally, all publicly audited universities have a satisfactory operational structure and governance for their e-learning implementation. For private university clusters, for items (i), (ii) and (iii), at least 80% of private universities achieve satisfactory performance status but for items (iv), performance status satisfies only 40% and 50% implementation. For university and college college clusters, the execution of items (i), (iii) and (iv) is at a less satisfactory level whereas item (ii) is unenforceable. The findings of the governance study are measured on two (2) main items ie the university has an e-learning policy and the university has a comprehensive action plan for e-learning. For public universities, four (4) out of five (5) IPTs have e-learning policies and have a comprehensive plan for e-learning. While private universities, only 70% have e-learning policies and have a comprehensive action plan for e-learning. On the other hand for college and college university clusters, 83% have no e-learning policies and 100% do not have comprehensive action plans for e-learning.

The e-content survey findings found that in public universities, the e-content developed is seen as a tool for replacing face-to-face learning and lecturers also need help from online pedagogical pointers to improve online learning methods and not merely use e-content as support material or just use an online platform as a repository. For that purpose, all five public universities are involved in providing training that assimilates online and e-content pedagogy to create a more robust and effective e-learning method. Most public universities in the study (70%) were found to be establishing units or centers for monitoring and assisting online pedagogy and the development of their respective e-contents. Furthermore, the audit found that private university colleges and private colleges did not have units or centers to develop and monitor e-content.

Overall, all the institutions involved provide basic training on the use of the learning management system (LMS) and e-learning to academics and students to adapt to the use of LMS and e-learning implementation. All the HEIs surveyed conducted technical training and practical training, while 21 of the 22 IPTs surveyed had undergone change management training. In terms of technical training, eleven (11) HEIs who have retrained their academics to an advanced level, an IPT is in the middle level, and ten (10) IPTs conduct basic training. This suggests that this technical aspect is an important requirement seen by all HEIs, of which 100% of HEIs implement it with 50% training at an advanced level of 4.5% at the middle level, and 45.5% at the baseline level.

For e-learning, the study found four key themes, namely knowledge level, attitudes towards e-learning, level of readiness and level of lecturer skills. Generally, the survey finds that the level of e-learning in public and private universities is at an impressive level in the above four items - knowledge, attitudes, readiness and skills level. But the majority of college / college colleges are still below the baseline in this aspect of the culture.

The findings also found that there are four other issues that are often voiced by the participants namely the issue of technology procurement and maintenance budget issues, the issues of discipline suitability in the implementation of e-learning, the issue of increase of lecturer's burden and special problems faced by open universities.

First, the findings of this audit study found that there were budget constraints in implementing e-Learning at local HEIs. Implementation of e-Learning requires large budgets for procurement of equipment and facilities such as wifi access, computer hardware, software, furniture and applications. In addition, these items need to be maintained from time to time to ensure a smooth system for users. However, the audit review participants stated that the budget for e-Learning implementation and maintenance of technology is often inadequate. The implication is that there are institutions of higher education that fail to provide and maintain e-Learning facilities for consumer use.

Second, in the e-Learning audit conducted, the researchers found that some academic staff found that teaching using e-Learning for specific areas such as Sports Science, Medicine, Art and Music was inappropriate. According to them, this is because teaching subjects in this field involves practical hands-on learning, hands-on learning and face-to-face meetings that are not possible through the e-Learning approach. The implication of this problem is that students in this field of study are less exposed to the e-Learning approach.

Third, the findings of the next audit review pertain to the increasing workload associated with the implementation of e-Learning to academic staff. In interviews conducted, academic staff often stated that the implementation of e-Learning led to increased workloads such as e-Learning materials, management of e-Learning syllabus improvement efforts, preparation of test and exam questions, as well as online teaching . Online teaching is different from face-to-face teaching. Online teaching requires more time from an academic staff because they need to communicate with each student individually and this consumes more time than the academic staff involved. Among the implications of the e-Learning task load on academic staff is the increasing pressure on daily tasks and less time to focus on the quality of teaching.

Fourth, the findings of the audit revealed that open universities such as Open University Malaysia (OUM) and Wawasan Open University (WOU) which carry out e-Learning share similar issues, relatedness and relevance compared to other universities. This issue is related to student background (age and geography). Interviews conducted in open universities found that student background issues, such as age profile and geography of students' residence contributed to the e-

Learning implementation problem. The academic staff's feedback stated that there are many older students (aged 40 and over) who have problems with the lack of skills in using technology in learning such as the use of learning systems (LMS) and computers. In addition, students living in rural or rural areas often face internet access problems. The implication of this problem is that the academic staff and students have to use their creativity to solve the problem they are facing. This takes a lot of time and energy for students and academic staff.

SUGGESTIONS

Larger e-learning budgets need to be put in place to make e-learning successful. This budget is for the acquisition and development of infrastructure such as wifi access, computer hardware, software, furniture and applications and sufficient maintenance costs. Detailed studies are needed to identify the suitability, e-learning activities and materials that can be used for subjects such as Science, Medicine, Art and Music. A networking platform among the academic staff of the subject can be created by MyCeL for collaborative purposes as well as exchange of ideas, experiences and materials. To solve the problem of increasing burden of the academic staff in implementing e-learning, a detailed study of the impact of e-learning implementation on academic staff workload needs to be conducted holistically involving academic staff of various universities. It aims to obtain detailed information as well as suggestions for improvement and solutions to the problems encountered. A platform for sharing best practices should be established in each institution of higher learning. In addition, MyCeL needs to have a complete and dynamic data bank to collect and disseminate information on 'best practices' by academic staff in the implementation of e-learning. To address the issue of wifi access for rural and rural students, the government is encouraged to provide internet access to schools and community internet centers across Malaysia, especially in rural and inland areas. Internet access is essential to successful implementation of e-learning in Malaysia, especially in rural and inland areas.

CONCLUSION

Malaysia's effort towards increasing the quality and standard of education in higher institutions through e-learning is an endless struggle. Despite of the many challenges faced by the institutions, there have been many success stories and best practices that provide hope and inspiration that e-learning in Malaysian higher institutions can be carried out successfully. The priority therefore is to provide a conducive e-learning ecosystem as well as established 'Community of Practices (COP) throughout these higher institutions lead by MyCEL.

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