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INTERNATIONAL JOURNAL ON E-LEARNING AND HIGHER EDUCATION

Design and Develop STEM Education in Malaysia: A Downdraft Gasifier Model

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Abstract: Design and development of a downdraft gasifier model can be used as a basis to foster STEM (science, technology, engineering and mathematics) education for young generation. Teaching and learning process through model can bridge the gap between STEM disciplines through actual practices, models should be used as a means to promote STEM literacy and the transfer of knowledge and skills between contexts, both in and out of the STEM disciplines. It is therefore imperative that intended model-based pedagogies for STEM education classrooms are further researched, in order to contribute in producing a creative thinking students in STEM educators. Downdraft gasifier used to produce renewable energy. This knowledge is important to young generation. It has been introduced to the secondary school and university. In this paper, a model of downdraft gasifier was designed, developed and tested for the visibility of producer gas output. This model was constructed at lab scaled to decrease the low temperature zone that appear in the actual size. The various parts of the gasifier like the throat, combustion zone, grate, reduction zone, fuel hopper, gas outlet and air inlet were designed. Biomass material source such as rubber wood was selected based on its properties as fuel. Later, the gasifier was ignited by a lighter to prove that the gas produced was a combustible gas. Results showed flares occurred on the gas output. It is proven that the gas ignited when flame is applied to the gas. This proves

that the producer gas produced is flammable. The yellow colour of flame was also observed.

Keywords: *Downdraft Gasifier, STEM Education, Producer Gas, Creative Thinking*

INTRODUCTION

STEM Education is derived from the SMET stands for Science, Mathematics, Engineering and Technology. In Malaysia, STEM (Science, Technology, Engineering and Mathematics) refers to education policies and school curriculum options to enhance competitiveness in science and technology to students. This is reflected in the Malaysia Education Blueprint 2013-2025 (Ministry of Education, 2013) which emphasizes STEM education at school level through curriculum and co-curricular activities with support through various stakeholders. STEM education was a priority for schools and universities to uphold and strengthen the field of engagement to the younger generation. It emphasized the concept of 4C components, namely communication, collaboration, creativity and critical thinking as contained in the 21st century learning (PAK-21) and high-level thinking skills (KBAT). The development of these components is seen as producing young people with high skills in solving complex problems (Kerka, 1992; Lopez & Whittington, 2001; Chinedu et al., 2015). Today the implementation of STEM is seen in the second wave when governments, statutory bodies, associations, non- governmental organizations (NGOs) and external agencies work together to promote STEM to the community. STEM education is seen to give birth to young people who have high intellectuals in science and technology. It is also capable of driving the country's economy and making Malaysia a high-income nation. Efforts to empower STEM culture among the younger generation, the media and technology must be fully utilized. Moreover, now the younger generation is so close to technology.

Bioenergy is the largest source of growth in renewable consumption over the period 2018 to 2023 (International Energy Agency, 2019). Bioenergy as solid, liquid or gaseous fuels will account for 30% of the growth in renewable consumption in this period. This is a result of the considerable use

of bioenergy in heat and transport. Other renewables have less penetration in these two sectors, which account for 80% of total final energy consumption.

Renewable energy knowledges are important to young generation. It has been introduced to young people in secondary school and also the university. For example, through the Design and Technology (RBT) subjects and a subject such as Thermodynamics are specifically taught about it. To produce young students who can think creatively, the appropriate learning model is needed. In this paper, a model of downdraft gasifier was designed, developed and tested. The objective is to design, fabricate, develop, test and obtain the flame visibility on the producer gas output. This model is built on a laboratory scale to reduce the low temperature zone that appears when it is in real condition. The various parts of the gasifier like the throat, combustion zone, grate, reduction zone, fuel hopper, gas outlet and air inlet were designed. The sources of biomass used in this study are rubberwood based on its nature as a fuel. This is based on research conducted by (Corella, 2001), (Lapuerta, 2008), and (Warnecke, 2000) that used rubber wood, wood chip and hazelnut shells respectively as their gasifier's fuel. The composition of gas for three type of biomass are then compared to select the best type of biomass material. The percentage of carbon monoxide for rubber wood is obtaine to be highest. High percentage in carbon monoxide will help during combustion in the combustion zone. Apart from this, rubber wood is chosen as biomass fuel because of its availability in this country.

DOWNDRAFT GASIFIER

This gasifier was developed to convert high volatile fuels such as wood. It is proven to be most successful design for power generation (Reed & Das, 1988) because producing low tar gas. This type of gasifier has four distinct zones which is drying zone, pyrolysis zone, oxidation zone and reduction zone. Both biomass and air move in the downward direction in the lower section of the gasifier unit. The producer gases leave a point just below the grate of the gasifier, which enables partial cracking of the formed tars and hence a gas with low tar content is produced (Patra & Sheth, 2015). Fig. 1 show the big scale of downdraft gasier design.

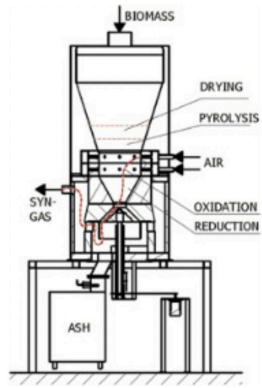

Fig. 1 Downdraft Gasifier Design (Jankes et al. 2012)

METHODOLOGY

3.1 Design and Drawing

SolidWorks 2014 software is used to draw and design the model laboratory scaled downdraft gasifier. The parts needed to build is hopper, throat, combustion zone, reduction zone, grate and gas outlet. These parts were studied and analysed based on the other reserachers (Reed & Das, 1988; Patra & Sheth, 2015 and Jankes et al. 2012).

3.2 Fabrication Process

The process of fabrication of the gasifier involve cutting, turning and welding as the joining process. Material selected for gasifier's body is mild steel because of its thermal conductivity and high melting point which is 1600 °C. The fabricated parts, rubber hose, air blower and galvanized pipe were assembled at FKM's welding workshop.

3.3 Experiment Setup

A downdraft gasifier model was designed for 3 kilogrammes capacity. Rubber wood size used as biomass fuel ranging between 30 mm to 35 mm. The amount of small rubber wood is burned in the reactor first

to get small combustion and flame. The remaining rubber wood was weighed using weighing scale before being filled into the gasifier and left to burn at full capacity. Air is supplied with air blower at highest speed. Air velocity was measured with anemometer and recorded. The gases produced left the reactor through the upper section, and a thermocouple was installed near the gas outlet to monitor the temperature of the exit gas. The temperature was taken for every 20 minutes. Fig. 2 shows the full setup for this experiment. At the end of experiment, the gasifier was cleaned to remove tar, ashes and unburnt wood inside the reactor. A size 30 spanner was used to loosen all the bolts located around the lower lid and tighten it all back after cleaning process was completed. The following equipment such as thermocouple, air blower, anemometer, spanner, weighing scale and a lighter during the proceses of gasification.

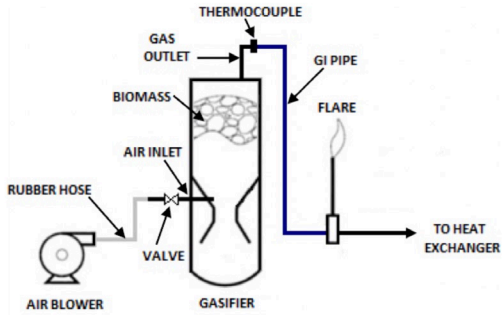

Fig. 2 Experiment Set up

RESULTS AND DISCUSSION

4.1 Drawing Result

Downdraft gasifier's model have internal and outer diameter of 0.2 m and 0.21 m. The height of the fuel hopper was 0.25 m and can be filled with 3 kilograms of rubber woodchip at full capacity. Reduction zone was designed with height of 0.05 m and the diameter of 0.1 m. The combustion zone on the other hand has the height of 0.04 m and diameter of 0.08 m. Air inlet and gas outlet have the diameter of 0.03

m and 0.02 m respectively.

Having high throat angle will decrease temperature, conversion efficiency and reaction rate. Therefore, smaller angles are appropriate but the downdraft gasifier model also needs longer gasification zone length to react efficiently. So in this design, the height of the throat was 0.1 m, the upper throat diameter was 0.2 m and the lower throat diameter was 0.08343 m. The throat angle was inclined 59.04°. These dimensions were chosen according to Reed and Das, 1988.

Grate height also need to be considered so that it will not block char in downdraft gasifier because blocked grate will block the flow or air and reducing the temperature area of the throat. 0.01 m height grate was positioned

0.03 m below the lower throat section and 0.140 m from the lower lid. The ash from reaction chamber could fall down freely through the grate, therefore, the char in downdraft gasifier will not be blocked.

Overall, this gasifier design is approximately 0.5 metre height with 0.21 metre diameter. The size of gasifier was reduced to reduce some low temperature zone that appear in the throat zone that will result in a rise of tar content in producer gas. The drawing of all parts are shown in Fig. 3. The isometric view of the gasifier are shown in Fig. 4.

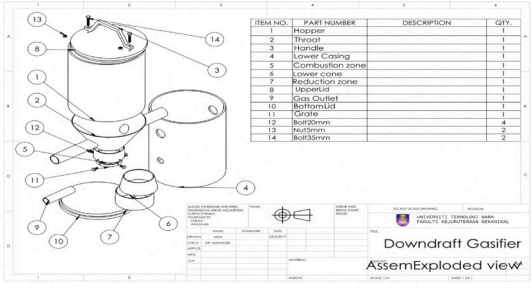

Fig. 3 Downdraft Gasifier Exploded View

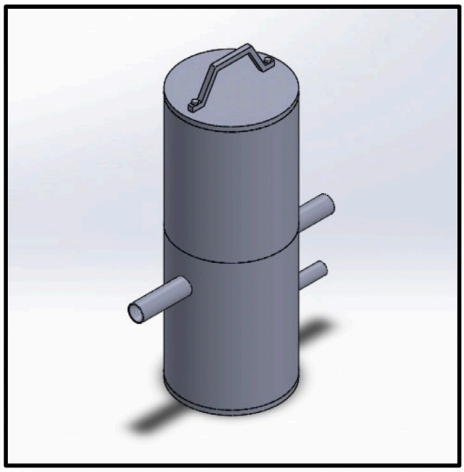

Fig. 4 Isometric View

4.2 Experiment

In these experiments, rubber wood is used as a feedstock for the gasification. It is a renewable source of energy and easily available at large scale in Malaysia. The wood is in block sized and it has to be cut into smaller pieces ranging between 0.030 m to 0.035 m as can be seen in Fig. 5. Small amount of rubber wood was added into the gasifier to start a small combustion before the gasifier was filled with the rest of the biomass and left to burn with full capacity. It was observed that the average lab-scaled gasification process duration is approximately 2 hours for a batch-load of 3 kilograms of rubber wood. The gasifier is sealed tightly and the gasifier is let to run for about 15 minutes to make sure that the combustion of wood inside the reactor is stable. The composition of producer gas derive from a downdraft gasification process which was determined by Gas Chromotograph is presented in Table 1. It was found that the result obtained was approximately similar to producer gas result published by Mahadzir, 2012.

An initial indication of suitability of producer gas to be used was determined by flare test. Fig. 6 is photographs of the flare test showing during operation of the gasifier. It was observed that producer gas flared

with a blue flame without any smoke. This proves that the producer gas produced is flammable.

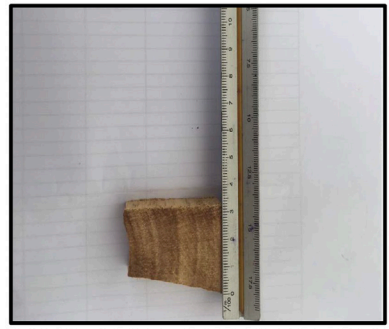

Fig. 5 A piece of rubber wood

Table 1. Producer gas Composition

	Producer gas composition (% vol) at 30 min					
	H_2	N_2	CO	CO_2	CH_4	LHV (MJ/Nm^3)
Authors	12.57	51.73	21.89	12.52	1.3	4.58
Mohd Mahadzir Mohammud, 2012	13.11	52.98	20.36	12.08	1.47	4.51

Fig. 6 Flare Test

CONCLUSION

The design and develop of the model scaled downdraft gasifier has been carried out. The lab model scaled based on the design, drawing and actual test were managed to be produced. Overall height is 0.58 m and the outer diameter 0.21 m. The hopper was designed to have the maximum capacity of 3 kilograms of feedstock. Throat was considered into this gasifier because it allowed maximum mixing of gases in high temperature region which aids

in tar cracking. Throat angle is designed to be 59.04° and have the length of 0.11662 m because smaller angles required a longer gasification zone length to reach optimum efficiency. The grate height is increased so that it does not block with char in downdraft gasifier. This model can be used as a laboratory teaching and learning tools for STEM education where the younger generation can understand more about renewable energy especially the field of biomass and producer gas.

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Visually Impaired Learning Design Experience through In-Vitro Design Protocol

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Abstract: This paper identifies a new research area of visually impaired learning form of design, where it emerged from the literature case study that the blind community commonly have not conceived to interpret design products. Moreover, it is related to the metaphoric of semantics in design language through design thinking as a product form entity translation known as formgiving. This research article folds to structure the ecological form creation in the semiotic of product's form orders, orientated by the extrapolative morphs design thinking. Using the in-vitro design protocol strategy that mediated through objects and haptic form understanding assessment enables the researcher to explore design attributes by its ergonomic through blind user touch experience sense. In return, the response can be digitized in extrapolative morphs design thinking (design anatomy) before entering the user-product interaction framework stage provisionally. In advance, basic qualitative preferences of blind user-designer experience can be detailed and put to highlight when it comes to predetermining product designing factoring through user experience.

Keywords: *Visually impaired, blind-user-experience, in-vitro design protocol, design analysis.*

INTRODUCTION

Touch and pleasure, certainly if one wants to understand the mechanisms underlying the effect of touch on humans' behaviors, cognitive and neuroscientific studies addressing the relationship between touch and pleasure are going to prove particularly relevant, which in this study the tangible product. Taking after (Desmet & Hekkert, 2006), he recognized that there are three (3) segments or levels of item experience: aesthetic pleasure, attribution of meaning, and emotional response. From this understanding of product experience it can be defined as "the entire set of affects that is elicited by the interaction between a user and a product, including the degree to which all our senses are gratified (aesthetic experience), the meanings we

attach to the product (experience of meaning) and the feelings and emotions that are elicited (emotional experience)" (Desmet & Hekkert, 2006). These three (3) parts or levels of experience can be recognized in having their own, but profoundly related legal fundamental procedures. Fig. 1 below demonstrates how the three (3) levels of item experience being classified.

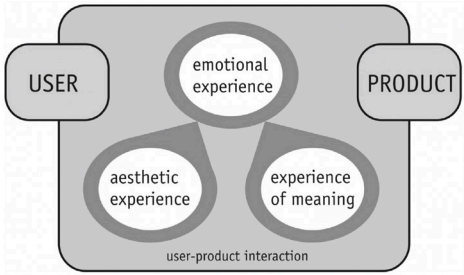


Fig. 1 Framework of product experience (Desmet & Hekkert, 2006)

Anwar et al. (2016) who experiencing the In-Vitro Design Protocol (IVDP) as illustrated in Fig. 2 the ambiguous characteristics of metaphorical form through designers sketching processes of Islamic product design has lead to a natural variety in output. Whereas Abidin (2012) refer this phenomenon as "consistency." Thus,

how do designers assess metaphorical form through their sketching assignments has discovered (Abidin, Bjelland, & Øritsland, 2008). Throughout thirty minutes of design activity (short-term memory), this empirical study stipulates in-depth qualitative data reflected all artificial situations that have been arranged.

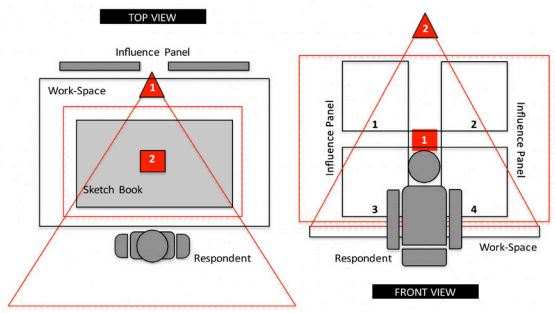


Fig. 2 IVDP experiment setup (Anwar et al., 2016).

Further along with the study, through the model of Dagman et al. (2010), she execute verbalized information through her experiment by presenting the product in front of the panel as in one way to render human experience of the product perceived through touching without the interference of visual information (see Fig. 3). From the information, she collected information on different "haptic product properties" (HPP) from the literature (Heller & Schiff, 1991; Klatzky & Lederman, 2003). Hubka and Eder (1988) characterize the property as any characteristic for an item that has a place with it and describes it; the sought properties are the most imperative aspects of a technical system (a product of human art and workmanship).

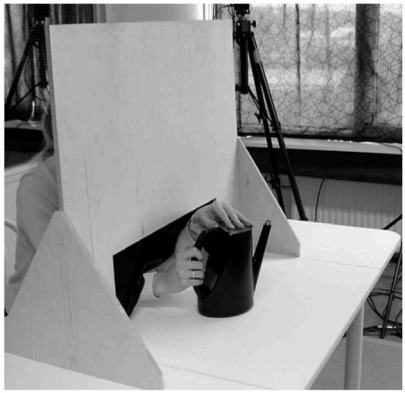


Fig. 3 Experiment setup where the participants could only touch the product without the influence of vision (Dagman et al., 2010).

USER DESIGN AND EXPERIENCE

2.1 User Centered Design

Based on Bjelland (2008) to separate the general knowledge of touch from the specific needs of the designer especially in haptic technology development; user-centred design (UCD) can be used as a framework reference in understanding the nature of the design process. UCD is both a design perspective and a process in which the needs, wants and limitations of the end-user of a product are given extensive attention throughout the development of a product. It is related to both product design and human factors (Lawson, 2005; Maier & Fadel 2008). The

physical appearance of a designed product justifies a philosophical effect through the way they are perceived. The designing process is crucial to determine the momentous factors in a designer's success. "Design" is both a noun and a verb and can either refer to the end product or to the process (Lawson, 1997, p. 3), both of which are important for the researcher to understand. In order of creating good end products, there is a need of knowledge on the capabilities and limitations of general human touch; the technical possibilities of designing for touch; and how resulting designs affect haptic interaction and the overall use (Vermol et al, 2016).

2.2 User Experience Design (UX)

The issues in this research are to uncovering general responses of touching activities through visually impaired perspective by looking at positive aspects, negative aspects, ethics, and conclusions. In order of finding how the aptitudes are articulated. The main purpose of this research is to establish a systematic approach to fundamental knowledge of what constitutes the quality of haptic product experience and access to methods and tools that can support the verbal elicitation of BVIG users' experiences and design requirements (Vermol, 2018). Without appropriate evaluation of users' problems and challenges in using 3-dimensional products and tools, we cannot begin to solve these problems and challenges faced by this particular user. Touch has traditionally received little attention in design or research on ceramic performance-critical products. Isaksson (2004) concluded the designer crucial process when dealing with tactile enhancement in product development is rarely documented. Supported by the findings of Kuiper & Scheepens (2000 cited in Sonneveld, 2007, p. 11) stated that designers very hard to articulate their knowledge of their long-term experience and skills.

2.3 User Design Awareness

Physical appearance of a designed product justifies philosophical effect through the way they are perceived. Designing process is crucial to determine the momentous factors in designer's success. "Design" is

both a noun and a verb and can either refers to the end product or to the process (Lawson, 1997, p. 3), both of which are important for the researcher to understand. In order of creating good end products, there is a need of knowledge on the capabilities and limitations of general human touch; the technical possibilities of designing for touch; and how resulting designs affect haptic interaction and the overall use (Vermol et al, 2016). According to Krippendorff & Butter, (1984); Monö (1997); Coates (2003), it is important to to consider the responses of consumer towards product appearance and taking the information as part of the process in communication. By taking this measure, it is significant to understand the connection of visually impaired group response in the context of visually impaired model of connection as per shown on Fig. 4, taken from the previous study. It is by setting up visually impaired at the middle between designer and user; both requisition and response can be channel to the development of the product (Vermol, et al., 2015).

BLIND-USERS' ACTIVITY EXPERIENCE: THE EMPIRICAL FOUNDATION

Throughout conceptual framework, researcher reflects to (Bannon & Bødker, 1991) consideration to human activity of three-layer system, which, opens up a possibility for a combined analysis of motivational, goal-directed, and operational aspects of human acting in the world. She explains her consensus on user application of how important it is to distinguish different aspect on application based on the characterization of the different focuses in the use activity. This section provides the activity framework that stresses out product evaluation by the respondent (see Fig.4.) while at the same time questioned and observed by the researcher. Through the dinamic interactive interview, with open-ended question, the researcher bargain for detail factors that influencing the behavior of each respondent. The intended questions however never stringent only to one mediating object as a study however, through course of previous pilot study conducted and series related literature indicates that what involved on the sudy was certain physical properties that together make up the design of the product (e.g., shape, and texture) and to be define through context of use driven from the touch senses looking through the collective study of (Dagman et al, 2010; Kaul et al, 1994; Snelders et al, 1995;

Veryzer,1999; Geistfeld et al, 1977 and Blijlevens et al, 2009). The sequence of activity overviewed through 3 components of understanding.

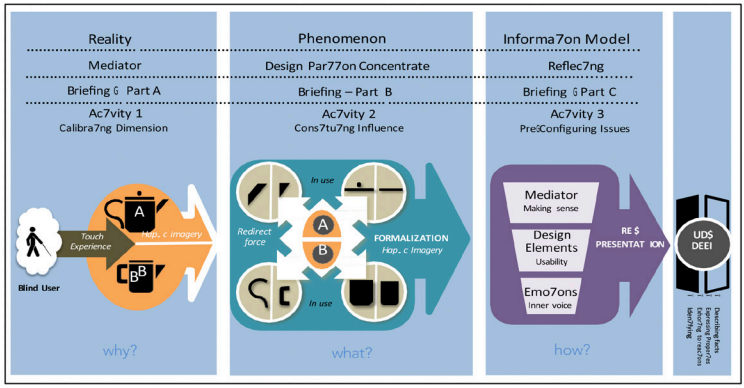


Fig. 4 Conceptual model of blind-user experience design experiment (Vermol et al., 2018)

3.1 Blind User Activity 1 – Blind Users Early Response To Product

Looking through mediating influence coming from the object. Questioning "why" is the product preferences understandable to the blind user. Is there sufficient haptic information triggered from the product? By questioning so, enables researcher to calibrate respondent dimension in confirming the quality of response, eligibility to be interview and direction of questions. Hence the important preferences that required in this section are to understand the early description of product information through its features ant attributes.

3.2 Blind User Activity 2 - Blind Users Performing Product In Use

Influenced by their experiences and how do they perceive things, mediated object are segregated to oversee what is the redirected force from each component and "what" is it contributing on. As in focus, it re- directs researcher to analyze on what is constituted the influence? To which particular part of the product involved? During which context of use does the influence commence? Throughout the emerging data gathered, enables the researcher to conduct formalization of haptic

imagery that forming the blind user identification to touched product.

3.3 Blind User Activity 3 - Blind Users Product Experience Response

Reflecting what had happened throughout the whole experience involved from the task, the researcher integrates "how" blind user life experience may depict the same scenario and situations. Through asking what is there conflicting or what is suppose to be there on the product , the researcher can mark an early framework over factors arise within mediator (product), design elements (attributes) and emotions (over blind user inner voice).

Activity plan constructed by the researcher in respond to clarify the needs and emotions involved in an activity, the meaning from blind users' experience and view on product appearance. Throughout the experiment the researcher question (Why) - by trying to clarify the needs and emotions involved in an activity, the meaning from blind users' experience. (What) - Only then, it determines the functionality influencing the experience and finally (How) the appropriate way of putting the functionality into action for the blind users' reflecting their perspective within their parameter (Geistfeld et al, 1977).

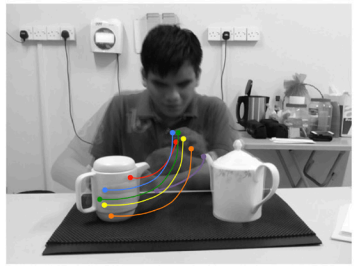
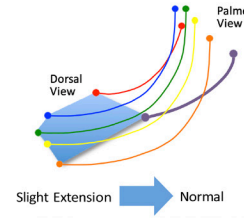
BLIND-USER EXPERIENCE: PERCEPTUAL ON PRODUCT AND DESIGN

Distinguishing blind user as legitimate subject to be taken as sample of study for haptic expression are due to their ability of adapting to the "mainstream products" of which designed without consideration to their needs However through time and experience, blind user learned to handle this designed product through their own possible way (Hersh, 2010). Even through extreme measure of activities that are sometimes not designed according to their perspectives. For an example, using a hot iron for clothes or cooking on a hot pan, to even

pouring hot coffee to cup and much more. It is said that touch to be the most reliable in sensory modalities. It is even considered as to be reliable than sight (Sekuler & Blake 2002). The opportunity of learning from observing and questioning them pertaining to product haptic properties leads to the

contribution of design factors which important for a product designer, Vermol, V. V. 2018).

Table 1. Ergonomic analysis of blind user respondent hand postures and movement in sensing a product design (Vermol et al., 2018)

Respondent	Artifact/Design Analysis
	Product A / Topic 1/ Sensing Knob and Lid  
	Product B / Topic 1/ Sensing Body 

An example of ergonomic study shows in Table 1 is inflicting from the visual images of blind-user experience experiment that was conducted. As reflection to the visual images, coloured wireframe provided on the right side columns indicating the hand movement observed (Bella Martin and Bruce Hannington, 2012) in a micro level. From the in information given from this experiment sampel of ergonomic study, inflicting from the visual images of Experiment that was conducted. As reflection to the visual images, coloured wireframe provided on the right side columns indicating the hand movement observed (Bella Martin and Bruce Hannington, 2012) in a micro level. From here, we able to grab some basic qualitative preferences of blind user respondents' ergonomics on hand grasping through visual observation of respondent grasping action (see Table 1 illustrating sampel of blind user as respondent reflecting from to the IVDP activity). This experiment taken through analyzing visual information from the videos recorded in accordance to Cutkosky grasp taxonomy, 1989) within 20 respondents

of blind users. In order of creating good end products, there is a need of knowledge on the capabilities and limitations of general human touch; the technical possibilities of designing for touch; and how resulting designs affect haptic interaction and the overall use (Vermol et al, 2016).

4.1.1 Product Understanding

With the great global increased on design and technology evolvement; product design activity is not only emphasizing the needs of utilarian, but also considering the value of affective, epistemic and hedonic requirements as well. It's a growing interest which developed through sensory design by other meaning taking human senses quality into consideration. Vision may have been regarded as most important sense in viewing a product; thus, in order to explore the whole quality interaction of product which designed for the people especially BVIG, the role of product appearance and its information especially during the state of product in use that can sense through touch are critically important (Vermol et al, 2015).

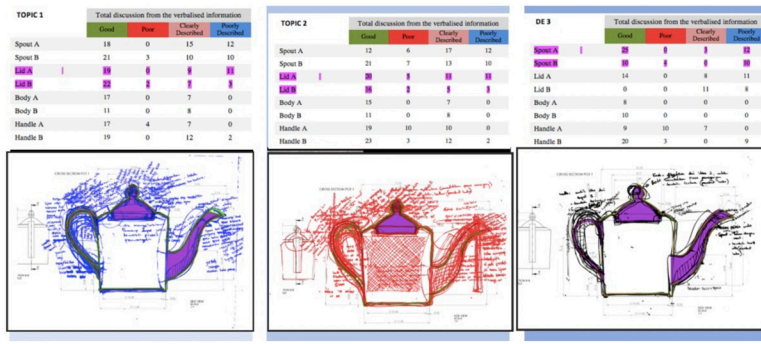


Fig. 5 Over-layering Designer Sketch Design Information (DSDI) feedback within product components (Vermol et al., 2018)

CONCLUSION

From the verbal information gathered throughout the whole topic of activities, the researcher quantifies emerging factors from key components of mediated Product A and B. This key finding from this analysis provides an actual overview in confirming which components from mediated product are the most important the most in making decision for improvement. Decision factor matrix analysis of components information provides analysis on decision factor matrix that representing five (5) mediating product components which are the 'handle', 'spout', 'lid', 'body' and 'texture'. In the process, the components are treated as contributing attributes. Overall, results form this study broading up the conventional way of product understanding in which, from the study of collaborative technologies approach will gathered information from multiple angles especially looking through product feedback and development.

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A SURVEY ON ONLINE LEARNING SESSION OF THE BLENDED LEARNING MODE AMONG LECTURERS

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Abstract : Graduates who are deemed to be knowledgeable, marketable, equipped with problem solving and critical thinking skills are what most universities aspire to produce. This kind of graduates are considered an asset to any organisation and are in constant demand because they are equipped with hard skills as well as soft skills. Thus, lecturers are constantly striving to find effective teaching strategies that encourage meaningful learning among their learners. In order to make the process of learning more efficient, interesting and engaging for the learners a majority of lecturers are constantly aiming to innovate and thus improve their teaching techniques. One of their teaching strategies is online learning. This study investigates the culture of online learning session of the blended learning mode among the lecturers in Diploma Science programme. Quantitative research approach was used for data collection and analysis in the study. Findings from the study shows the lecturers use various medium to conduct online learning where the most popular is i-Learn while the least is Facebook. The most common activities during online session was uploading the e-content. 70% of lecturers spend between six to 10 hours of their working time to fulfils the one-hour online session for every week and most of the lecturers spends two weeks to finish the evaluation of student's work. Student engagement towards online learning are good and lecturers are agreed that this method can help

student to improve their critical thinking skill compared to communication skill in order to achieve the 4C's skills. Research findings will give input to lecturers in T&L process to be more innovative and creative in order to help the learners achieving those required knowledge and skills.

Keywords: *blended learning, online learning, 4C's learning skills*

INTRODUCTION

21st Century Learning has become an increasingly important issue in the education as it is seen to meet the needs of nowadays learning, as well as bring new changes in the education world. 21st Century Learning emphasizes student-centred learning processes where they have to acquire some skills such as communication, collaboration, critical thinking, creativity and the application of pure and ethical values. Therefore, 21st Century Learning has made paradigm shift in learning that encompasses curriculum, media, and technology. Good learning media translates the difficult concepts to easier understanding. Therefore, Diploma in Science program does not exempt from applying the 21st Century Learning especially during the curriculum delivery. One of the elements applied are blended learning (BL).

In the traditional approach, a teacher delivers the content by repetition, making learner say or write the same thing repeatedly which make class less interesting. This model was teacher-centred which focus on rote learning where it requires students to memorize a large amount of information in order to expand their knowledge. Teachers then assess student knowledge by using tests and quizzes at the end of the unit or year in order to identify students' learning level (Halah & McGuire, 2015). Today, traditional lecture-based classroom needs to be changed to empower the education in 21st century learning. In 21st century learning, the teacher-centred learning has change to student-centred learning. The learner needs to acquire the 4C's skills which are communication, collaboration, critical thinking, and creativity in their daily life (Rusdin, 2018). Nowadays, the lecturer is not only delivering the knowledge in the classroom, but they also need to facilitate the learners to acquire that 4C's skills. The use of podcasts, audio and video blogs and online learning all play into how education is moving and is significant in current learning activities.

To adopt this changes, Diploma in Science programme was not exempted from applying the 21st Century Learning especially during the curriculum delivery. One of the elements applied was distance learning or blended learning (BL). According to the Ministry of Education Malaysia, blended learning is defined as "A mix of face to face and online learning mode where between 30% - 80% of the course content and activities are delivered online" (i-learn Centre HEA). A typical application of BL in the content delivery would be a combination of face-to-face instruction along with a technology-based material. For example, a lecturer can begin a course face-to-face with a well-structured lesson in the classroom then, students will be engaged with online tutorial to continue the learning processes. Integration between traditional face-to-face instruction with the university Learning Management System (LMS) also benefits the BL. During the programme curriculum review done by year 2017, almost 50% of the courses offered by the programme use BL as their teaching and learning (T&L) method. Face-to-face tutorial session had been switched to online tutorial. Each of the courses allocate about one hour every week for the online tutorial activity. In conjunction with the current situation, this study investigates the implementation of BL among Diploma Science programme lecturers. The objectives of this studies are to investigate the preferred online medium and the activities perform by the lecturer during online session. Other than that, this study is to obtain the lecturer's perspective on learner performance on 4C's skills.

METHODOLOGY

This study applies descriptive survey using cross sectional research design. Data were gathered through a set of structured questionnaires distributed to the lecturers. The sample was selected from 64 lecturers of Faculty Applied Science, UiTM Perak Branch Tapah Campus. This research utilised the random sampling technique, which refers to a sampling procedure whereby a group of subjects is randomly selected from any one population as the studied respondents.

Quantitative approaches were used to analyse and evaluate the findings. These approaches involved the analysis of data and information through the perception survey method. Quantitative data which were obtained through likert scale type questionnaire were analysed using the Statistical Package for

the Social Sciences (SPSS) software. In order to achieve research objectives, the data were analysed using descriptive statistics encompassing frequency distribution and percentages presented in the form of tables.

The value of Cronbach's alpha for all the item is 0.759, value Cronbach alfa > 0.7 is an ideal value which means, this research instrument is appropriate and reliable.

RESULTS

The respondent consist of 16.7% male lecturers and 83.3% female lecturers from various area of science courses (28.6% biology, 42.9% chemistry and 28.6% physics). Respondent grades ranged from DM45 to DM52 where 31% of them had less than five years teaching experience, 47.6% with five to 10 years teaching experience and 21.4% had 10 to 15 years teaching experience.

Table 1. Mediums used for online learning

	i-Learn	WhatsApp	Edmodo	MOOC	Facebook
Mean	2.90	2.67	1.31	1.19	1.12
N	42	42	42	42	42
Std. Deviation	.297	.650	.604	.505	.453

Mediums used for online learning has been tabulated in Table 1. i-Learn (M = 2.9) is the most preferred medium among the lecturer follow by WhatsApp (M = 2.67), Edmodo (M = 1.31), MOOC (M = 1.19) and the least is Facebook (M = 1.12).

Table 2. Activities performed for online learning in a semester period

	Upload learning material	Assignment	Discussion	Quiz	Forum	Upload Video
Mean	3.69	3.24	2.93	2.93	2.71	2.62
N	42	42	42	42	42	42
Std. Deviation	1.137	1.322	1.276	1.276	1.470	1.324

Table 2 shows that, upload learning materials are the most frequent activities during online with mean value

3.69 followed by assignment (M = 3.24), quiz and discussion (M = 2.93), forum (M = 2.71) and the least is upload the video (M = 2.62).

Table 3. Preparation duration for online learning

	Frequency	Percent	Valid Percent	Cumulative Percent
<1 hour	3	7.1	7.1	7.1
1-3 hour	19	45.2	45.2	52.4
3-5 hour	9	21.4	21.4	73.8
>5 hours	11	26.2	26.2	100.0
Total	42	100.0	100.0	

From Table 3, it was found that 45.2% of the lecturers are spending one to three hours for preparation and only 7.1% of lecturers spend less than one hour. Yet, there are 26.2% lecturers taking more than five hours to prepare for the online learning.

Table 4. Duration for lecturers to responds to the online forum or discussion

	Frequency	Percent	Valid Percent	Cumulative Percent
<1 hour	4	9.5	9.5	9.5
1-3 hour	17	40.5	40.5	50.0
3-5 hour	13	31.0	31.0	81.0
>5 hours	8	19.0	19.0	100.0
Total	42	100.0	100.0	

From Table 4 above, 40.5% of the lecturers need one to three hours to respond and only 9.5% lecturers need one hour to give a feedback. There are also 19% lecturers who spend more than five hours to reply to the students. Overall, there are 70% lecturers spend between six to 10 hours of their working time to fulfils the one-hour online session for every week.

Table 5. Duration for lecturers to evaluate assessment online

	Frequency	Percent	Valid Percent	Cumulative Percent
<1 week	3	7.1	7.1	7.1
1 week	14	33.3	33.3	40.5
2 weeks	17	40.5	40.5	81.0
3 weeks	5	11.9	11.9	92.9
>4 weeks	3	7.1	7.1	100.0
Total	42	100.0	100.0	

Meanwhile in Table 5, it shows 40.5% lecturers spends two weeks to finish the evaluation of student's work, while there are 7.1% lecturers who allocate less than one weeks and more than four weeks to evaluate the assessment online.

Table 6. Duration given to students to complete the assessment online

	Frequency	Percent	Valid Percent	Cumulative Percent
<1 week	2	4.8	4.8	4.8
1 week	23	54.8	54.8	59.5
2 weeks	14	33.3	33.3	92.9
3 weeks	2	4.8	4.8	97.6
>4 weeks	1	2.4	2.4	100.0
Total	42	100.0	100.0	

Table 6 shows one week is the most common period allocated by lecturers for student to finish their assessment which is 54.8%. While only 2.4% lecturers give more than 4 weeks to their students.

Table 7. Student engagement for online learning

	Frequency	Percent	Valid Percent	Cumulative Percent
0-20%	2	4.8	4.8	4.8
20-40%	1	2.4	2.4	7.1
40-60%	8	19.0	19.0	26.2
60-80%	12	28.6	28.6	54.8
80-100%	19	45.2	45.2	100.0
Total	42	100.0	100.0	

Table 7 shows the trend of student engagement for online learning. 45.2% lecturers choose 80-100% of their students are engaged with the online session. While only 2.4% lecturers saying that 20-40% students are participated.

Table 8. Lecturer's perspective on online learning towards learners 4C's skills outcome

	critical thinking	collaboration	creativity	communication
Mean	3.38	3.00	2.93	2.71
N	42	42	42	42
Std. Deviation	1.125	1.126	1.068	1.088

Table 8 indicate the mean value for lecturer's perspective on online learning towards learners 4C's skills outcome. It shows that, critical thinking is the most agreed skills that can be achieved through online learning followed by collaboration skill (M = 3.00), creativity (M = 2.93) and communication skill (M = 2.71).

DISCUSSIONS

The finding of the study shows that the Diploma in Science lecturers are applying various medium in carrying out the online learning. The most popular was i-Learn (LMS). i-Learn is the most preferred medium might because it is the system developed by university itself where every lecturer and student are automatically own an account and have an easy access to it. In addition, the system interface is suitable for learning activity. Lecturer can upload notes, create online quizzes, form a group forum and many more. While students are automatically joining a specific group based on the class registration, so it is easier and convenience for both parties. Whatsapp also is a popular medium used by lecturers. Interactions can become more instant since lecturers and students can respond quickly via Whatsapp. By using Whatsapp, lecturers and student can communicate anytime and everywhere (Sonia Gon and Alka Rawekar, 2017). In addition, the preference such as multimedia, group chat, unlimited message, no username and password are the great collaborative features which help the user to communicate (Bere, 2012). Facebook is the least popular medium to do online learning. It might because, Facebook is a platform for social life and by using Facebook for learning purposes, learning can be informal. Other than that, students can be distracted by other variety of post and it will make the learning process less effective. In addition, Facebook is lack of feature such as monitoring audience's progress to support the complete learning process. Liu (2010) have agreed that social media were not developed for learning purposes. While, another study support that by saying most lecturer use them for recreational purposes such as gaming, communication, and shaping online space for expression of personal identity (Crook, et al,. 2008).

The most common activities performed for online learning in a semester period was uploading a note for a course followed by assignment, discussion, quiz, forum and uploading video. It shows that the lecturer does have a great deal of creativity to fulfils the 14 learning weeks. Moreover, this might be due to the BL

implementation guideline where the lecturers need to comply certain criteria which are uploading seven e- contents, create three forums and provide two assessments online.

In term of duration, most of lecturers spend one to three hours for preparation and yet there are lecturers taking more than five hours to prepare for the online learning. While for giving feedback, most of the lecturers allocate one to three hours and do have lecturers who spend more than five hours to respond to the students. Overall, there are 70% lecturers spend between six to 10 hours of their working time to fulfils the one-hour online session for every week. Addition to that, most of lecturers spends two weeks to finish the evaluation of student's work. All this duration will increase if the lecturer assists more than one group and it will require more time if there are high number of student in a group. These findings show that, online learning is a time-consuming method. Lecturers have to allocate and manage well their time for preparation and giving responses to the students.

The most common duration given to students to complete the assessment online was within one to two weeks. This period is considered as enough while the other factors was taken into consideration. It includes, the ability of student to do self-learning (student centred learning), enough time for communicate and collaborate with each other in order to complete the given assessment.

Most of lectures agreed that their students are engaged during the online session. Student responds within the given time and participate in every forum or discussion created. Yet, there are some students who are not engage might be due to the technical issues which is particularly poor internet connection. Z.M. Zabidi et al. (2019) also reported that, poor internet connection may be the factor of less student engagement during online learning. In addition, student might take advantage from the online session by doing another assignment or activities because they do not have to see the lecturers. Besides that, less readiness on the topic discussed during the online session might leads to the poor engagement of students.

Based on the 4C's skills that need to be achieve by student, critical thinking is the most agreed skills that can be achieved through online learning followed by collaboration skill, creativity, and communication skill. This might be due to the nature of online learning where there is less verbal communication. With the assignment and discussion through online, it might help student in term of critical thinking skill because student they can do independent learning and directly it will improve the cognitive skill. Student might be

good by communication in written but verbally, they need another medium.

To achieved the 21st century 4C's skills among the learners, the lecturers need to be more creatives and innovative and willing to change their pedagogy method in T&L. With this motivation, UiTM Perak Branch has taken an initiative in establishing a hub for innovative teaching and learning (HITeL). This hub act as a catalyst to encourage university academicians to be innovative in designing flexible learning models and creating active learning as well as identifying the latest educational technology in fast-paced online learning.

CONCLUSIONS

This study has shown the culture of Diploma in Science program lecturer towards online learning for BL implementation. Overall, lecturers are using various medium for online learning which the most popular was i- learn and least popular was Facebook. The most common activity performed for online learning in a semester period was uploading a note for a course and the least is uploading video. Based on the duration, online learning consumed more time and it will increase based on the number of group and number of students per group. Student engagement towards online learning are good and lecturers are agreed that this method can help student to improve their critical thinking skill compared to communication skill. Lecturer have to be good in managing their time and be more innovative so that the teaching and learning processes through online can give bigger impact to students in order to help them achieving those required skills. Thus it is wise that educator only use a teaching and learning approach that will evoke the interest and enthusiasm of students. By using such T&L approach, the students will feel more excited and interested in the learning process and not feel intimidated or restricted.

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STUDYING THE USABILITY ON VARIOUS TYPES OF PROGRAMMING MOBILE APPLICATIONS

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Abstract: In this new era of technology, smartphone has been widely used. To cope with the vast usage of smartphone, many kinds of mobile application or mobile apps has been developed. Besides social mobile apps, educational mobile apps are also one of the most popular application among users. For those who learn programming, many programming mobile apps are available on iOS and Android platform. Thus, this paper will study on the usability on various types of programming mobile apps such as CaptainCStudy for iOS, C++ Programming for Android and Learn C++ for both iOS and Android. A survey has been done to find the usability of the apps based on the interface and layout, content and activity provided. Result shows that each of the apps has its own style of delivering the information. Besides being able to type programming sytax, the programming mobile apps also provide various information for the knowledge of the students and even exercises which can help students understand programming easily.

Keywords: *interface, comparison, programming, mobile apps*

INTRODUCTION

Nowadays, mobile devices have become one of the most popular communication devices among people of different ages. Student especially uses social networking media as a mean of communicating among themselves. The usage of mobile devices are becoming more popular for most computing tasks. Today, mobile devices are widely used not only for communication but also in education, entertainment, research collaboration and social interaction. (Ramanuja, 2014). In education, besides face-to-face, learning can also be done online. Instead of using using personal computers or tablet, it will be more convenient for the students to learn using mobile

devices.

Basically, learning programming are done in class using personal computers and giving hands- on to students. Mobile devices such as smartphone are the most commonly used technologies for mobile learning (Naismith et al., 2004). Smartphones are also the most widely used devices among students in developing countries (Mbogo C., 2017). Thus, with the over-increasing used of smartphone, many programming mobile applications have been developed to help learners learn programming easily.
Learning programming acquire skills and knowledge. Programming on smartphones is much more easier as we carry it with us at all time. Working with mobile devices makes learning programming more interesting to students. Students can download and use the applications available anywhere at anytime (Jordine et al., 2014). Thus, by carrying their own mobile devices with them at all times, students will effectively carry around the entire computer programming learning and practicing environment. (Tillmann et al., 2012).

Presently, millions of apps are available for free or to be purchased in different platform to smartphone users. Each day, new applications are launched to the online stores (Chandi et al., 2017). There were around 5 million mobile apps available for iOS devices in Apple's AppStore and Android OS devices on Google Play (Wikipedia, 2019a & Wikipedia, 2019b). Education apps has led to tremendous interest among learners and educators. Many programming mobile applications can also be found in the iOS and Android platform. This apps provide various features which can help learners to learn programming wherever they go. Most of the programming apps available in iOS and Android allow users to generate code in certain language. Some of it provide programming contents such as learning materials and examples while others provide activities and games related to programming.

Hence, this paper will study some free programming apps which are available in iOS and Android platform. The apps are C++ Programming for Android, Learn C++ for Android and iOS and CaptainCStudy for iOS. The study will focus on understanding the usage of each apps by reviewing all the features provided in the apps such as on the user interface, content and activities.

Figure 1 below shows the icon for the programming mobile apps that has been chosen.

Fig. 1 List of programming mobile apps

DATA COLLECTION

In this study, the primary data is collected through online questionnaires. The scope of respondent covers degree and diploma of civil and mechanical engineering students with different genders. The questionnaires are distributed in middle of the semesters.

A survey is done to study between three types of programming mobile application available in iOS and Android. The applications chosen are C++ Programming for Android, Learn C++ for Android and iOS and CaptainCStudy for iOS. C++ Programming can be installed for free using Google Play. It is being developed by Akshay Bhange and consists of tutorial sections and colourful programs. Learn C++ is a free programming apps developed by SoloLearn. It includes lessons which are split into 8 levels (SoloLearn, 2019). CaptainCStudy consists of 4 educational interactive contents (Softheaven, 2019). It is a free programming apps developed by Softheaven.

The content of the questionnaire is split into four components, which are; 1) personal background; 2) interface and layout; 3) content; and lastly 4) activities.

DATA ANALYSIS

The three programming mobile applications are being studied based on the interface and layout, content provided and activities given in the applications. For interface and layout questions, respondents need to answer according to the scale provided which is 1(Disagree), 2(Moderate) and 3(Agree).

Four questions has been constructed for interface and layout as given below:
Q1: Is the application attractive?
Q2: Is the application easy to use?
Q3: Is the application interactive?
Q4: Is the application interface consistence?

In the second part, four questions covers about the content.
Q5: How far do you understand the content?
Q6: How do you prefer the content to be displayed?
Q7: What style do you prefer for the content?
Q8: What type of content on programming do you prefer?

Finally, the last 4 questions enquired the respondents to answer questions based on the activities.
Q9: What type of activities do you prefer?
Q10: What type of questions do you prefer?
Q11 Do you prefer to do the activity individually or in group?
Q12: Is the activity in this application interesting?

RESULTS AND DISCUSSIONS

80 respondents have answered the survey in google form. The survey has been distributed to UiTM Cawangan Pulau Pinang diploma and degree engineering students from the Faculty of Civil Engineering and Mechanical Engineering. Figure 2 shows the number of respondents based on gender. Among all this students, 75% are male respondents while 25% are female respondents. This is because most of the engineering students in UiTM are male students.

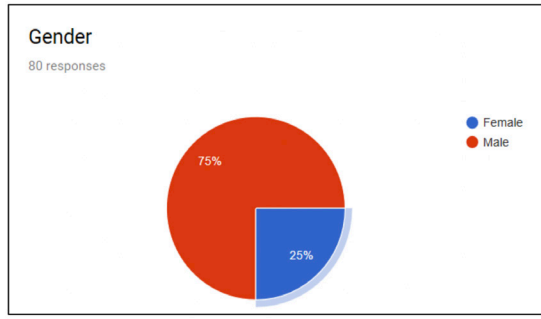

Fig. 2 Respondents based on Gender

Since this paper is to study the usability of programming mobile applications, it is very important for us to know how many students uses smartphone. The result below shows that all of the students have their own smartphone with data plan subscription. This enable the students to use the programming mobile apps easily.

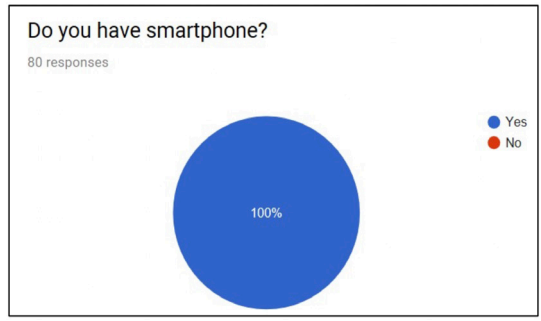

Fig. 3 Usage of smartphone and data plan

The below chart shows the result based on the problem faced when using the applications. Most of the respondents do not have any problem while using the applications whereas only 7% of them faces problems. This may be because of problems with the network connection, phone memory and new to the applications.

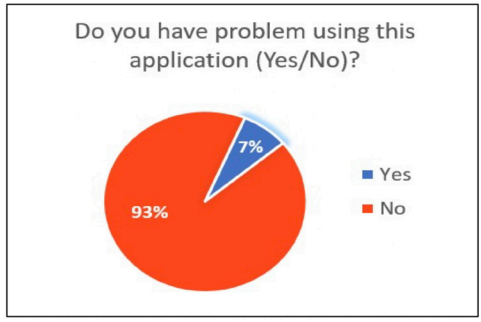

Fig. 4 Problem using the applications

This study focused on the applications based on the interface/layout, content and activities. Figure 5 shows the respondent's feedback on the applications interface/layout based on the attractiveness, easy to use, interactive and consistency of the applications. It shows that most of the respondents agree that the applications are attractive, easy to use and interactive while most respondents feel moderate on the consistency of the applications. This is because the applications interface/layout are being developed by different people and they have their own way of representing their applications.

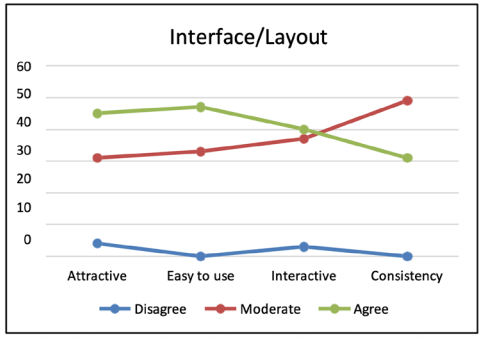

Fig. 5 Respondents' feedback on the applications interface/layout

The result below shows the respondent's feedback on the applications content based on their understanding, content display, style and type. Most of the respondents think that the applications content are interesting. They prefer the content to be displayed by topics and can provide many programming examples instead of theory. The respondents also prefer the content to have the combinations of all elements which are text, graphics, videos and animated.

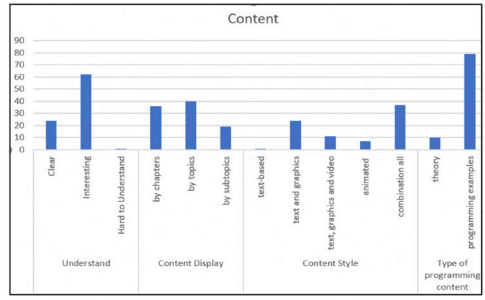

Fig. 6 Respondents' feedback on the applications content based on their understanding and preferenc on the content display, style and type

Figure 7 shows the number of respondents' feedback on the application activities. Most of the respondents feel that the activities are interesting while only 1 of them feel it is not interesting. This is because maybe the respondents do not understand the activities given. The respondents prefer the activities to be done in gaming form compared to the conventional way. This may led to the respondents preference on the group activity types instead of doing it individually. They also felt that activities on implementation is more better compared to theoretical types of questions.

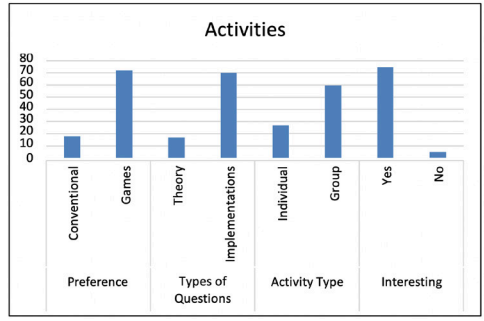

Fig. 7 Respondents' feedback on the applications activities based on their interest and preference, types of questions and activity type

CONCLUSION

Mobile devices has been extremely used in many areas such as communication, entertainment, business and education. Many types of mobile application on education are available and can be downloaded free from the iOS and Android platform. Learning programming using smartphones are a new way of learning styles which can be done anywhere. With the increasing number of programming mobile applications available, student can learn programming easier. Most of the programming applications available can attract and help students to learn programming anywhere at any time. However, the programming applications may not satisfy certain students as the features may varies according to the students preference and requirements.

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DESIGNING A PROGRAMMING MOBILE APPLICATION FOR NOVICE USERS: A PROTOTYPE

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Abstract: Mobile application or mobile apps has been a trending technology nowadays. This can lead to a new way of learning style. Learning process also becomes easier with the over-increasing development of education mobile apps. Novice programmers can learn programming easily with the development of programming mobile apps. A good programming mobile apps should not only focus on delivering the content but also on various aspect such as availability, usability, dependability, performance and functionality. Thus, a prototype on programming mobile apps has been designed to cater the needs of novice users. This paper will study the suitable method on system development that focus on activities and content arrangements based on the survey that has been done prior to the design .From the method chosen, a full system layout will be designed as a preliminary process before developing an effective programming mobile application.

Keywords: *programming, mobile apps , mobile learning, method, system development, system layout*

INTRODUCTION

Mobile learning is a new and trendy way to access learning process using personal electronic devices. This can be done using devices like your smartphone, laptop or tablet. The contents in the mobile learning application are across multiple contexts, through social and content interactions. Mobile learning application have become a highly trendy in the apps development industry. There are many company developing mobile apps in the market to serve the mobile learning purpose that can be used by teachers, students and trainers. With the increasing use of smartphones and tablets, the trend of mobile learning is going to expand exponentially in our daily life rutin (Riresh, 2019).

Nowadays, with the popularity of smart mobile devices among the young generation, it can be expected that educational applications that target these platforms should gain interest from students (Rau et al., 2008). Many kind and level of mobile learning applications for educational field are available such as for preschool, primary, secondary school and university level. There are variety types of mobile application for learning such like learning through games and combination of notes and games. As we all knows, the advantages using mobile learning application in education field are learners can learn from anywhere and anytime, the contents will be in various type of materials and learners can collaborate and discuss through online in large groups from all over the world (Cheon et al., 2012). The programming subject is also not left out in the world of mobile learning technology. Currently, there are various programming mobile applications on the market for those who wants to learn programming. In the early stage of teaching programming online, there are three strategies identified to improve students' programming online learning experiences by providing a virtual computer lab, create materials full of multimedia elements and creating a sense of community among students (Wang, 2011). By creating the virtual lab, problem on installiting the programming environment software can be avoided. Creating materials full of multimedia elements such as video and audio, will increase the students interest in learning it. Beside that, creating the community sense will allow the student to interact with each other easily. By providing discussion forums in a course management system, it will facilitate discussions on assigned programming topics, team interaction, and communication (McKelvey and Curran, 2012). Therefore, it is important

to create an online community to support online programming activities.

This study is going to focus on developing mobile applications for novice programmers. Therefore, we have to identify what are their needs. There are several perspectives on the characteristics and common delusions of novice programmers that should be considered (Soloway and Spohrer, 1989). They usually felt difficult to understand the concept and syntax of programming (Baist and Pamungkas, 2017). The novice programmer expect to learn from clear explanation with examples. Beside that, interactive presentation will also continue to generate interest in learning it.
Mobile application development process are different compared to normal desktop or laptop software development (Wasserman,2010). Availability, usability, dependability, performance and functionality are indentified as the system quality characteristics for selecting mobile applications (Sarrab et al., 2015). Therefore, learning mobile applications should be developed in a manner that is appropriate and has characteristics in interactive learning. This study focus on developing a suitable prototype programming mobile application for novice programmers. This prototype has been designed to fufilll and cater the novice programmer need, which is learning programming in an easy, simple and interactive way.

METHODOLOGY

Software development models are processes or methodologies used for the development of software or applications. There are many development model which has been developed like Evolutionary Prototyping Model; Spiral Method (SDM); Iterative and Incremental Method; Extreme programming (Agile development);Waterfall model; Prototype model; Rapid application development model and so on (Whitten and Bentley, 2007). All the models identify the various stages of the process and the order in which they are carried out (Sommerville, 2016).

For the purpose of this prototype development, few steps has been planned. For basic software development prosess, waterfall model has been applied to study and plan the overall mobile application process. Beside that, Agile methodology also will be applied during developing the mobile application development process and will be discussed in future research.

2.1 Waterfall Model

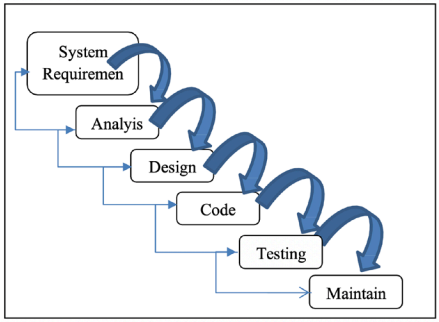

Fig. 1 Waterfall Model

The prototype in this study has been developed based on the waterfall model. In the Waterfall Model, there are six steps involve as shown in the figure above. Waterfall Model was introduce by Dr Winsson W. Royce. This model emphasizes the linear sequential phases in developing a software. Applying this model in software development gives a lot of advantages. This model will allow us to understand and focus on the requirement identified, plan our design early and beside that it also help us focus in our project milestone by phases.

The system requirement, analysis, design, coding, testing and maintainance are the six phases in Waterfall Model. The first stage, system analysis guide us to really understand our problem statement and requirement. In this stage, we undertand the problem statement that we would like to resolve which is developing an application that can used by novice programmer. In the analysis stage, to identified what are the special requirement needed, we preform the data collection and research. Detail explanation about the data collection will be elobrated in following section. Then, we planned our storyboard as in the design stage. We will start to implement the design from the storyboard in the coding stage and continue by testing the application and preform the maintainance.

2.2 Data Collection

A survey has been conducted to identify the suitability and preferences style for mobile programming application among the novice

programmer. The survey is done among the engineering students in UiTM Cawangan Pulau Pinang. In our previous paper, Studying the usability on various type of programming mobile application had explain detail about the result. As in this paper, the analysis will focus on the users preference on programming mobile application as it is the importance aspect when developing a prototype for it. Below are the questions asked on the survey based on the content and activity part:

Part : Content

Q1: What type programming content do you prefer? Q2: What style do you prefer for the content?

Q3: How do you prefer the content to be displayed?

Part : Activity

Q4: What type of activities do you prefer? Q5: What type of questions do you prefer?

PROTOTYPE DESIGN

From this study, we plan to come out with a new programming mobile application which is specially designed for novice users. We named it as EZ C++. EZ C++ is a programming mobile application which can be used by those who wish to learn C++. This apps consists of interactive notes, examples and activities which is suitable for novice programmers . Users can also try the C++ programming syntax by writing their own program in EZ C++. Figure 2 shows the logo of EZ C++ mobile apps.

Fig. 2 EZ C++ logo

Before we design the prototype layout, we have done a few survey. Based on our previous paper, "Studying the usability on various types of programming mobile applications", a summarization of the results on the respondents' preference for the content and activities in programming mobile applications has been identified.

Figure 3 below shows that the respondents prefer the content to be displayed by topics and consists of all elements such as text, graphics, audio and animated content. For the activities, the respondents prefer games compared to the conventional way. Activities on the implementation in programming is more preferable instead of theoretical questions.

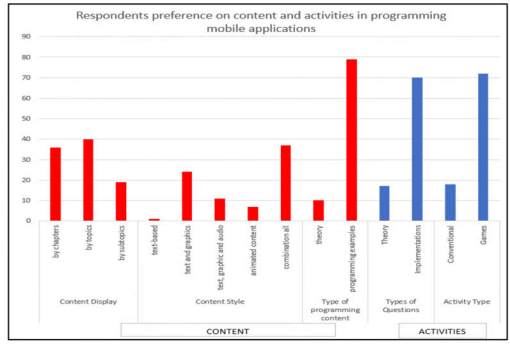

Fig. 3 Respondents' preference on the content and activities in programming mobile applications

From the result above, we have propose a suitable layout for EZ C++ mobile application prototype. Below figure shows the design for the prototype layout of EZ C++ mobile application. There will be seven interfaces in this prototype. The storyboard consists of nine interface layout of the EZ C++ mobile application.

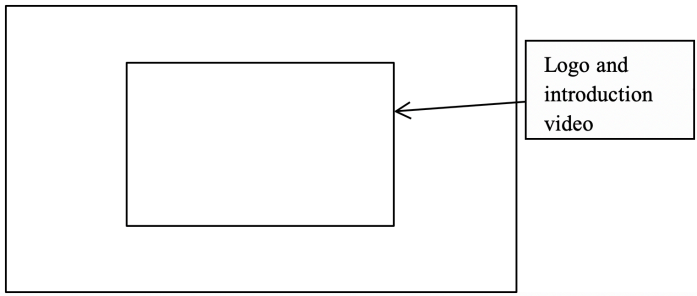

Fig. 4 Introduction Interface

Figure 4 above shows the first or introduction interface for the prototype EZ C++ application. In this interface, there will be a short video that display the logo and some information about this application. The next interface will be displayed once the video ends.

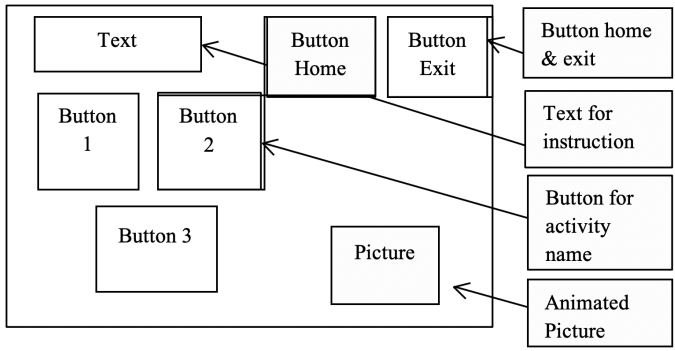

Fig. 5 Interface for select activity

The layout as in the figure 5 will appear after the introduction interface. This interface will consists of the list type of activity which are notes, example and game activity in button mode. Home and exit button also will be provided in the inteface.

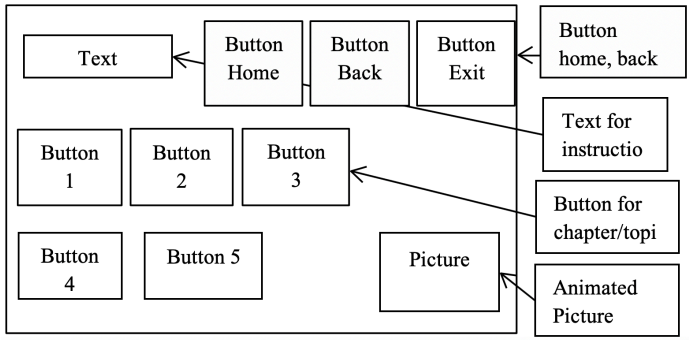

Fig. 6 Interface for select chapter or subtopic

Once user select the type of actity notes, interface as in figure 6 will be displayed. Here, user can select the chapter they want to go through by clicking the button provided. In this interface, we also provide home, back and exit button. The similar design interface will appear for selection of the subtopic.

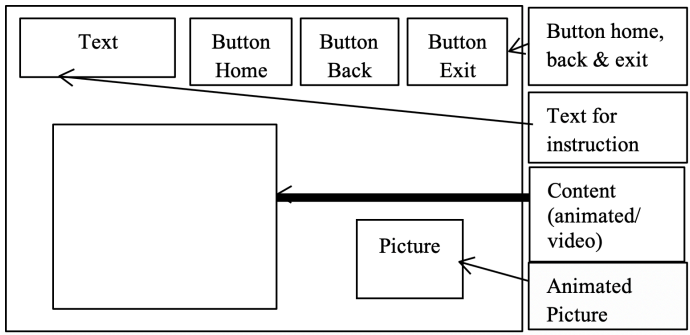

Fig. 7 Interface for display content by chapter, topic and example

Figure 7 shows the interface for display content by chapter, topic and example. All of the contents have the same layout. Various type of content will be provided such as in video mode, animated pictures and mindmap materials. As usual, we have home, back and exit button in this interface.

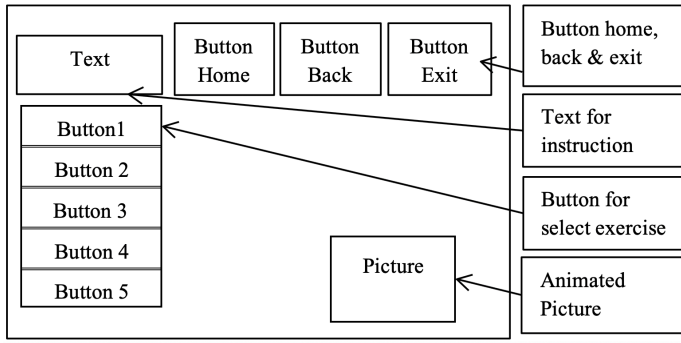

Fig. 8 Interface for select exercise questions by topic

Interface layout as in the figure above shows the list of exercise question by topic that can be selected. This interface will be displayed once user select game activity button from the interface select activity. Here, user can select the appropriate button to do exercise question by topic that they prefer. Similar to other interfaces, here we also provide the home , back and exit button.

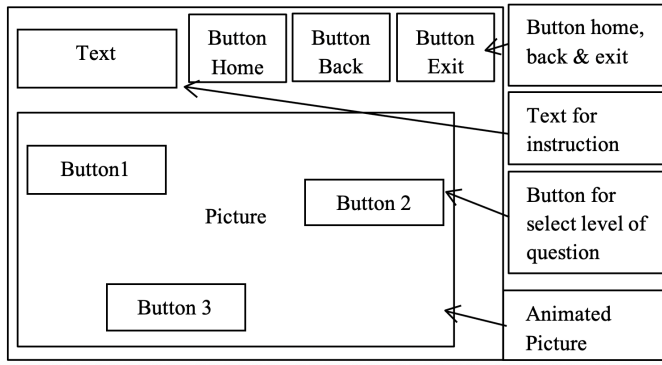

Fig.9 Interface for select level of exercise

Figure above shows the layout for interface level of exercise. Once the user select the topic from figure 8, this interface will be displayed. Here, the animated image will be displayed and on the image will shown the buttons that refer to the levels of question. Once user answer correctly, they can go to the next level of question. User have to play the exercise in sequence mode.

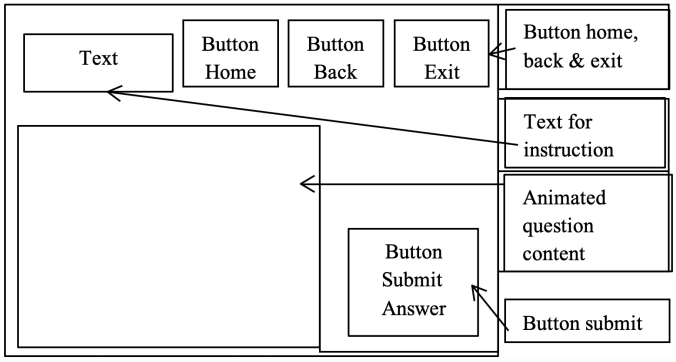

Fig. 10 Interface for display excerse question

The layout in figure 10 show the interface for display question based on the level selected from the previous interface. The question will be diplayed and space for the answer will be provided. After inserting the answer, user has to click on the sumbit answer button to sumbit their answer. An appropriate pop up image will appear based on correct or wrong answer. Various style of questions will be given such as match the answer, multiple answer question, fill in the blanks, and tick the correct answer.

CONCLUSION

The concept of mobile learning is getting very popular these days, as many school and universities are implementing it as an additional references and class activity. Various type of learning mobile application are famous among students, learners and trainers. Programming mobile application are also avalaible in the market especially for those who like to learn programming. In this paper, we focus on developing a prototype programming mobile application for novice programmer. Novice programmer usually prefer the application that is easy to use, can be understood easily and attractive. They prefer materials in various type that will enhance their interest to continue using the application. This study has design a prototype on programming

mobile application that will fullfil all these requirements.

ACKNOWLEDGEMENTS

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INNOVATION IN POSTGRADUATESTEACHING: ANDRAGOGY THEORY CONSIDERATION FOR MBA EXECUTIVE CLASS

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Abstract
The personal development and direction of postgraduate's education is becoming increasingly important, composite, and confusing. The higher education has an effect on the society through policy- making, funding, and planning. Adult learning and teaching is part of the universities' efforts to fulfill their primary functions, namely, the teaching and learning process, research and scholarly activities, and service to society. Center for postgraduate studies have to manage and implementing adult learning theories intensively and innovatively in university operation in order to attract more postgraduate admission. The purpose of this paper is to clarify the important element of student participation, comunity involvement in upgrading postgraduate student and motivation. Findings show that by complying with the andragogy theory and community involvement can grab more collaboration partners and increase the number of admission especially for postgraduate program in branch campus. Final recommendation and conclusion are presented at the end of paper.

Keywords: *Postgraduate, Teaching Innovation, Motivation, Community, Involvement, Andragogy.*

INTRODUCTION

Motivation Theory

According to Maslow, there are many factors might contribute to human intention on doing something burden in their life. However, the human has to do something in order to fulfill their requirement. There are two categories of choice, needs and wants. The limit of resources will enforce the human to react on fulfilling their needs first rather fulfilling their wants. Maslow have stress on five level of needs required by human which is basic needs, safety needs, social needs, love and belonging, esteem and self-actualization. Adult learners are looking for the forth and fifth level of needs if compare to fresh after school students or group. They are the workers of any organization and they have a family to support. Roughly, MBA students under executive modes are almost looking for self-satisfaction and society group acceptance rather than fulfilling basic needs and safety for their future. Therefore, by considering this motivation theory, the executive student is more openness to new idea especially more open to career enhancement through upgrading their qualification campaign by universities around them.

Figure 1. Maslow's hierarchy of needs

Andragogy Theory

In the traditional sense of the word, pedagogy is authority-focused, "top-down," in that a teacher as complete or nearly complete control over a child's learning experience. The teaching methods employed in pedagogy

are very much about transferring foundational knowledge, not about critical discourse. It is a formal process, and usually grades are involved as a means of documenting children's progress. Normally the students are assessing from a formal exam at the end of learning duration per semesters or per year. Meanwhile, andragogy is focused on the learning experience of adults and which methods work best in adult education. It is much more self-directed, in that adults must often set their own schedules for learning and be motivated to commit to study or practice. The aims of andragogy are more on motivation to learn rather than achieving a good exam result in the formal exam. Adult education is also often cooperative, in that adults tend to work together and review each other's work and understanding of a subject. It is clear that the method of judging their ability is for the group basis rather than individual orientation. Thus, those adults are often motivated to learn by a sincere desire to solve immediate problems in their lives, have an increasing need to be self-directing, and in many ways the pedagogical model does not account for such developmental changes on the part of adults, and thus produces tension, resentment, and resistance (Henschke, 2008).

Hugo (2003) put forward the perspective that andragogy is loosely defined as adult learning. However, more specifically andragogy is the formal term used to describe the process of educating and leading adults to fulfill their role as parent, educator, citizen or worker. Likewise, Picavey (2003) says that learning family history in an andragogical way and much more important than just knitting names together. The concept is about culture, human behaviour, social relations, sociology, biology, psychology, philosophy, geography, economics, law, philology, learning, education, and so forth. In dealing with adult learners, demographical factors such as age, ethnic group, culture and social norm should be considered. On the other hand, family will contribute more toward the success of adult students in term of moral support, financing, time and life routines.

Bron (2001) gives the rationale of how andragogy became a term interchangable with adult education in European circles. It shows only one stage of development in asserting its connection with research, because the term andragogy at another stage meant the practice of the education and learning of adults. However, now andragogy and adult education are used synonymously in Europe. Methodologically,. Reischmann (2005)

makes a clear distinction in his definition between andragogy and adult education. He defined andragogy as the science of the lifelong and lifewide education/learning of adults. Adult education is focused on the practice of the education/learning of adults. He suggested that the reality of andragogy has sound university programs, professors, research, disciplinarian knowledge, and students. Yet the term andragogy would be needed for clarification of the reality. Another definition is that of Zmeyov (1998) who aptly defined andragogy differently from others. He said that andragogy is "the theory of adult learning that sets out the fundamentals of the activities of learners and teachers in planning, realizing, evaluating and correcting adult learning" (p. 106).

Kenyon and Hase (2001) suggest there is a need to move from andragogy towards truly self-determined learning, which is call heutagogy. In their estimation, andragogy apparently fails to deliver on this aspect of learning. They agree that Knowles through andragogy provided many useful approaches for improving educational methodology, but still has connotations of a teacher-learner relationship. Although it is the relationship that teaches, they argue that the rapid rate of change in society, and the so-called information explosion, suggest that we should now be looking at an educational approach where it is the learner him/herself who determines the way how learning should take place. They suggest that heutagogy is appropriate to the needs of learners in the workplace in the twenty-first century. Despite its merit, this is an opinion that may still need to be questioned and questioned.

Van Gent (1996) asserts that andragogy has been used to designate the education of adults, an approach to teaching adults, social work, management, and community organization. Its future lies only as a generic term for adult education and as a complement to pedagogy, which has been used mainly to focus on the art and science of teaching children.

OBJECTIVES

In many adult education courses — for example, a cooking or art class — learning is somewhat informal, and grades may not be important or may be absent altogether. As been mentioned by Henschke, the old concept of andragogy more applicable for skill-based learning not much of them relate and discuss andragogy concept towards management skill base such as practice manager, accountant, officer at the higher ranking post and executives. This paper will explore the effectiveness of andragogy theory in this type of managerial skills that involve Masters of Business Administration students (MBA) at UiTM Pulau Pinang branches,

METHODOLOGY

This research involves 6's MBA students who's are in the final semester stage. The duration of study is 7 weeks in the third module of semester started on September 2018 to January 2019. The participants are full time executives at various organization in federal government and state government of Penang.

Qualitative method and interview are the nature of this study, observation tools are considered in concluding the learning process(Merriam, 2009). The narrative analysis are used to capture the ideas and determining the fact and ideas from the participants. The result of formal exam also been summarizing as one of the outcome for this andragogy learning concept as a backup in discussing the research result.

Outside Classroom Activities

Outside Classroom Activities

Week	Activities	Location	Observation
1	Participating Seminar in Entrepreneurship Discussing with Rector about MBA program and strategic plan for MBA survival in Penang Campus	School Expo Small Entrepreneurs Sekolah Kebangsaan Seri Bayu, Teluk Kumbar Pulau Pinang	Students were very happy interviewing the hawkers at the booth. They must submit the assignment that covers chapter 1 to 3 from the syllabus. In this slot they also have the opportunity to meet Rector who was invited to be a keynote speaker in the entrepreneurial seminar which is part of the school exhibition expo.
	 *The students session with Rektor Prof Madya Ts Dr Mohd Hisbany Mohd Hashim at School Canteen – Informal Session*		
2	Island Development Plan: Balancing social and physical development	Pulau Aman, Sungai Bakap Penang	Students have arranged the appointment with YB Sungai Bakap, Penang. They have to prepare the strategic development plan for Pulau Aman by considering the welfare of local community and keeping the bio environment of the island. This activities will covers chapter 4 to 7, it is about the planning, organizing, economic stability and survival element in strategic management.
	 *The picture shows students with YB of Sungai Bakap*		
3	Overseas Trip	Ho Chi Mint City, Vetnam.	There is a speech by MATRADE officer titled the challenge of international market and globalization. The idea of this sharing is equivalent to chapter 8 to 10 of the syllabus.
	 *Picture shows the arrival of the students at Ho Chi Minh Airport*		
4	International Conference Presentation – Lampung Indonesia	Lampung Indonesia International Conference of Syariah, Law and Compliant	Students are sponsored and exposed to oral presentation in the conference
	 *Three students successfully presented in the International Conference at Lampung, Indonesia.*		

FINDINGS

The interview result as shown below;

Participants	***Comments and Answer Summary***	***Fact and finding/ Value Creation***
Participant 1	" I enjoyed my trip to Pulau Aman, this is my first time arrive here, I can see the island and start thinking the development plan from the real visit to the location.." In a group we draft the development plan without interrupting the local community…"	Actual and real problem solving exposure, relating the decision making in a real situation
Participant 2	" I enjoyed our trip to Ho Chi Min, the people here is hardworking and most product are from the farm…" This is a good experience that we can share to our society in Malaysia…"	Learning from observation and relate this situation to the syllabus on market penetration in global marketing
Participant 3	" from this presentation in the International Conference conducted by Postgraduate Unit UiTM Penang we gained very good experience in writing an article and presenting infront of profesors worldwide." I shared my good idea in my article on strategic planning…" One Professor from USM has asking me about my methodology, I am happy he can accepted my justification. This make me more confident in giving new idea arguing my idea…"	Touch up with theoretical enrichment as a basis for research framework. Life justification on critical issues can increase confidents and individual leadership capability.
Participant 4	"…this is my first experience meeting with Rectors and shared our ideas on how to attract more student to study MBA in UiTM Pulau Pinang. Rector;s are very humble and support us in part time study since 2017.."	This session really a value added to their expectation…
Participant 5	"….In our 2 hours slot in Maidin Mall Jalan Baru Perai Penang we really learned how to convince people to trust our MBA program. We realize that there are many benefits of experiencing campaign job for post graduate program toward society."	Developing a sense of loyalty towards the choices that we make along the duration of our studies.
Participant 6	"…I can bring my kids to this expo, we also have a time to meet entrepreneurs and interviewed them on their business vision, mission and survival strategies …., they gives an honest answer trust on us"	Field learning are more efficient than classroom. As adult learners, this group of students are responsible and matured enough in planning their reading time at home.

CONCLUSION

It can be concluded that by having a combination of variety method of teaching among MBA executive student, the weekend classes are more meaningful and create values. From the event they involved, their knowledge and experiences were shared among them in their class, which is the new experience they are gaining from the field can established a new knowledge to be practices in their worflife. This will provide a good phenomenon of enjoy learning in the happiness and motivate them along the study duration. As a result, the students are satisfied and their experiences latter on, will spread to other friends either in the workplaces or social group that they belong to. This positive story about MBA program will convince others to join this program which is one of the efficient communication tools in marketing and known as word of mouth. Involvement in the activities will allow them to gather a good knowledge through hands on process.

RECOMMENDATION

It is recommended that all academics center in universities especially those involved in executive program for long distance learning to practice andragogy theory rather than pedagogy concept in student assessment and classroom activities. Since the numbers of intake are reducing in most of executive program, this article highlights the idea of contemplation on improvement in teaching methodology.

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THE LEVEL OF NPQEL PARTICIPANTS' INTERACTION IN THE E-LEARNING PORTAL AND ITS RELATIONSHIP WITH THE PARTICIPANTS' ACHIEVEMENT

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Abstract: The e-Learning phase encompasses 70% learning hours of the National Professional Qualification for Educational Leaders (NPQEL) course at the Aminuddin Baki Institute (IAB), thus it plays a major role in determining the quality of the course. During the e-Learning phase, the participants of NPQEL course have the opportunity to interact with the contents of the course, other participants, and the lecturers. The objectives of this paper are to identify the level of NPQEL participants' interaction in the e-Learning portal and to determine the relationship between the level of interaction and the participants' achievement. The sample of the study consisted of 394 NPQEL participants. The research design used for this study was the Explanatory-Mixed-Method-Design. Data were collected by means of questionnaires, open-ended questions, interviews, and online data analyses. Overall, the results showed that the participants had a high perception on their level of interaction in the e-Learning portal. The results also showed that only the interaction between the participants and the contents had significant relationship with the participants' achievement. Qualitative data analysis has not only provided clarifications about the situations being studied but also contributed ideas for the improvement of the contents and delivery approach to enhance the quality of the overall interaction in the e-Learning portal.

Keywords: *e-Learning; learner-content interaction; learner-learner interaction; learner-teacher interaction*

INTRODUCTION

Institut Aminuddin Baki (IAB) is a training institution under the auspices of the Ministry of Education Malaysia. IAB is responsible for providing training to MOE staffs in the field of Educational Leadership and Management. One of the key training programs at IAB is the National Professional Qualification for Educational Leaders (NPQEL) which provides training for future school leaders. The programme was first introduced in 1999 with the name National Professional Qualification for Headship (NPQH). In 2008, the name of NPQH was changed to NPQEL as several values were added, and the duration of implementation as a one-year programme was set. In 2011, the New Mode NPQEL Programme using the Blended-Learning approach was introduced. The programme includes a combination of three approaches, namely: (i) face-to-face learning at IAB (ii) online distance learning (e-Learning phase) from the course participant's workplaces, and (iii) consultation programme. The span of the programme is 5 months, consisting of a 6-week face-to-face study and a 14-week e-learning course. During the fourteen weeks, participants also need to engage in two consultation programmes, namely (i) a two-week benchmarking programme, and (ii) an eight-week attachment programme. The e-Learning phase is implemented through the IAB e-Learning Portal, which contains course materials and various activities for the training and assessment of participants. Course materials are in the form of lecture notes, circulars, scholarly articles, and videos. Meanwhile, e-Learning activities and assessments are in the form of discussion forums, self-reflection, quizzes, and assignments. As the e- Learning phase is closely related to the quality of NPQEL courses at IAB, the e-Learning contents and delivery approaches should be evaluated from time to time.

PROBLEM STATEMENT

As a leading establishment that organizes educational leadership training programmes for MOE, the IAB needs to assure that the NPQEL graduates have proper qualities to lead the schools. An initial criterion for measuring the quality of NPQEL graduates was their own respective achievements in the overall evaluation of the course. Out of the overall score of the course, the e-Learning phase accounts for 20%, while 40% of the marks come from the consultation programme and another 40% from the final test. Although

the e-Learning phase contributes only 20% of the overall NPQEL score, it massively includes 70% learning hours of the course. Thus, the e-Learning phase plays an essential role in providing critical elements to develop the quality of the course participants.

During the e-Learning phase, the participants of the course interact with the NPQEL course contents, other participants, and the lecturers. Numerous studies on e-Learning have shown a positive relationship between students' or participants' levels of e-Learning and their learning quality (Masarrah, Noor Dayana & Noraffandy, 2016; Kearsley, 2000; Merriam & Caffarella, 1999; Milheim, 1996) and the improvement of their respective achievements (Cook & German, 2010; Ramos and Yudko, 2008; Kay, 2006). However, after the e-Learning phase was introduced at IAB, the interaction levels of the participants of the course in the IAB e-Learning portal and how it is related to participants' achievements have not yet been evaluated.

Thus, the aim of this paper was to identify the levels of interactions of NPQEL participants in e- learning portals and the relationship to their achievements in NPQEL course evaluation. The results of the study were used to improve the contents and approaches of module delivery in the e-Learning portal to enhance the quality of the participants' interactions and thus contribute to the improvement of the quality of NPQEL courses and other courses at IAB from the e-Learning perspective.

LITERATURE REVIEW

Online learning, or better known as e-Learning, is often criticised because it offers limited face-to- face interactions (Kirby, 1999; Kruger, 2000; Benbunan-Fich, Hiltz &Turoff, 2003) as students and teachers are physically and remotely separated. Long-distance interactions in e-Learning can only happen with the help of technological tools and Internet connection. This situation becomes a barrier to communication (Sorensen and Beylen, 1999) and causes students to feel isolated (Weller, 2007) when engaging in e- Learning.

According to Thurmond (2003), interactions in e-Learning can be defined as students' engagements with course contents, other students, teachers, and technological media used in the courses that can produce two-sided

exchanges of information. He maintains that the exchange of information is crucial for students to improve the structuring of knowledge in their learning environment and enhance understanding of the course contents or mastery of learning objectives that have been set.

Thurmond's opinion is supported by Thomassen & Ozcan (2010), who reaffirm that the principle of interaction cannot be overlooked in the attainment of learning goals because the flow of information between course participants contributes significantly to the learning process. Hrastinski (2009) points out that online learning takes place through a complex process that requires the engagements and interactions of participants with the digital environments available.

Many experts have categorized interactions in e-Learning into four types, namely student-student, student-lecturer, student-content, and student-interface (Hillman, Willis & Gunawardena, 1994; Moore, 1989). Meanwhile, Chou et.al (2010) classifies e-Learning interactions into five types, namely student- lecturer, student-student, student-content, student-interface, and student-him/herself. These five types of interactions are mentioned as able to involve participants actively in e-Learning. Anderson (2003) further classifies interactions into six categories based on the Modes of Interactions in Distance Education Model (Anderson & Garrison, 1998), as shown in Figure 1. The categories of interactions that Anderson discusses are student-student, student-lecturer, student-content, lecturer-lecturer, lecturer-content, and content- content.

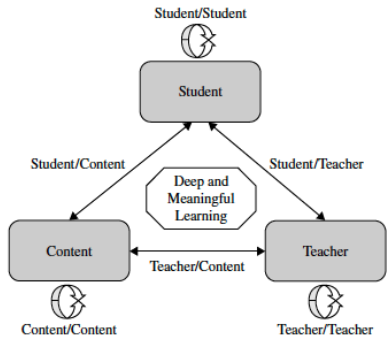

Figure 1: Modes of Interactions in Distance Education Model by Anderson & Garrison (1998)

Numerous studies on online interaction have been carried out based on Moore's (1989) three categories of interactions, namely student-content, student-student and student-lecturer. The discussions in the following section will focus on the three types of students' interactions used in this current study, namely student-content interactions, student-student interactions, and student-lecturer interactions, as suggested by Moore (1989) and adapted from Anderson (1998).

3.1. Student-Content Interactions

Moore & Kearsley (1996) define student-content interactions as a consequence of student's reading and research activities on course contents/materials and students' involvement in the activities implemented. Among the factors that influence students' perceptions of course contents are their constant relationships with course contents (Leasure, Davis & Thievon, 2000); precise designs of course contents (Swan, 2001); time/duration of interactions with course contents (Atack & Rankin, 2002); involvement in online discussions (Jiang & Ting, 1999); and delivery mode of course contents (Faux & Black-Hughes, 2000). Studies carried out on these factors have confirmed the results that students' interactions with course contents improve students' achievements (Cook & German, 2010; Ramos and Yudko, 2008; Kay, 2006).

3.2. Student-Student Interactions

Online learning limits the physical interactions of students with other students, and this may affect their learning (Beard & Harper, 2002). Studies reported that students are required to perform four actions to ensure effective online learning, namely (a) engage, (b) respond, (c) give effective feedback, and (d) write a short, focused message. Students also need to be encouraged to carry out collaborative learning via group assignments to enhance their understanding of course contents, stimulate critical thinking, overcome the sense of aloneness while partaking in online learning, and promote a learning community (Abrahamson, 1998; Palloff & Pratt, 2001). Findings from various studies revealed that students who make online interactions experience more productive and more beneficial learning (Masarrah,

Noor Dayana & Noraffandy, 2016; Kearsley, 2000; Merriam & Caffarella, 1999; Milheim, 1996).

Additionally, Grandzol and Grandzol (2006) pointed out that the most important matter in online learning is students' interactions to create virtual communities in which interactions between members of the learning community that are numerous and of high quality may enhance students' participations in learning activities. The creation of a thriving virtual community makes students feel the "emotional and personal attachment to the subject, teachers, and peers" in the virtual community. Such attachments are necessary to enhance students' discipline to participate in online learning (Clark-Ibanez and Scott, 2008). In their research on the social environment in online learning, Summers et al. (2005) maintained that good online social relationship determines good learning.

3.3. Student-Lecturer Interactions

Lecturers/facilitators' roles in online courses are different from face-to-face courses. In face-to-face courses, lecturers are the centre of learning, while in the online learning environment, lecturers play the role of a facilitator (Gutierrez, 2000). Literature studies on student-lecturer interactions are often linked with different variables, such as face-to-face meetings, immediate feedback, performance, and the presence of a lecturer in the learning setting. Most students appreciate their interactions with lecturers (DeBourgh, 1999; Jiang & Ting, 1999; Thurmond et al., 2002). Thurmond et al. (2002) found that students who thought they knew their lecturers through interactions, were more actively involved in online conversations, and thought that the courses they attended gave them numerous ways to access learning.

Previous studies conducted on the roles of lecturers in e-Learning have also shown similar findings. As an example, the research of Brandon and Hollingshead (1999) states that the role of lecturers' encouragement on students' participation in online learning activities can increase the levels of students' engagement in learning activities. Besides, on the factors that influence students to fail in online courses, a study by Nash (2005) maintains that lecturers need to be exposed

to the requirements and methodologies of online learning. Conrad and Donaldson (2004) emphasize that the most significant role of lecturers when conducting e-Learning is to ensure students' intense engagement and interaction in online activities. This can be attained by intensifying online interactions between lecturers and students, increasing the role of lecturers in participating in discussions, and using reflective learning approaches (Rabe-Hemp et al., 2009). Meanwhile, Palloff and Pratt (2005) propose that the support and cooperation of lecturers who participate as members of the learning community in online discussions will help students become more adept in managing their learning.

In conclusion, studies related to the investigation of interactions in e-Learning show a positive relationship between the levels of interactions by students (course participants) in e-Learning with the quality of their learning and achievements. Therefore, this current study was carried out to investigate the levels of interactions of NPQEL participants in the e-learning portal and to identify whether there is a relationship between these levels of interactions and their achievements in NPQEL courses. The findings of the study will be used to improve the contents and approaches in the delivery of IAB e-Learning portals and further contribute to improve the quality of NPQEL courses and other courses in IAB from the e- Learning perspective.

RESEARCH METHODOLOGY

4.1. Research Design

This study uses Explanatory-Mixed-Methods Design in which qualitative data are used to provide a more extensive description of quantitative data findings (Creswell, 2008). According to Creswell (2008), qualitative data findings are used to refine quantitative data by exploring or explaining in-depth on specific cases.

4.2. Research Sample

The study population comprises the entire NPQEL New Mod Programme participants (students) from six years of intake (2011 – 2016) totalling over 6500 people. The study sample consisted of 394 NPQEL participants from intake 2/2016, who would be leaders in primary and secondary schools. Meanwhile, the minimum number to generalize the findings to a large population is 384 people (Krejcei & Morgan, 1970). The study sample was chosen using a random sampling method. The NPQEL participants answered the questionnaires completely via online after finishing the NPQEL course. Nine NPQEL participants from intake 2/2016 who were chosen as the study sample, were also selected as the study participants to answer the interview questions. All interviewees were selected based on identified criteria based on cases representing different situations of NPQEL participants from various perspectives.

4.3. Instruments and data

Quantitative data were collected using questionnaire. The questionnaire instrument used to measure participant-participant interactions and participant-lecturer interactions was adapted from equivalent instruments applied in previous studies (Sher, 2009; Johnson, Aragon, Shaik & Palma-Rivas (2000). Meanwhile, the questionnaire instrument to measure participant-contents interactions was developed by the researchers based on relevant constructs in previous studies. All items in this survey were measured using a Likert scale (1 = strongly disagree; 2 = disagree; 3 = strongly disagree; 4 = agree; 5 = strongly agree) to assess students' level of agreement on their level of interaction in the e-Learning portal. A pilot study was conducted to determine the internal consistency of all items in the questionnaire instrument used in this study. Data analysis showed that each attribute in the study instrument had an acceptable Cronbach's alpha value of greater than 0.90 ($\alpha \geq 0.90$).

Qualitative data were collected using open-ended questionnaires, interviews, and online data. Data analysis from open-ended questions and interviews were applied to render more detailed explanations about the practices of NPQEL participants as they engaged in e-Learning. The online data used were in the form of (i) an indicator of the

e-Learning activities of the participants, and (ii) the number of posts in the lecturer's forum. The data were obtained from the e-Learning Portal database.

Next, NPQEL Participant Achievement data were used to investigate the relationship between the levels of interactions of participants in the e-Learning portal with their NPQEL achievements. Data for achievements used were the overall achievement of the NPQEL participants comprising e-Learning assignments (20%), Final Examination of the Course, UAK (40%), Benchmarking reports, (10%) and Attachment Programme reports – including colloquium presentation (30%). Achievement data were measured using the Cumulative Grade Point Average (CGPA).

DATA ANALYSIS PROCEDURE

5.1 Quantitative data analysis procedure

Quantitative data were analysed using descriptive statistical analysis, namely mean and standard deviation. Quantitative data were processed using the Statistical Package for Social Science (SPSS 23 for Windows) software. Descriptive statistical analyses of quantitative data were presented in the forms of the mean and standard deviation to describe the feedback of the study sample about their level of interaction in the e-Learning portal.

Data obtained from the questionnaires and achievements of NPQEL participants were analysed using Spearman's Correlation Analysis to identify the relationship between the levels of interactions of NPQEL participants in the e-Learning portal with NPQEL achievement. Spearman correlation was used because both variables (participants' level of engagement in e-Learning and achievement) were in the form of ordinal data with the abnormal distribution. Data on the participants' interactions in e-Learning were measured using the Likert scale. Data on achievements were measured using the Cumulative Grade Point Average (CGPA).

5.2. Qualitative data analysis procedure

Qualitative data from open-ended questions and interviews were managed using Ms Excel (Windows) software. These data were then analysed using thematic analysis to produce matrix tables related to participants' habits during e-Learning. Online data were analysed to obtain the patterns of the participants' interactions in the e-Learning portal. Overall, qualitative data analysis was used to render a more profound understanding of the findings from the questionnaire concerning the patterns of participants' interactions in the e-Learning portal.

RESEARCH FINDINGS

The data from the questionnaire were analysed descriptively to obtain the distribution of the

consensus level by the study sample on their levels of interactions in the e-Learning portal in the form of mean scores and standard deviations. Table 1 shows the mean scores used to assess the levels of agreement of the study sample to their levels of interaction in the e-Learning portal.

Table 1: Interpretation of Mean Scores for the NPQEL Participants' Levels of Interactions in the e-Learning Portal

Mean Scores	Interpretation of Mean Scores
1.00 – 1.79	Very low
1.80 – 2.59	Low
2.60 – 3.39	Moderate
3.40 – 4.19	High
4.20 – 5.00	Very high

Besides, qualitative data from open-ended questions were examined using thematic analysis, while the online data were used to support the findings of the open-ended analysis. Both types of data were used to provide a more extensive explanation of the quantitative data on the levels of interactions of study sample in the e-Learning portal.

6.1 The NPQEL Participants' Levels of Interactions in the e-Learning Portal

6.1.1. Participant – content interactions

The interaction levels of the study sample with the course contents in the e-Learning portal were evaluated through 9 items (items 1-9) based on participants' interactions with course materials (videos, reading materials, links, and references) and with online activities or assessments (quizzes, forums, and assignments). The levels of interactions for course participants with contents are "…on the extent to which it engages students in interaction…" (Anderson, 2003). Figure 2 shows a bar graph of mean scores to assess the levels of agreements for the study sample on their interactions with the course contents in the e- Learning portal.

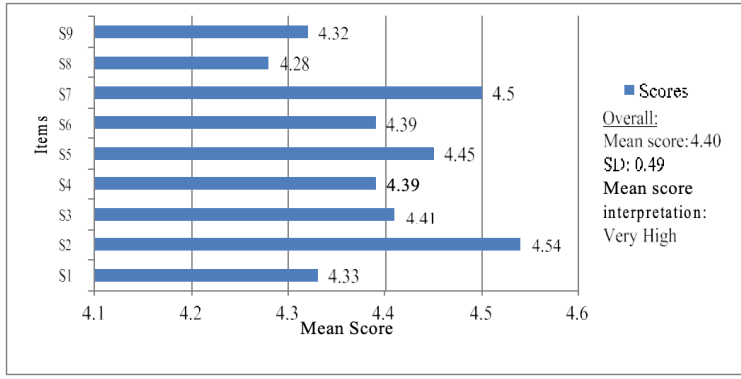

Figure 2: Analysis of the study sample on participant-content interactions

The evaluation of the study sample on their level of interaction with the course contents in the e- Learning portal (Figure 2) showed that all 9 items displayed a mean score value representing a very high level of agreement. The item that showed the highest level of agreement was item 2 (mean score = 4.54), which was about participants' involvement in answering the quiz questions. The item with the lowest level of agreement was item 8 (mean score = 4.28), which was about participants' use of links to get additional information. Overall, the findings show that the study sample provided a very high level of agreement (mean score = 4.40; SD = 0.49) to describe their levels of interactions with the course contents in the e- Learning portal.

6.1.2. Participant – participant interactions

Interaction levels of the study sample with other participants in the e-Learning portal were evaluated through 8 items (items 10-17). The levels of interactions were measured based on knowledge sharing, communication, giving/getting help, and creating virtual communities. Figure 3 shows a bar graph for mean scores to evaluate the agreement level of the study sample of their interactions with other participants in the e-Learning portal.

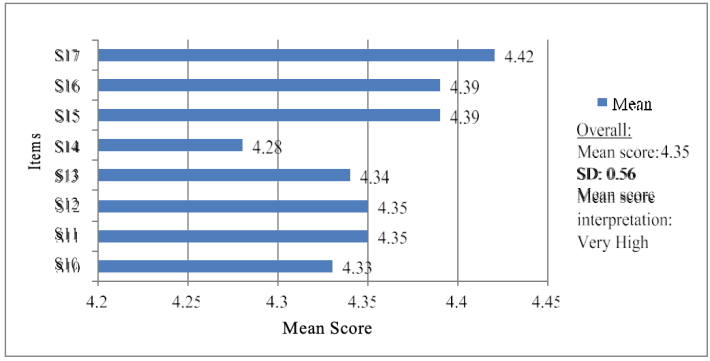

Figure 3: Analysis of the study sample on participant-other participant interactions

The evaluation of the study sample on their level of interaction with other course participants in the e-Learning portal (Figure 3) showed that all 8 items displayed a mean score value representing a very high level of agreement. The item with the highest level of agreement was item 17 (mean score = 4.42), which was related to the perceptions of the study sample on the co-existence of teamwork. The item with the lowest level of agreement was item 14 (mean score = 4.28), which was about the potential of positive feedback to motivate participants to continue to share their views in the forum. Overall, the findings show that the study sample provided a very high level of agreement (mean score = 4.35; SD = 0.56) to describe their levels of interactions with other participants in the e-Learning portal.

6.1.3. Participant – lecturer interactions

Interaction levels of the study sample with the lecturer in the e-Learning portal were evaluated through 6 items (items 18-23). The levels of interactions were measured based on the aspects of encouragement, responses, and assistance/facilitation for the participants of the course. Figure 4 shows a bar graph for mean scores to evaluate the agreement level of the study sample of their interactions with the lecturer in the e-Learning portal.

Figure 4: Analysis of the study sample on participant-lecturer interactions

The evaluation of the study sample on their level of interaction with the lecturer in the e-Learning portal (Figure 4) showed that the items that showed the highest level of agreement was item 22 (mean score = 4.43), which was related to the lecturer reminding the participants about important dates in carrying out the e-Learning activities. The item with the lowest level of agreement was item 19 (mean score = 4.06), which was related to the lecturer providing feedback on the participants' output of the assignments in the e- Learning. Four out of six items showed mean score value representing a high level of agreement while two more items showed mean score value representing a very high level of agreement. Overall, the findings show that the study sample provided a very high level of agreement (mean score = 4.20; SD = 0.64) to describe their levels of interactions with the lecturer in the e-Learning portal.

Overall, it can be concluded that the three types of levels of interactions for the study sample in the e-Learning portal are either high or very high. However, the level of interaction for participant-lecturer was relatively low compared to the other two types of interactions. The quantitative findings of this survey are further strengthened by the findings from the online data analysis.

The findings of the online data analysis (analysis of the indicators for participants' e-Learning activities implementation) showed a high percentage of 88.2% to describe the participants who completed all of the module activities. This high percentage supports the quantitative data findings that showed a high level of interactions for participant-content and participant-participant (through forums) in the e-Learning portal.

However, the findings from the analysis on the number of posts in the forum by the lecturers showed a very low percentage of lower than 20%, indicating that the participant-lecturer interaction in the e-Learning portal was low. This finding was contrasted with the findings of the quantitative analysis from the participants' questionnaires that found high levels of participant-lecturer interactions in the e-Learning portal. A high level of perceptions of the participants on the level of participant-lecturer interactions was most likely due to the fact

that many student-lecturer interactions took place through other online applications. This statement was based on the results of the qualitative analysis of participant-lecturer interactions indicating the study sample suggested that student-lecturer interactions also occurred through online applications such as email, Google Apps, phones, and WhatsApp application.

The qualitative findings related to participant-content interaction and participant-participant interaction provided further insight into the types of activities that participants liked and how the participants' interactions in each of these activities helped them improve their learning through the IAB e- Learning portal.

The qualitative findings of the participant-content interaction found that the study sample was very interested in quiz activity, followed by forum activities, assignments, and course materials. The study sample suggested that quiz activities could (i) challenge the mind, test comprehension, and increase content knowledge; (ii) simple, brief, and fast; (iii) provide answer choices, allow quick feedback, allow multiple attempts, and (iv) assist in the Course End Exam (UAK). Overall, the findings show that the theme of "increasing understanding and knowledge (of course content)" was reflected in every e-Learning activity which was chosen at a high percentage level.

Furthermore, the qualitative findings of the participant-participant interactions showed that the study sample selected the forum as the e-Learning activity that was the most encouraging for their interactions with other participants. The study sample argued that, through forum activities, they could (i) share ideas, opinions and experiences collaboratively; (ii) hold discussions; (iii) interact and develop good relationships with other participants; (iv) increase knowledge, and (v) get interactive feedback. Overall, the themes covered were that participants in the e-Learning portal were focused more on social purposes, such as sharing ideas, opinions, and experiences, discussing and establishing good relationships with other participants to help each other in their learning.

6.2 The relationship between the level of interaction in e-Learning and achievements in NPQEL

The data from the questionnaires and the data from NPQEL participants' achievements were analysed using Spearman's Correlation analysis to identify the relationship between the levels of interactions of NPQEL participants in the e-Learning portal with NPQEL achievements.

6.2.1 Relationship between participant-content interaction levels and NPQEL achievement

Table 2 Correlation analysis of the levels of interactions of participant-content with NPQEL Achievements

			NPQEL Achievement	Participant-contents
Spearman's rho	NPQEL Achievement	Correlation index, r	1.000	.158**
		Sig. (2- tailed), p	.	.002
		N	394	394
	Participant-contents	Correlation index, r	.158**	1.000
		Sig. (2- tailed), p	.002	.
		N	394	394

**. The correlation was significant at the $\alpha = 0.01$ level (2-tailed) meaning.

Table 2 shows that there was a significant relationship between the levels of participant-content interactions in the e-Learning portal with NPQEL achievement where the significant value, $p = 0.002$ was lower than the significant level, $\alpha = 0.01$ in the two-tailed correlation test. The correlation index was at a low positive of $r = 0.158$. A positive correlation index value indicated that the relationship existed between the two variables was a positive relationship. This means that the probability of achievements of NPQEL participants would be high if they practice high levels of interaction with the course contents in the e- Learning Portal.

6.2.2.Relationship between participant-participant interaction levels and NPQEL achievement

Table 3: Correlation analysis of the levels of interactions of participant-participant with NPQEL Achievements

			NPQEL Achievement	Participant - Participant
Spearman's rho	NPQEL Achievement	Correlation index, r	1.000	.049
		Sig. (2-tailed), p	.	.333
		N	394	394
	Participant-Participant	Correlation index, r	.049	1.000
		Sig. (2- tailed), p	.333	.
		N	394	394

Table 3 shows that there was no significant relationship between the levels of participant- participant interactions in the e-Learning portal with NPQEL achievement where the significant value, $p = 0.333$ was higher than the significant level, $\alpha = 0.01$ in the two-tailed correlation test. This means that the levels of interactions of NPQEL participants with other participants in the e-Learning portal did not affect their achievement.

6.2.3. Relationship between participant-lecturer interaction levels and NPQEL achievement

Table 4: Correlation analysis of the levels of interactions of participant-lecturer with NPQEL Achievements

			NPQEL Achievement	Participant - Lecturer
Spearman's rho	NPQEL Achievement	Correlation index, r	1.000	-.004
		Sig. (2- tailed), p	.	.939
		N	394	394
	Participant - Lecturer	Correlation index, r	-.004	1.000
		Sig. (2- tailed), p	.939	.
		N	394	394

Table 4 shows that there was no significant relationship between the levels of interactions between participant-lecturer in the e-Learning portal with NPQEL achievement where the significant p-value = 0.939 and was higher than the significant level, $\alpha = 0.01$ in the two-tailed correlation test. This means that the levels of interactions of NPQEL participants with the lecturer in the e-Learning portal did not affect their achievement.

Overall, it can be concluded that only the levels of interactions of participants with contents in the e- Learning portal which significantly affected the achievements of the NPQEL study sample. Meanwhile, the levels of interactions of participant-participant and the levels of interactions of participant-lecturer did not affect the achievements of the NPQEL study sample.

DISCUSSION

7.1. The level of interaction of participants in the e-Learning portal

Interaction in e-Learning can be defined as students' engagement with the course contents, other students, teachers and the technological media used in the course. The real interactions with other students, teachers, and technology result in two-way information exchange. Exchange of information is essential to improve knowledge restructuring in the learning environment (Thurmond, 2003). The principle of interaction should not be overlooked to fulfil the purpose of learning because the flow of information between course participants contributes to the learning process (Thomassen & Ozean, 2010). Interaction was categorized into three types in this study, namely (i) participant-content interactions, (ii) participant- participant interactions, and (iii) participant-lecturer interactions.

7.1.1. Participant-content interactions

The findings showed that the level of participant-content interaction was very high in the e-Learning portal. The qualitative findings of the participant-content interaction discovered that the study sample was very interested in quiz activities, followed by forum activities,

assignments, and course materials. The study sample suggested that quiz activities could (i) challenge the mind, test comprehension, and increase content knowledge; (ii) simple, brief, and fast; (iii) provide answer choices, allow quick feedback, allow multiple attempts, and (iv) assist in the Course End Exam (UAK). Overall, the findings showed that the theme of "increasing understanding and knowledge (towards course content)" was reflected in each e-Learning activity selected at a high percentage. This implies that participant-content interaction in the e-Learning portal contributes to increasing participants' understanding and knowledge of course content. This finding was in line with the findings of other studies that have found that students who interact more online have a more effective and quality learning experience (Masarrah, Noor Dayana & Noraffandy, 2016; Kearsley, 2000; Merriam & Caffarella, 1999; Milheim, 1996).

Numerous studies have been conducted on participant-content interactions. It has been found that among the factors that influence students' positive perception of course contents are their constant relationship with course contents (Leasure, Davis & Thievon, 2000); precise designs of course contents (Swan, 2001); time/duration of interactions with course contents (Atack & Rankin, 2002); involvement in online discussions (Jiang & Ting, 1999); as well as delivery mode of course contents (Faux & Black- Hughes, 2000).

These studies have shown that the aspects related to the quality of the online course contents are closely related to the needs and requirements of participants. Accordingly, the findings of the study on participant-content interactions can serve as a source for creating the types of e-Learning content that participants enjoy to promote interactions between participants and high-quality content in the e-Learning portal in the future, as well as improve their knowledge of the course content.

7.1.2. Participant- participant interactions

Concerning the interactions of participants, the findings indicated that the levels of interactions were very high. Analysis of qualitative data from open-ended questions indicated that the study sample selected the forum as an e-Learning activity that most promotes

their interaction with other participants. The study sample argued that, through forum activities, they could (i) share ideas, opinions, and experiences collaboratively; (ii) hold discussions; (iii) interact and develop good relationships with other participants, (iv) increase knowledge, and (v) get interactive feedback. Overall, the themes reflected the interactions of participants in the e-Learning portal were more focused on social goals or "virtual learning communities", which were to share ideas, opinions, and experiences; hold discussions; and develop good relationships with other participants; rather than the purpose of "enhancing knowledge".

Numerous studies support the findings of participant-participant interactions that lead to social goals based on the supportive aspects of the virtual learning community. Some of these studies have found that a sense of community could be measured based on the individual's sense of cohesion and awareness of others within the community. An individual's sense of cohesion creates emotional relationships such as love, caring and relationships among members of the learning community (Abedin et al., 2010). Furthermore Jonassen (1999), Reigeluth (1999) and Martin & Reigeluth (1999), found that to maintain a positive relationship, community members needed to have empathy for each other and provide emotional support. This finding is in line with a study by Milheim (2012) that discusses the value of connection among community members and the value of caring can be enhanced through pedagogical design that promotes collaborative activity, presence of virtual mentors, personalized feedback, creating a learning community, and using application software for communication.

Support for the virtual learning community is critical to increase students' engagements in e- Learning. This is supported by a study by Grandzol & Grandzol (2006) who found that the most significant matter in online learning was creating a virtual community in which the quantity and quality of interaction between members of the learning community can enhance students' participations in learning activities. Creating a successful virtual community will enable students to feel the "emotional and personal attachment to their subjects, teachers, and peers" in the virtual community. Such relationships are important

to enhance the discipline of students in partaking in online learning (Clark-Ibenez and Scout, 2008). Also, a study by Summers et al. (2005) on the social environment in online learning found that good online social relationships affected good learning achievement.

As participants' interactions enhance participants' involvement in e-Learning, it is important to design e-Learning activities that support these interactions. Thus, the findings of this study can serve as a source to identify the types of forum questions/assignments that can improve the quality of participants' interaction in the e-Learning portal, which also provides a chance for them to increase their knowledge of the course contents.

7.1.3. Participant-lecturer interactions

The results of the qualitative analysis of open-ended questions for participant-lecturer interaction showed that the study sample indicated none or very little interactions with the lecturers through the e- Learning portal. Other research samples indicated that lecturer-participant interactions occurred through forums and through online applications, such as emails, Google Apps and WhatsApp/Telephone. The findings described that the quantitative data of the questionnaires found high levels of participant-lecturer interactions, which did not actually happen through e-Learning portals but through other online applications.

The findings of the study also showed that through participant-lecturer interaction, participants received (i) lecturers' assistance regarding e-Learning assignments; (ii) lecturers' supervision of the benchmarking, backup, and preparation programs for colloquial presentations and (iii) lecturer's assistance in understanding the contents of the NPQEL module. Besides, the interviewees contributed valuable suggestions on the interaction of lecturer participants; (i) lecturers should be more active in providing feedback and more helpful to participants who lack confidence and lack of ICT skills, and (ii) lecturers should be active during a specific time that can be set in advance. This finding is supported by Salmon (2000) who found that e-Learning lecturers needed to provide encouragement to passive

learners to ensure that dropouts did not occur and to become "technical experts" to assist students in technical aspects such as accessing the system, downloading files, inserting graphics, videos, and others.

Active engagement of lecturers can stimulate students' engagement. This is supported by a study carried out by Brandon & Hollingshead (1999), who found that the role of lecturers in encouraging students to participate in e-Learning activities could increase the levels of students' engagement in the learning activity. This finding is in line with the study by Conrad & Donaldson (2004), who also found that the most important role of e-Learning lecturers was to ensure active engagement and interactions in online activities. This can be achieved when lecturers join in discussions and use reflective learning approaches (Rabe-Hemp et al., 2009). Furthermore, a study by Palloff & Pratt (2005) also found that the involvement of virtual mentors as members of the learning community in forums and discussions had assisted students in being more skilful in managing their learning.

Consequently, the findings of this study can serve as the source for identifying and proposing (i) the role of lecturers as e-facilitators in the e-Learning portal, and (ii) the role of institutions in promoting the involvement of lecturers as e-facilitators who contribute to the enhancement of high quality online interactions.

7.2. Relationship between the levels of interactions by participants in the e-Learning Portal with NPQEL achievements

The findings showed that only the levels of interactions of the participants with the contents in the e- Learning portal that affected the achievements of the NPQEL study sample. Meanwhile, the levels of interactions of participant-participant and the levels of interactions of participant-lecturer did not influence the achievements of the NPQEL study sample. The findings were attributed to the qualitative data analysis that found that participant-content interactions generally improved the comprehension and knowledge of the study sample on course contents. This implied that participant-content interactions in the e-Learning portal contributed to the increase in participants' comprehension and knowledge of course contents, which indirectly

helped them to enhance their achievement.

The findings of this study were almost similar to the findings of Song and McNary (2011), which found no positive relationship between students' engagements in e-Learning and their levels of achievements. In their study, Song and McNary (2011) resolved that a positive relationship between students' engagements in e-Learning may be due to interaction quality rather than the quantity of interaction. This implied that it was possible that the interactions of participant-participant and lecturer-lecturer interactions in e-Learning in IAB had not yet reached the expected quality and that further efforts for improvements are necessary.

Some studies showed that students who interacted a lot online experienced more effective and quality learning in their learning (Masarrah, Noor Dayana & Noraffandy, 2016; Kearsley, 2000; Merriam & Caffarella, 1999; Milheim, 1996). However, other studies have found that there was a positive relationship between levels of students' (participants') interactions in e-Learning with their achievements (Cook & German, 2010; Ramos and Yudko, 2008; Kay, 2006).

Although the findings of this study indicated no positive relationship between participant-participant interaction level and participant-lecturer interaction level with NPQEL achievements in the study sample, qualitative data analysis findings showed that these two types of interactions helped participants in their learning in terms of idea sharing, opinions, and experiences as well as having discussions on learning materials. This indicated that the interactions of participant-participant and participant-lecturer can indirectly enhance participants' engagement in e-Learning activities and help to improve their achievements.

The findings are supported by other studies which have found that the quantity and quality of interactions among members of the virtual community (participant interaction) can increase not only students' participation in e-Learning activities (Grandzol and Grandzol, 2006), but also the discipline of students partaking in e-Learning (Clark-

Ibenez and Scout, 2008), which in turn impacts the achievement of good learning (Summers et al., 2005). However, studies on participant-lecturer interactions have found that active involvement by lecturers in e-Learning can stimulate students' engagement (Brandon and Hollingshead, 1999; Conrad and Donaldson, 2004; Rabe-Hemp et al., 2009) and can support students to become more skilled at managing their learning (Palloff and Pratt, 2005). In brief, abundant literature support the importance of these three types of online interactions, namely participant-content, participant- participant, and participant-lecturer, to contribute to the improvement of the quality of online interactions to enhance participants' learning and achievements in e-Learning. Therefore, numerous steps should be taken to improve the quality of participants' interactions in the IAB e-Learning Portal in terms of the interactions of participant-content, participant-participant, and participant-lecturer.

CONCLUSION AND SUGGESTIONS

The e-Learning phase comprises 70% learning hours of the National Professional Qualification for Educational Leadership (NPQEL) course conducted at the Aminuddin Baki Institute (IAB) and thus it plays a major role in determining the quality of the course. During the e-Learning phase, NPQEL course

participants can interact with course content, other participants and lecturer. The quality of participants' interactions in e-Learning enhances their learning activities and achievements. Therefore, this study is crucial to recognize the levels of interactions by participants in e-Learning so that actions can be taken to improve the quality of the interactions to provide quality and meaningful learning to the course participants. Overall, the findings showed that the levels of interactions of participant-content and participant- participant are high in the e-Learning portal, while the level of participant-lecturer interaction is low. It was found that most of the participant-lecturer interactions took place via Email, Google Apps, and phones and WhatsApp applications. The results showed that only the levels of interactions between participants and contents alone had a significant relationship with NPQEL achievements of the study sample. The analysis

of the qualitative data explains the situation under study and contributes to the improvement of contents and delivery approaches in order to improve the quality of participants' interactions in the e-Learning portal.

The findings of this study reflect the quality of participants' interactions in e-Learning. The review of the literature shows that all types of interactions under study, namely participant-content, participant- participant and participant-lecturer are important and have contributed to the increase of the quantity and quality of participants' interactions in e-Learning, and thus have enhanced their achievements. Subsequently, efforts must be made to enhance the contents and approaches of e-Learning to improve the quality of these three types of interactions, especially participant-lecturer interactions. The findings of the study discussed can serve as the basis for designing and restructuring of IAB e-Learning contents.

Thus, these are several suggestions to be implemented to improve the quality of IAB e-Learning:

ï To provide Quality Standards for e-Learning Modules and Rubrics to evaluate e-Learning Modules approved and mandated in the development of an IAB e-Learning module.

ï To establish e-Learning Technical Committee to monitor, review and appraise the e-Learning course/module development process according to the IAB e-Learning Module Quality Standards to ensure quality assurance of the course/module.

ï To encourage lecturers' involvement in e-Learning by strengthening the IAB e-Learning Policy and taking into account the following issues:

- o To establish the contributions and involvement of lecturers in e-Learning as a Key Performance Indicator (KPI) of the lecturers.
- o To provide incentives to lecturers who make outstanding contributions to the development or implementation of e-Learning.
- o To develop the capacity of IAB lecturers in implementing e-Learning (as a module builder/virtual facilitator) through periodic training.
- o To monitor lecturers' competence indicators in implementing e-Learning.

ï To provide other quality documents related to e-Learning approved by the e-Learning Technical Committee.
ï To regularly conduct reviews on the quality documents related to the IAB e-Learning and e-Learning Policy.
ï To perform periodic research and development (R&D) for the purpose of continuous improvement of the IAB e-Learning.

E-Learning Module Quality Standards and the IAB e-Learning Policy need to be enforced in the implementation of the IAB e-Learning. With such action, the contents and approaches of delivery of IAB e-Learning will be enhanced. This situation can enhance the quality of participants' interactions and contribute to the improvement of the quality of NPQEL courses and other courses at IAB from an e-Learning perspective.

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PRE-CLINICAL YEAR MEDICAL STUDENTS' PERCEPTION ON THE USAGE OF KAHOOT! QUIZ CHALLENGE AS POST-PBL ASSESSMENT

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Abstract: Formative assessment is an important tool to gauge the competence and performance of a medical student. This type of assessment enable the students to identify their strengths and weaknesses in order to improve their learning. The feedback given to students will motivate them to achieve their learning goals. The advancement of technology increases the usage of online-based assessment as it is more relevant and appealing especially to the younger generation. Online-based assessment such as Kahoot! offers immediate feedback and enhances the students' critical thinking and problem solving skills in a fun environment. These skills are important to be assessed especially following Problem-based Learning (PBL) sessions. PBL is adapted in many medical schools worlwide. Due to the nature of extensive learning objectives in PBL, it is important to have a practical formative assessment like quizzes in Kahoot! platform to assess the students' understanding. This study investigates the pre- clinical medical students' perception about Kahoot! quiz challenge as a formative assessment tool following PBL sessions.

Summary of work: Kahoot! quiz challenge was done following the completion of the second session of PBL in pre-clinical medical students. The quiz consisted questions related to the learning objectives of that particular PBL session from various subjects. At the end of the year, an online survey was carried out on the pre-clinical medical students on their perception of Kahoot! quiz challenge following PBL sessions. The modified validated questionnaire used has 12 items related to the students' perception on Kahoot! quiz challenge. Each item consists of 5-point scale; ranging from 1 (strongly disagree) to 5 (strongly agree) in which the students must rate each item. The data were then analysed, descriptive statistics and Mann-Whitney test was performed.

Summary of results: A total of 243 students participated in this survey with a majority of female respondents (76.1%). All the items in the survey has the median score of 4 in which the students agree that Kahoot! quiz challenge helped them to focus on the subjects, motivates them to learn, enhances their understanding, simplifies complex subjects and facilitates learning. The students also agreed that Kahoot! quiz challenge is fun, more enganging and is effective in providing feedback.

Conclusions: Kahoot! quiz challenge is useful as a formative assessment in PBL. It helped the students' understanding and also motivated them to learn.

Keywords: *Assessment, Formative, Kahoot!*

INTRODUCTION

In medical schools, assessment has been an important tool to gauge the competence and performance of medical students. One of the goals of such assessment is to optimize the students' capabilities by providing direction and motivation for their future learning (Epstein, 2007). This goal is achieved by formative assessment in which feedback is provided to the students to help them learn effectively (Dixson & Worrell, 2016). Another type of assessment is summative assessment; where the students are assessed on how much they have learnt or retained at the completion of a learning course (American Educational Research Association, 2014). Formative assessment is important to improve teaching and learning and to identify the students' difficulties in learning (Dixson & Worrell, 2016). This type of assessment is practical; as it is more closely tied to the teaching outcomes of the lecturers and it has a potential to refine a student's learning (Baleni, 2015). It is used as a feedback in the classroom aiming to advance teaching and learning and to develop learning goals (Taras, 2005). This feedback may address various issues such as the running of the assignment or programme, performance of the students and the improvement of the learning process itself (Fluckiger et al., 2010). This formative feedback may come from the instructor as well as from self or from peers (Smith, 2007). Paper-based quizzes/questions is one of the tools in formative assessment but with the age of digitalization, online-based assessment is more relevant and more appealing especially to the younger population.

Online-based assessment provides immediate feedback as compared to the traditional classroom method and the immediate generation of comprehensive feedback and scores aids the students in finding a solution for their problems. These features of online-based assessment offer an attractive learning features for the students (Baleni, 2015). Some of the online-based assessment is game-based; in which students are enticed by the competitiveness of the game. Using digital games, students are able to use their critical thinking, problem-solving skills and addresses their success and failure in a fun way (Dellos, 2015). One of the popular game-based platform is Kahoot!.

Kahoot! is free, easy to use for the students and simple for the instructors. It can be assessed via various devices such as smartphones, tablets or laptops with a stable internet connection. Its interactive interface with music and colours excite the students and encourage them to focus (Plump & LaRosa, 2017). A successful educational game needs to have the right context, cognitive activities, meaningful challenges and provides feedback (Plump & LaRosa, 2017) and these features are offered by Kahoot!. Thus, Kahoot! quiz challenge may serve as a formative assessment tool such as in Problem- based Learning (PBL) type of learning due to its ability to offer feedback to aid learning.

PBL is one of the learning methods adapted by many medical schools worldwide as it promotes critical thinking and problem-solving in real life learning situation (Yew & Goh, 2016). PBL may also promotes good communication and teamwork. A PBL case encompassed various topics from different subjects and may have a long list of learning objectives which may be overwhelming to the students. Due to the extensive learning objectives, the students may not be able to address them in detail. Hence, it is important to develop a formative assessment for PBL in which the learning objectives are addressed and assessed.

Learning style for each individual is unique. They may have their preferred learning styles such as visual learning, auditory learning, reading-writing learning and kinesthetic learning (Wehrwein, 2007). There was conflicting reports on the learning styles between males and females in terms of multimodal and unimodal learning style (Wehrwein, 2007, Slater, 2007, Choudhary, 2011). Therefore, in this study, our aim was to assess the

students' perception on the usage of Kahoot! quiz challenge as post-PBL session assessment and to further assess the findings based on gender.

METHOD

2.1 Context

During the academic year of 2018/2019, the Deputy Dean of Academic, Faculty of Medicine (FoM), Universiti Teknologi MARA (UiTM) initiated Kahoot! quiz challenge as a formative assessment tool post-PBL in pre-clinical years. Questions were designed according to the learning objectives of each PBL cases. Kahoot quiz challenge was opened to student for a limited time window after each 2nd PBL session. Top three winners after each challenge were awarded with a small token of appreciation. On top of that, the top three winners for highest accumulated points were also awarded with gifts at the end of the semester. As this initiative was recently commenced, student perception on the usage of Kahoot quiz challenge as post-PBL session assessment is important.

2.2 Study instrument

Modified questionnaire based on Ismail et al. (2017) was used in this study. Face validation of the modified questionnaire was done through a discussion with ten, randomly picked year 1 and year 2 undergraduate students from FoM UiTM. They were asked to complete the modified questionnaire and they were shown the original questionnaire by Ismail et al. (2017). After completion of the modified questionnaire, they were interviewed regarding their comprehension and understanding of the said questionnaire. They were also probed if they have misunderstood any of the questions. All the students understood the modified questionnaire better compared to the original questionnaire.

2.3 Data collection

Participants for this study were year 1 and year 2 undergraduate students of academic year 2018/2019 from FoM UiTM who participated in at least one Kahoot post-PBL quiz challenge throughout the academic year. The questionnaire was distributed through an online survey (Google form).

2.4 Data analysis

The collected data was transferred into SPSS version 23.0 and inferential analysis was performed using the nonparametric Mann-Whitney test.

RESULTS AND DISCUSSION

PBL has been adopted in FoM UiTM since its inception in 2003. In PBL sessions, students learn by discussing a case/problem in small groups and usually is supervised by a facilitator. There are two PBL sessions held per case/problem, where in the first PBL session, triggers were given and discussed. Several learning issue pertained to the learning objective of the PBL case will be recognized during the first PBL session. Students are expected to find the resources on the learning issues at home and to discuss them during the second PBL session. However, students may be overwhelmed with the vastness of learning objectives of PBL (Valaitis et al., 2005), and therefore, it is important to have some sort of assessment at the end of PBL sessions.

Currently, incorporating game-based apps in teaching-learning sessions is considered as one of strategies to invigorate learning (Telner et al., 2010). Game-based apps such as Kahoot! provide refreshing and exciting technique for students on top of providing them better understanding towards their learning objectives (Ismail et al., 2017). In this study, we assessed students perception on the usage of Kahoot as the assessment` tool in post-PBL session. A total of 243 students from Year 1 and 2 responded in the survey. From this number, 189 students had participated in at least one Kahoot! quiz challenge and 54 of the respondents have never participated in Kahoot! quiz challenge. Table 1 showed the most common cited reason for not participating. Majority of the students procrastinate in joining the quiz challenge which later make them fail to complete the challenge within stipulated time. Procrastination is a common attitude among university students and this may lead to negative effects towards their academic achievements (Hussain & Sultan, 2010). Improvement could be made by giving the students time to do quiz challenge before ending the PBL sessions in the future. Students may participate more when they perceive it as a compulsory task (Gafni & Geri, 2010).

Table 1. Most common reason given for not participating

Reason	Percentage (%)
Students' attitude (procrastinating, uninterested)	67
Issues with smartphone	25
Issues with internet connection	8

Among those who participated with the survey, female students made the majority of the respondents with 76.1%. This correlated with the ratio of the student population in FoM UiTM which is around 3 male students to 7 female students.Table 2 showed the median score for each item in the survey. All the items in the survey had a median score of 4, indicative of positive feedback. It showed that Kahoot! helps the students to focus, enhance understanding, facilitate learning and motivate them to learn. They also agreed that learning with Kahoot! is fun, a better e-learning platform and effective in providing them feedback. Comparison of mean score between gender (Table 3) and the year of study; Year 1 and Year 2 (Table 4) showed no significant difference in the way students' perceived Kahoot! quiz challenge post PBL.

Table 2. Median score of the items in the survey

Item	Median (IQR)
Kahoot! helps me to focus on the subjects related to the PBL sessions	4 (2)
Kahoot! enhances my understanding on the subjects related to the PBL sessions	4 (1)
Kahoot! facilitates my learning on the subjects related to the PBL sessions	4 (1)
Kahoot! is an effective method to correct my misconception on the subjects related to the PBL sessions	4 (1)
Kahoot! simplifies the complex subjects	4 (2)
Kahoot! helps to retain my knowledge	4 (1)
Kahoot! motivates me to learn more	4 (1)
Kahoot! is an effective method to provide feedback (track my performance & limitation of my knowledge)	4 (1)
I'm more engaged with feedback through Kahoot!	4 (2)
Learning with Kahoot! is fun	4 (1)
Kahoot! is a better platform than other e-learning (such as Google classroom, Ed puzzle, Quizziz, Socrates, Padlet) for feedback to students	4 (1)
Kahoot! is an effective method for reflective learning	4 (1)

Table 3. Comparison of median score between males and females

Item	Median (IQR)			
	Male	Female	z-Statistic	P value
Kahoot helps me to focus on the subjects related to the PBL sessions	4 (2)	4 (2)	-0.273	0.785
Kahoot enhances my understanding on the subjects related to the PBL sessions	4 (1)	4 (1)	-0.854	0.393
Kahoot facilitates my learning on the subjects related to the PBL sessions	4 (2)	4 (1)	-0.686	0.493
Kahoot is an effective method to correct my misconception on the subjects related to the PBL sessions	4 (2)	4 (1)	-0.516	0.606
Kahoot simplifies the complex subjects	4 (2)	4 (2)	-0.754	0.451
Kahoot helps to retain my knowledge	4 (1)	4 (1)	-0.120	0.904
Kahoot motivates me to learn more	4 (1)	4 (1)	-0.409	0.683
Kahoot is an effective method to provide feedback (track my performance & limitation of my knowledge)	4 (1)	4 (1)	-0.625	0.532
I'm more engaged with feedback through Kahoot	4 (2)	4 (2)	-0.970	0.332
Learning with Kahoot is fun	4 (2)	4 (1)	-1.413	0.158
Kahoot is a better platform than other e-learning (such as Google classroom, Ed puzzle, Quizziz, Socrates, Padlet) for feedback to students	4 (1)	4 (1)	-0.769	0.442
Kahoot is an effective method for reflective learning	4 (1)	4 (1)	-1.114	0.265

Table 4. Comparison of median score between years of study

Item	Median (IQR)		z-Statistic	P value
	Year 1	Year 2		
Kahoot helps me to focus on the subjects related to the PBL sessions	4 (1)	4 (2)	-0.771	0.441
Kahoot enhances my understanding on the subjects related to the PBL sessions	4 (1)	4 (2)	-0.578	0.564
Kahoot facilitates my learning on the subjects related to the PBL sessions	4 (1)	4 (2)	-0.512	0.609
Kahoot is an effective method to correct my misconception on the subjects related to the PBL sessions	4 (1)	4 (2)	-1.089	0.276
Kahoot simplifies the complex subjects	4 (1)	4 (2)	-0.783	0.433
Kahoot helps to retain my knowledge	4 (1)	4 (1)	-0.549	0.583
Kahoot motivates me to learn more	4 (1)	4 (2)	-0.588	0.556
Kahoot is an effective method to provide feedback (track my performance & limitation of my knowledge)	**4 (1)**	**4 (1)**	**-0.366**	**0.714**
I'm more engaged with feedback through Kahoot	**4 (2)**	**4 (2)**	**-0.399**	**0.690**
Learning with Kahoot is fun	**4 (1)**	**4 (1)**	**-0.874**	**0.382**
Kahoot is a better platform than other e-learning (such as Google classroom, Ed puzzle, Quizziz, Socrates, Padlet) for feedback to students	**4 (2)**	**4 (1)**	**-1.165**	**0.244**
Kahoot is an effective method for reflective learning	**4 (1)**	**4 (1)**	**-0.338**	**0.736**

Generation Z students, those who are born after 1995 till 2010, are the group of medical students nowadays. They have access to digital technology since they are born, hence, known as digital natives, and are accustomed to learning through mobile apps and technology (Shatto & Erwin, 2016). Therefore, they do appreciate game-based learning as it is interactive and able to provide immediate feedback (Table 2). Generation Z students rely much on immediate feedback as the way to enhance their understanding (Ding et al., 2017).

CONCLUSION

This study demonstrates that student have good perception on the usage of Kahoot! quiz challenge in post-PBL sessions by enhancing students' understanding, facilitating their learning and providing feedback to them. There was no difference in the perception among males and females students. More improvement could be incorporated in the process of implementation to get better and continuous participation from students.

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Building Qualitative Research Construct by Conceptualizing Theory and Model of the Literature Review

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Abstract: This paper concentrates on the process of construct development for the qualitative research design. The aim of this paper is to represent a process in the developing research construct which specifies into (7) steps; identifying issues, formation of problem statement, development of research objectives, research question, literature review, building toward the development of the construct, building the protocol for data collection techniques from the identified construct until formulated the pattern of finding. To formulate the statement of problem three (3) elements had been addressed; research gap, significant and context of the study. The consolidation of the research objective and research question must be aligned with the issues that had been examined on the statement of the problem. In addition literature review carried out toward understanding further upon issues been studied where it able to identify the construct that underpinning the theoretical research framework. Thus, the steps undertaking is to ensure the process of developing the construct will properly in place to meet the research convention order. From the construct, a protocol of the interview, observation and document analysis will be developed. This is the guiding principles to direct the data collections. From these data, a pattern will be developed that ability to disclose the practices of the respondents.

Keywords: *Qualitative data, Literature Review, Journal Analysis Table, Construct, Research Protocol.*

INTRODUCTION

Research can be accredited as a systematic investigation to increase knowledge and understanding towards knowledge sustainability to the higher level. To apply a scientific research approach acquire researcher to exercising a disciplined and systematic inquiry in gaining and analyzing the data. Scientific research involves of an investigation on seeking an answers to a research question that been identified, systematically uses a predefined set of procedures that been acknowledge from the construct in order to answer the research question, process of collecting an evidence, producing findings which were not establish in advance and producing a findings that are penetrating a pattern of the answers. Conceptualizing principles in the theory and model in literature review is inventiveness for the researcher in the building of qualitative research construct for the study on documentation strategies in safegurading intangible cultural heritage at Malaysia Cultural Heritage Institution: Case study on Mak Yong Performing Art. The aim of this paper is to expose a process in the developing research construct which specify into (7) steps; identifying issues, formation of problem statement, development of research objectives, research question, literature review, building toward the development of the construct and building the protocol for data collection techniques from the identified construct until formulated the pattern of finding for the study.

ISSUES IDENTIFICATION

Fig. 1: Conceptualization Process Diagram (Suria, 2015)
First stage in doing this scientific research is identifying the issues that arise on the researcher genuine interest which researcher need to recognize one issue or problem that is critical and feasible to studied. According to (Kumar, 2011) the research problem served as fundamental of research study, if it is well formulated, researcher can expect a good study to follow. The identification of issue or problem can be varied through void of literature; conflict in research result literature; topic that neglected in the literature; a need to lift up the voice of marginalized participants; and "real-life" problems found in the workplace, the home, communities and so forth (Creswell, 2014).

FORMATION OF PROBLEM STATEMENT

The formulation of problem statement is most precarious part in research journey as the quality and relevancy of study entirely depends on it. The problem statement is a carefully constructed essay that clearly and succinctly states the problem of research study will help to solve. Normally, the construction of the problem statement is embedded in and draws from the theoretical framework of the study. The process of formulating a problem statement varies in practices. Therefore, in this paper it is accentuate three (3) elements had been address; research gap, significant and context of study (Merriam, 2009).

3.1 Identification of research gap

The key success factor in identification of research gap is reading. Reading more and more in the research area would eventually achieve to a research problem which also requires a scholarly inquiry. Uyangoda (2011) propose puzzling approach in identifying research gap to build a research problem which researcher can simply convert the scenario happen into a research problem by approach in solving a puzzle. Meanwhile, Dissanayake (2013) state that two approaches to identifying a research gap which by "Practical Problem" and a "Contradiction in Literature". Practical problem is more like to the approach that stated by Uyangoda, it is contrast with the contradiction

in literature. This approaches is recurrently practice by the researcher nowadays in formulating the research gap. Contradiction in literature will direct a prerequisite and offer hunches for study further investigation.

3.2 Context for the study

Singh, Fook, and Sidhu (2009) indicate that researcher has to briefly state the background of the study, latest development, current status and emerging problem that arise in the context of problem statement. It is important to persuade the reader through logic and documentation that there is a pressing need for your research.

3.3 Significant of problem

In formulating the statement of problem, researcher must be able to convince the reader that the issue chosen consists of important problem and the significant of solution to it will not only contribute to the development of particular corpus of knowledge but also lead to further research.

DEVELOPMENT OF RESEARCH OBJECTIVES

Objective are the goals that set out to attain a study which should be clearly and specifically indicate a reader what researcher want to achieve through the study. The most important part, the research objectives must be answer the need of research question. The consolidation of research objective and research question must be align with the issues had been examine on the statement of problem.

DEVELOPMENT OF RESEARCH QUESTION

According to Fraenkel and Wallen (1993) a good research question have four main character which feasible, clear, significant and ethical. Research question is a center of study, where researcher need to synthesize the idea into a question which can be clear and focused to the research objectives. Researcher be able to used 5W (What, Where, Why, When, Who) 1H (How) method in articulate the research question, but in qualitative research the

most common term that used is "what" and "how" where its need more descriptive answer to analyze.

CONCEPTUALIZING LITERATURE REVIEW

There is variant way to writing a literature review, numerous scholars practiced in a systematic fashion to capture, evaluate and summarize the literature. Wiersma (1995) stated that the review of the literature provide the background and the context for the research problem. It should establish the need for the research and indicate that the researcher is knowledgeable about the area. In addition, literature review carried out toward understanding further upon issues been studied where it able to identify the construct that underpinning the theoretical research framework. Referring to Boote and Beile (2005) designate five (5) criteria in conducting a literature review such (1) coverage, (2) synthesis, (3) methodology, (4) relevance, and (5) rhetoric. Meanwhile, Creswell (2014) recommend seven (7) way in performing a literature review consist of; (1) identifying key words, (2) begin searching databases, (3) initially try to locate about 50 reports of research, (4) look over the abstract and skim the article to identify useful literature, (5) begin designing literature map/visual picture – useful organizing device, (6) write summaries of the most relevant articles – including precise references, and (7) assemble the literature – thematically or according to important concepts addressed in the study.

This paper highlighted the process in designing a literature map which known as Journal Analysis Table (JAT). This table is useful for the researcher in groupings the literature on the topic that illustrates how particular study will contribute to the literature, positioning study within the larger body of research. Below is an example of features that available in the JAT template: The data and information that extracted from Journal Analysis Table can be used in conducting and writing up literature in the chapter two. Merriam (2009) book on guide to design and implementation of qualitative research stated that writing a literature review required an integrated, synthesize, and criticize on the particular field of study which necessary for the researcher to indicate their argument and justification on the quotation that extracted from the literature. In the other hand, writing style is important in order to presenting a good literature review where it can persuade and informative to the reader. As suggested by Merriam (2009) the presentation of literature

can be manageable by chronological, particular themes or by combining the chronological and thematic of the fields of study.

Table 1. Journal Analysis Table (JAT)

JOURNAL ANALYSIS TABLE (JAT)

NO.	AUTHOR/ YEAR	TITLE/JOURNAL	PURPOSE	CONTRUCT	METHODOLOGY	FINDINGS	REMARKS
1.	Mariel R. Templanza & Natividad R. Templanza 2015	A Study of the Documentation and Archival Practices of The Mangyan Heritage Center and The Center for Mindoro Studies The General Conference Congress Of Southeast Asian Librarians (Consal) Xvi Bangkok – Thailand,	This study sought to find out what has been done so far by the Mangyan Heritage Center and the Center for Mindoro Studies to preserve the Mangyan heritage of Mindoro, Philippines and to recommend steps to further improve these practices. This study also pointed out to what degree these two local studies centres conform to the archival standards and best practices and identified available documentations on the Mangyan heritage.	1) Standard 2) Information access and user needs 3) Security, sustainability and preservation	Mix method 1) descriptive method 2) survey 3) questionnaires 4) interview	The findings of this study revealed that : 1) Mangyan Heritage Center and Center for Mindoro Studies maintain their collection on the cultural heritage of Mindoro in line with their goals and objectives. 2) Available documentations of the Mangyan heritage were composed of books about the Mangyan culture, Ambahan books, Ambahan poems in audio format, photographs of Mangyans and their activities from 1900s up to the present, and theses and dissertations pertaining to the island of Mindoro. 3) Archival standards and best practices a. Acquisition b. Arrangement c. Physical organization d. Description e. Finding aids	

DEVELOPMENT OF THE CONSTRUCT

An accomplishment of Journal analysis table (JAT) is enable researcher in identifying the component of construct for the field study which important to guide researcher in the scope of study design. This literature map can guide a researcher to identify the related model, theory, concepts, principles of other related in field of study that been used by others scholar in their writing. Researcher can adopt the existing construct that used or develop a new construct which applicable for the study. Besides that, this literature map also facilitated in identifying the sub construct and sub-sub construct which it is useful in clear understanding for building a protocol in the data collection instruments.

PROTOCOL BUILDING

In the end of conceptualization for construct, researcher be able to build a protocol for the means of data collection process. The protocol can be straightforwardly acquire by the sub construct and sub-sub onstruct that been identified in the Journal Analysis Table (JAT) or literature map. In qualitative study, protocol can be used in collecting the data which can conveyed by

the various instrument such interview (by structure or philosophical and discipline orientation), observation (participant or non-participant, document analysis. All of data will be gathered through word which difference to the quantitative data that presented in number or figure. Qualitative data that can obtain by interview consist of "direct quotations from people about their experiences, opinions, feelings and knowledge", meanwhile observation can attain "detailed description of people activities, behavior and action and document analysis can reach a data on "excerpts, quotations or entire passages" (Patton, 2002).

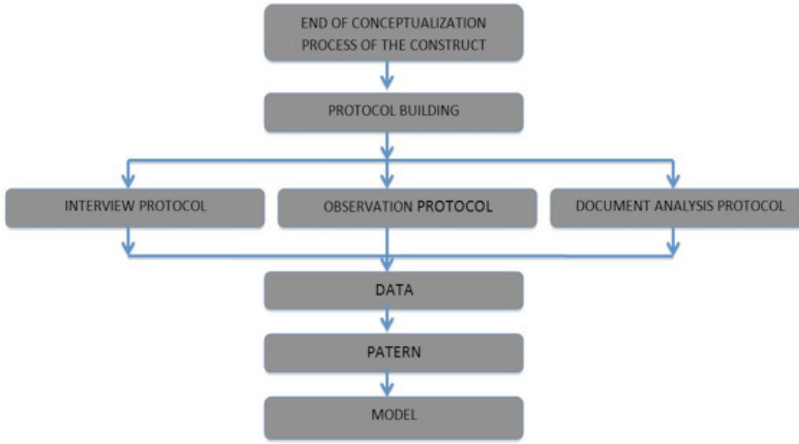

Fig. 2 Protocol Building Diagram (Suria, 2015)

INTERVIEW PROTOCOL

In qualitative research, interviews can be recognize as a prominent instrument in data collection. deMarrris (2004) demarcates interview as a "process in which researcher and participant engage in a conservation focused on question related to research study". Researcher be able to identify an interview procedure by structure or philosophical and discipline orientation. Structured interview consist of highstructure interview, semi-structured and unstructured which have their own benefits towards finding the data. In building the protocal for interview, researcher need to identify

at least sub-contruct in developing the interview question. Semi-structure

interview is most applicable for researcher in order to make sure the interview question is answerable to the interviewee. (Refer appendix 1: Interview Protocol)

8.2 Observation Protocol

Observation process comprise two types of technique which known participant and non-participant observation. Implementation of observation generally must be reliable directly to a specific research question it is subject to check and balanced in producing trustworthy results to the study (Merriam, 2009). In constructing the protocol for the observation, researcher need to identify the discipline of study by identification construct, taking an observation notes in real time as observed and write the overall report. (Refer appendix 2: Observation Protocol)

8.3 Document analysis Protocol

Document analysis is different compared to interview and observation because it dependent upon document not human beings in collection the data. Common source of document include official records, letters, newspaper account, poems, songs, corporate records, government records and document, historical accounts, diaries, autobiographies and so on. Besides that, audiovisual collection also can be used as a data sources and physical evidence or traces in performing document analysis (Lee, 2000; Webb, Campbell, Schwartz, & Sechrest, 2000). In constructing the protocol for the document analysis, researcher need to find a relevent documents that bound to the research field. Once it is located, researcher need to determine the authenticity and accuracy of document such the author the place and data of writing all need to be established and verified (McCulloch, 2004). After that, researcher need to generate a descriptive appraoch such coding and cataloguing system for easy access to information retrieval in the analysis and interpretation stages.

The data collection will be culmination until researcher found a pattern through the data that been collected. The finding of these data will be analyze through an appropriate data analysis software that suitable and adequate for the study design. In the end of process, model of study can be generalized through the combination of conceptualization process, protocol building by using a proper data collection instrument and a systematic data analysis.

CONCLUSION

The conceptualizing principles in building of qualitative research construct through theory and model of the literature review is a ground-breaking to the researcher in conducting a systematic convention of research proposal. Researcher be able to determine their issues and problem in related field in analytically approaches, coordinate the statement of problem aligned with the research objective and research question and conduct a systematic literature review by using Journal Analysis Table (JAT). The literature map can be guided a researcher to identify the research construct and building a protocol for the data collection instrument.

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Augmented Reality (AR) Concept in Hospitality Education: Advantages and Challenges

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Abstract: The Augmented Reality (AR) Concept in education is mostly studied and applied in the areas of mathematics education, science educations and educational technology. While in the tourism industry, it's played an important role as a marketing tools towards smart tourism approach. However, the Augmented Reality (AR) Concept in hospitality education have not yet been explored. Thus, this study aims to review existing literature to identify advantages and challenges pertaining to Augmented Reality (AR) Concept in the hospitality education. The output may give new perspective and potential application that may enhance the learning achievement and the hospitality course may become more interesting. Moreover. this may help the education provider towards movement to the Fourth Industrial Revolution 4.0 (IR 4.0) demand.

Keywords: *Mobile Augmented Reality, Challenges, Hospitality Education, Opportunity, IR 4.0*

INTRODUCTION

An Augmented Reality (AR) is not a new technology as it was started evolving since 1990 across the industries of medicine, military, manufacturing and entertainment, and more recently it has expanded into advertising, healthcare, hospitality industry as well as education (Akc ayır & Akc ayır 2017; Uzunboylu & Yıldız 2016). AR was found to have a huge potential for pedagogical application where it has been chosen to be one of educational tool in a number of purposes such as collaboration, cultural exploration, digital storytelling and interaction (Bacca et al. 2014; Radu 2012, 2014).

AR also became a vital marketing tool in the hospitality Industry which can be deployed in many ways that changed the way of the customers used to see and interact with the industry. Moreover, this technology gives unlimited potential to engage with the customers. Figure 1.0 below represents the benefits of AR adoption in the hospitality and tourism industry.

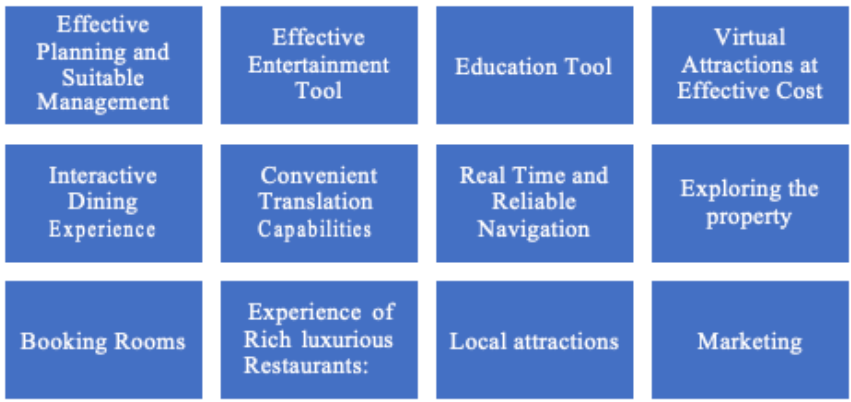

Fig.1.0: Summary of the impact and importance of AR technology for the Hospitality and Tourism Industry (Nayyar, Mahapatra, Le & Suseendran,2018)

Moreover, recent advances have shown the opportunities offered by AR applications for smartphones to the hospitality industry (Fritz, Susperregui, & Linaza, 2005; Yovcheva, Buhalis, & Gatzidis, 2012), such as providing real-time information about a place and simulations of historical buildings,

monuments, and events, all by superimposing virtual objects into their current view of a landscape or interior.

With the rapid development of information communication technologies benefit and widespread use of mobile, smartphone or tablets open an opportunity to AR to be integrated. According to Aghaee and Larsson, (2013), those devices offer user friendly characteristics such as easily carried, wireless, containing many apps that making it easy for the student to do multiple tasks at one stand, and connecting while roaming. Previous has shown that smartphone give a great impact upon the nature of higher education as it was easily transmitted teaching experiences via smartphones, as well as the use of educational programs and the transfer of information outside the routine use of information communication technologies in higher education institutions (Ozuorcun & Tabak, 2012). Meanwhile, Traxler et al. found that Smartphones and iPads offered great impact towards students' usage as the educational content they offer in such a way that let them control their content especially when there are no laptops or desktops available (Kimura, n.d.). Smartphone augmented reality (SAR) is largely unexplored especially in the hospitality education. Thus, this review aimed to identify benefits and challenges in adopted AR on smartphone in the context of hospitality education.

LITERATURE REVIEW

A narrative review was carried out in order to identify advantages and challenges on adopting Augmented Reality (AR) in the Hospitality Education. Articles from reviewed journal were selected and comprehensively studied and rigorously discussed from the perspective of Malaysian Hospitality and Tourism Education.

2.1 Malaysian Education

The rapid growth of Internet of Things (IoT) became main challenges for educators especially in teaching the Net Generation. Different approach of teaching need to be adopted in order to meet the demand. Over the last decade blended learning approaches and online education has been applied/incorporated in many disciplines of education. Globalised online learning has been incorporated for higher education

under Shift 9. While the Malaysian Education Blueprint 2013-2025, incorporated of ICT was under Shift 7. In implemented the online education, three (3) factors need to be considered which were macro, meso and micro as shown in Figure 1.0 below.

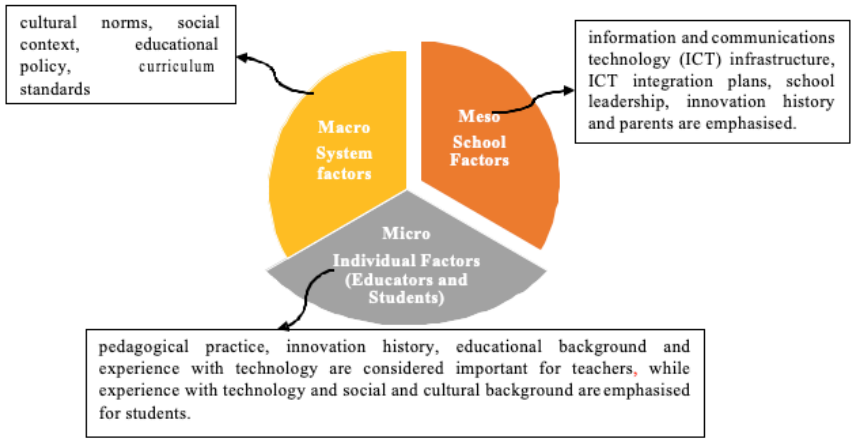

Fig. 2.0 Three Main Factors involved in adopting AR in education (Rozinah, 2018)

2.2 Hospitality Education in Malaysia

In Malaysia, tourism and hospitality education dates back to the early 1967 when the Institute of Teknologi MARA(ITM) began producing skilled graduates in hotel, catering and management from its Jalan Othman campus in Petaling Jaya,Kuala Lumpur. With such changes of name, Universiti Teknologi MARA in 1999, the Faculty of Hotel and Tourism Management continued offering Hospitality Programs (Hotel Management,Tourism Management,Culinary Arts and Gastronomy,Foodservice Management,Pastry) at six (6) different campuses throughout Malaysia . The evolution of education provider is then continuously rise as a rapid growth of this industry requires a workforce that is not only skilled but has a formal education to ensure a good quality of services were provided to guests or tourists. Thus, several academic institutions started offering the hospitality programs such as Universiti Putra Malaysia (UPM), Universiti Utara Malaysia (UUM) and International Islamic University Malaysia

(IIUM). Moreover, when the Private Higher Educational Institutions (PHEI) Act was passed in 1996, more private educational institutions have established hospitality programs namely Taylor's University College, Segi University College, Damansara Utama College and Limkokwing University of Creative Technology. The curriculum of hospitality education mainly consists of Food and beverage, Lodging (accommodation), Recreation and Travel and tourism.

The technology development in hospitality industry is growing thus required the education provider to adapt to the changing needs by the employer as well as customer where they are becoming more demanding, sophisticated and experienced. AR has been embedded in different fields of education but only a few studies have been conducted in Hospitality Education even though the number and variety of courses of hospitality and tourism education continuing to increase. According to (Cantoni, Kalbaska, & Inversini, 2009), the hospitality and tourism education were typically provided by four main sources: academic institutions, corporate entities, destination management organizations, or independent third party associates.

2.3 Augmented Reality

2.3.1 Definition

In general, augmented reality is referred to the integration of digital information with the user's environment in real time. In the other hand, AR presents virtually superimposed images on the real world view (Rauschnabel, 2018; Rauschnabel, Rossmann, & Tom Dieck, 2017). Furthermore, Agarwal et al., (2014) defined Augmented Reality is the augmentation or superimposing of graphical elements that are generated by computer such as audio, video, GPS data or graphical images on top of the real world environment. It could be understood more specifically by a notion called mediated reality through which artificial information can be added or subtracted or manipulated or overlaid on the real world. Meanwhile, Daponte et al., 2014 stated that AR is defined as involvement of virtual environment into the real world to enrich the view, the sound, sense of taste,

feel or touch and scent or smell. This was supported by Johnson et al. 2010 that highlighted Users can also engage with AR objects through haptics, or touching their mobile device screens, and manipulating the various types of superimposed content.

2.3.2 Brief History of Augmented reality (AR) in Education

Recently, augmented reality is one of the technological innovations that moving towards mainstream. Throughout more than five (5) decades the history and revolutionary of augmented reality are rapidly changes across diverse disciplinaries including in Education. Within education, the adoption of AR and most commonly AR apps, represents a strand of m□learning and technology□enhanced learning. Various devices can be used to display and integrated with AR technology. Brief history of AR technology application as shown in Table 1.0 below. There were five (5) main categories devices that suitable for AR application; mobile devices, special AR devices, AR glasses, AR contact lenses and virtual retina display.

Table 1.0: Brief History of AR applications

Year	History
1960	Detector, Morton Heiling
1973	First mountable head screen (HMD= Head Mounted Display)
1985	First augmented reality laboratory (Immersive/Interactional)
1990	Virtual Reality (Jaron Lanier)1992: Augmented Reality (Tom Caudell)
1994-99	First RA Systems (KARMA 1994 and ARToolkit, 1999)
2000	First augment reality played with mobile devices
2008	Wikitude: Augment reality scanner
2009	Initiation of Standardization operations
2013	Google is in the process of commercializing RA eye glasses

A few number of studies on mobile augmented reality in the hospitality context have been carried out. Summary of the research's as presented in table 2 below.

Table 2.0: List of AR Research in Hospitality Education

No	Author	Title
1	Deale, 2013	Incorporating second life into online hospitality and tourism education:A case study
2	Huang,Backman,Chang,Backman & McGuire, 2013	Experiencing student learning and tourism training in a 3D virtual world:An exploratory study
3	Hsu, 2012	Web 3D simulation-based application in tourismeducation: A case study with second life
4	Huang, Backman and Backman, 2010	Student attitude toward virtual learning in second life: a flow theory approach
5	Penfold,2009	Learning through the world of second life-a hospitality and tourism experience

2.3.3 Mobile Augmented Reality

The Fourth Industrial Revolution 4.0 (IR 4.0) is changing the world including the education landscape and system. The shift of this paradigm seems to force all the education provider, policy marker and educators to be ready in changing ways of thinking, teaching and learning. Internet of Things (IoT) becoming main driver towards IR 4.0. Thus, Mobile Augmented Reality was found to be an appropriate technology to be employed in the education system. Mobile Augmented Reality is referred to mobile, smartphones and tablets that currently the most available and best fit for AR mobile apps, ranging from pure gaming and entertainment to business analytics, sports, and social networking.

2.3.3 Advantages of Augmented Reality (AR)

Previous researchers found that AR application in the area of teaching and learning environments has remarked the advantages as follows:

Table 3.0: Advantages of AR application in teaching and learning

Author	Advantages
Anne-Marie DePape, Marissa Barnes & Jayme Petryschuk (2019)	Technological Factors-usability- & functionality Student Characteristics- demographic & Academic background Learning Outcomes – hard skills & soft skills & essentals skils
Bujak et al.,2013; Di Serio, Ibáñez, & Kloos, 2013).	Increase student's motivation Hybrid learning 'dynamic' and not 'static' " 'two dimensional', digital natives, physically enacting the educational concepts' "perfectly situated scaffolding" in ways that were not previously possible'. enables users to be immersed in a virtually enhanced real world
Serio et al., (2012	Boost students' motivation and interest
Chien, Chen and Jeng (2010)	Encourage kinaesthetic learning.
Dede (2009)	Experience real life Break the boundaries of formal education-to reach a quality education from everywhere in the world, in an informal way and through ubiquitous technologies obtained by everyone to engage in authentic explorations in the real world

2.3.4 Challenges in Adopted Augmented Reality

However, several studies have identified potential challenges and drawbacks toward adopting AR smartphone in tourism and hospitality which were presented below:

Table 4: Challenges of AR application in teaching and learning

Author	Challenges
Uden et.,al (2019)	Potentially high cost of acquiring a system Lack of realism/fidelity/skill transfer issues Physical effects on end-users No curriculum content Require Mobile Device
Kerr & Lawson (2019)	Technological-AR complicated, technical problems (various divices) Pedagogical-excessive additional lecture time is required to use AR effectively in education Learning Challenges Privacy and Security issues
M. Akçayır, & G. Akçayır (2017)	AR is difficult for students to use Requires more time Low sensitivity in triggering recognition GPS errors cause student frustration Not suitable for large group teaching Causes technical problems (camera, Internet, indoor use) Causes cognitive overload Distracts students' attention Expensive technology Large file size limits the sharing of content Ergonomic problems Difficult to design Inadequate teacher ability to use the technology

CONCLUSION

Educators in the hospitality courses need to continue exploring the potential of Mobile Augmented Reality (MAR) in order to identify and develop a new educational opportunity that will encourage interaction and engagement among their students as well improvement in the method of teaching. Moreover, such technology is crucial in order to be aligned with the IR 4.0 shift. However, readiness in term of systems, organization (university or school) and Individual, are the other factors that need to be focused.

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e-Book Usage in Teaching Science: the Perspectives of Science Teachers in Secondary Schools in Selangor

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Abstract: E-book is one of the products of technology that have benefited many educators all around the world. It has also revolutionized the way students learn. Previous studies have shown that e-book brings positive effects on students' academic achievements. Due to this scenario, this study 1) investigates the preferences of teachers in the use e-book in teaching and learning 2) identifies impacts of using e-book in teaching and learning and 3) determines the challenges of using e-book. 48 science teachers from selected schools in Selangor were the respondents for this study. Quantitative approach was employed with questionnaires used as the instrument. The findings indicated that most of the respondents had positive perceptions on the use of e-book in classrooms and were willing to overcome the challenges that they were facing.

Keywords: *Information Technology Communication, Classroom, Science subject*

INTRODUCTION

Previous studies have reported that e-book or electronic book is a type of digital book that contains a lot of multimedia programs. Its user claimed that it was easy to read and get information from this technology (Jimenez, 2000). Additionally, e-book also can be a replacement medium of original book (Sobihatun, 2002). This is the same with the e-book supplied by the Terengganu government to the students in the state. The students were only required to bring their laptops or e- books to school as replacement to the heavy text books. A recent study by Jane (2009) suggested that e- book is "the digital media that is equivalent with conventional printed books. Prior to this, an e-book was a handheld device whose main purpose was to look like a book but now an e-book is now a device that can read on digital devices like PDAs, computers, and smart phones.

There is a lot of published research describing the types of e-book. Mohd (2005) stated that e- books can be classified according to their perspectives, types of reader, contents and types of delivery. In the perspective of types or reader, there are two types; hardware-based reader and software-based reader. For hardware-based reader, a custom made devise to read e-book such as Franklin e-BookMan and GermStar is used. For software-based reader, users can choose to read e-book format such as Adobe Acrobat Reader or Microsoft Internet Explorer. In content perspective, e-book is classified based on the way it is presented to the user. The difference between traditional book and e-book is the latter's capabilities in embedding multimedia elements in the e-book. There are three families of e-book – based on content; static, partly multimedia and fully multimedia. The next is the type of delivery. According to Wilson (2000), an extended book is one of the means used to deliver an e-book to users. Extended book refers to a book that uses a CD ROM as a medium of delivery data to users. Other type of delivery is the web book. Web book refers to the book that is available online like Freebooks,

eBook-to-buy, and Open eBook. In his analysis of e-book, Mohd (2005) identified six types of web book. They are delivered to users; free of charge, purchased only, read only, borrowed only, downloadable and printed versions. Jane (2009) stated that the other dimensions include the reading of a book in electronic format. Some hardware devices like personal

computers are designed to support all kinds of activities so reading e-book in a computer needs a software application that can read the file.

In a study which was carried out to determine e-book concepts, Sobihatun (2002) found that e- book concepts included all the reading materials that were kept in digital form by any kind of software manually. These reading materials include the multimedia programs or integration packages that are in the forms of texts, graphics, sounds, animations and videos and also the way of interaction to the users. Graphics can help users to communicate with many types of information. Animations can help users to present the information efficiently and attract users to object movement and so on. Sounds can show the feedback of something and texts are used to send information, order anything that can understand the users' one way communication tool. Besides, most e-books apply the hypertext concept, which allows users to open pages continuously. Other than that, an e-book is able to link any documents in other websites on the Internet through hyperlink. Jane's (2009) study on the features of e-book has now been accepted by people because of its technological advances and technology acceptance. People are very comfortable with the idea of personal and portable technology as essential accessories. E-books in these devices such as smart phones and i-pads are always available and can be used at any time and any place.

RESEARCH QUESTIONS

The research questions for this study are:

i. What are the teachers' preferences in using e-book for teaching and learning?
ii. What are the impacts of using e-book in teaching and learning?
iii. What are the challenges of using e-book in teaching and learning?

RESEARCH DESIGN

This study adopted quantitative approach with a descriptive research design using a questionnaire and semi-structured interview. The survey consists of four parts which are part A, B, C and D whereas the semi structured interview was used to find out the positive and negative impacts of using e-book in classrooms and the challenges of using e-book. Table 1 shows the description of the questionnaire used in this study.

Table 1. Descriptions of the Research Instrument

Section	Description	Number of Items
A	Collecting demographic data such as gender, age, area of school, teaching subject and years of teaching experience	5 (1-5)
B	Focusing on the preference of the teacher in using e-book in teaching and learning and also the teachers' computer competencies	10 (6-15)
C	Focusing on the positive and negative impacts of using e-book in classrooms	7 (16-22)
D	Focusing on the challenges of using e-book in teaching and learning	6 (23-28)

3.1 Sample

The sample in this research was Science teachers in eight secondary schools in Selangor. To qualify as a sample for this research, the respondents must teach Science subjects that include Biology, Chemistry and Physics. Overall, the total number of the samples in this study is 48 Science teachers from four areas which are Shah Alam, Klang, Damansara and

Subang, as shown in Table 2.

Table 2: Distribution of Schools and Number of Teachers Involved

Areas of Schools	Number of Schools Involved	Number of Science Teachers Involved
Shah Alam	2	19
Subang	2	10
Klang	3	16
Damansara	1	3
Total	8	48

3.2 Demographic Data

Based on Table 3, the number of respondents is 48. 75% of them are female (n=36) and the remaining 25% are male (n=12). Most of them are in between 21 and 30 years old (n=35). They are new teachers teaching in their schools. The others are between 31 and 40 years old and the remaining teachers are in between 41 and 50 years old.

35% or most of the respondents teach Physics. This is followed by Science 29 % (n=14). It can also be found that some teachers teach two subjects like Science and Biology, Science and Chemistry, and Science and Physics. 73% of the teachers have one to five years of teaching experience while 19% of them have 6 to 10 years experience in teaching. Only 2% of the teachers (n=1) have teaching experience for more than 15 years.

Table 3: Respondents' Demographic Data

	Frequency	Percent (%)
1. Respondents' Gender		
Male	12	25
Female	36	75
Total	**48**	**100.0**
2. Respondents' Age		
21 – 30	35	73
31 – 40	8	17
41 – 50	5	10
51 – 60	0	0
Total	**48**	**100.0**
3. Subject Taught		
Science	14	29
Biology	6	13
Chemistry	6	13
Physics	17	35
Science and Biology	3	6
Science and Chemistry	1	2
Science and Physics	1	2
Total	**48**	**100.0**
4. Teaching Experience		
1 – 5 years	35	73
6 – 10 years	9	19
11 – 15 years	3	6
More than 15 years	1	2
Total	**48**	**100.0**

RESULTS AND DISCUSSION

4.1 Teachers' Preference in using e-book in Teaching and Learning

Based on Table 4, it can be found that 79 percents of the teachers are familiar with e-book. This is reflected in Table 5 where it can be seen that more than half of the respondents look for teaching aids from the e-book.

Table 4. Total respondent familiar with e-book

Total respondent	Frequency	Percentage (%)
Yes	38	79
No	10	21
Total	48	100

Table 5. The total respondent find the teaching aids from e-book

Find Teaching Aids	Frequency	Percentage (%)
Yes	27	56
No	6	13
Sometime	15	31
Total	48	100

Based on Table 6, it can be found that the majority or 47.9% of the teachers spent not more than once a week to use e-book for teaching and learning. Only 27.1 % of the teachers surveyed use e- book for teaching at least once a week. This shows that the teachers use e-book in teaching.

Table 6. Time use e-book for teaching and learning purpose

Time use e-book	Frequency	Percentage (%)
Never	6	12.5
Less than once a week	23	47.9
At least once a week	13	27.1
Everyday	6	12.5
Total	48	100

Based on Table 7, most of the respondents (59%) feel that e-book is necessary in teaching Science and only 6 percent (n=3) of respondents feel that e-book is not necessary in teaching the same subject. The remaining 18% percent of the respondents are not sure of the necessity of e-book in teaching Science.

Table 7. Feel e-book is necessary in teaching Science

Respondent feel e-book is necessary in teaching Science	Frequency	Percentage (%)
Yes	30	59
No	3	6
Unsure	18	35
Total	48	100

Overall, most of the Science teachers surveyed have direct and indirect knowledge about e-book but not all of them apply their knowledge in teaching and learning. This also means the respondents know the information used in teaching is e-book. This is supported by Jane Lee (2009) who found that although e-book appears in headlines with regular frequency, there is still confusion about what exactly an e-book is that makes it difficult to focus on the real issues. These teachers need some explanations about e-book. Based on Understanding the Basics by Jane Lee (2009), there are different perceptions among people about e-book in the last few years. Before this, people believed that e-book is a handheld device whose main purpose was to look and act like a book but now e-book can read on your PDA, smart phones and any technology devices. Besides, the teachers do not want to take risk using e-book in class because of other factors that prevent them from doing so. The factors will be revealed in the finding of other research questions. Excellence in teaching can be achieved with good teaching techniques. However, applying the latest techniques does not guarantee excellent teaching or enhancing learning (Anne, T.R et all, 1997).

4.2 Impacts of e-book to Teachers and Students

Based on the findings of this research, it is evident that e-book has

positive and negative impacts on teachers and students in learning process. Based on Table 8, two of the five given statements were agreed by the respondents and the other items (item 4, 3, 5) were undecided. Item 4, which has a mean of 3.44, is undecided. This shows that the students are more serious in learning if their teachers like to use computer and internet resources in their classrooms. This shows that teacher's attitude in teaching is important to generate interests in the subject among the students. This is possible since the teachers are able to be real persons, who can play some sort of roles, provide resources and tools and include themselves among the resources for which the pupil might discover a use (Cyril, 1960). This is supported by Afshari, Kamariah, Wong, Bahaman and Foo (2009), who claimed that teachers are at the center of curriculum change and they control the teaching and learning processes. Therefore, they need to prepare young people for the ICT knowledge to acquire and process information (Plomp et al., 1996).

Table 8. Positive and negative impacts of using e-book

No.	Items	Mean	SD
1	Do you think e-book give many benefits in teaching and learning?	4.21	0.54
2	Do you agree e-book make your teaching method more interesting?	4.15	0.62
4	Do you think students are more serious in learning if teachers like to use computer and internet resources in classroom?	3.44	1.17
3	Using a computer in classroom takes a lot of teaching time. Do you agree with this statement?	3.33	1.02
5	Do you feel e-book is hard to find online and wastes your time?	2.69	1.06

According to Mohd. (2005), e-book has the ability to embed multimedia elements. There are three types of e-book based on content; static, partly multimedia and fully multimedia. It depends on teachers to make a topic more interesting to students in classes.

The highest scoring statement in Table 8 is item 1 (mean 4.21) which revealed that e-book gives many benefits in teaching and learning. This statement was supported by the finding reported in Table 7,

which shows that more than half of the teachers feel that e-book or any Internet resources are necessary in teaching Science. Aside from that, the second highest scoring statement in this table is item 2, which reveals that e-books make a teaching method more interesting. This statement was supported by theme 1 (35.4 %) in Table 9.

Based on Table 8, items 1 and 2 are about the positive impacts of using e-book. The respondents agreed with both statements. Item 4 receives both positive and negative impacts. The result from content analysis in Table 4.14 shows that using e-book in classroom causes less attention by the students. Item 3 and item 5 are the negative impacts and both of these items were undecided by the respondents. Based on finding in reported in Table 6, most of the teachers use e-book less than once a week for teaching and learning purposes. This shows that the respondents have less experience using e-book in classrooms so they could not decide the items.

Table 9. Content analysis for other positive impacts of using e-book in classrooms

No	Theme	Frequency (n)	Percentage (%)
1	Learning becomes more interesting	17	35.4
2	Get extra knowledge	8	16.7
3	Increase students' attention	6	12.5
4	Motivate students	6	12.5
5	Easy to find information	11	22.9

In addition to investigating the other positive and negative impacts, the researcher carried out content analysis for each impact, which are represented in Table 4.13 and Table 4.14. Theme 1 in Table 9 reveals that learning becomes more interesting. The accepted reasons of this result are teachers can vary their teaching styles and increase their information on the subject by using e-book. Goktas, Yildrim & Yildrim (2009) stated that teacher's characteristic is also important in implementing a creative teaching style in class. A teacher who is a creative thinker is more likely to use computers in more integrative and transformational ways that are useful and valuable to students instead of ways that promote and support traditional classroom practices (Bielaczyc & Collin, 1999; Carvin, 1999).

The second highest is theme 5 which reveals the ease to find information with 22.9 percents. This shows that the teachers like to use e-book because it is easy to find related information for the topics they teach. This is also depending on their accessibility to the Internet connection. Theme 5 in Table 10 reveals e-book can cause less attention by the students and lessons become complicated. The reasons are highlighted because some e-books are too complicated for students and many sources of information referred from the Internet tend to confuse the students. However, these are only the thoughts of teachers who are having negative perceptions on e-book and the Internet. Previous study by Goktas, Yildrim &Yildrim (2009) did not deal with negative impacts of using e-book in teaching. This study indicates contradictory results if compared to the literature on barrier (USDE, 2000) in that "lack of appropriate course content and instructional programs," "lack of time," and "lack of appropriate administrative support" are not representing main barriers.

Table 10. Content Analysis for other negative impacts of using e-book in classrooms

No	Theme	Frequency (n)	Percentage (%)
5	Less attention by students	18	37.50
3	Technical problems	6	12.50
4	Wasting time	6	12.50
1	Lessons become complicated	15	31.25
2	No creativity	3	6.25

Table 11. Content Analysis for other factors that can bring problems in using e-book

No	Theme	Frequency (n)	Percentage (%)
1	E-book is too advance	10	20.83
2	E-book is hard to understand	19	39.58
3	Limited time	19	39.58

4.3 Problems in using e-book among teachers

From the finding of this research, it was found that there are some factors that can cause problems in using e-book. All items in Section D are designed to achieve the research question 3 in this study. Based on Table 12, four out of the five given statements were agreed by the respondents and only one item (item 2) was disagreed. The highest score in Table 12 is item 5 which reveals that printed e-book is costly. E-book commonly contains many pages and this is costly to teachers because they need to download and print the e-book by themselves. In addition, not all e-books are free on the Internet and the purchased e-books are also expensive. This statement is supported by Doty & Bishop (1994) who stated that the expensive e-book cost is not reliable with the weakness of its quality control and document available. Two items (item 3, 4) receive the second highest scoring with the same mean,4.17. These two items are negative-phrased statements. Item 3 reveals that not all e-books in the web are suitable for teaching and learning. This item was supported by Theme 2 in 11 which state that e- books are hard to understand. This item is also supported by Theme 1 in Table 11 which states that e- books are too advanced. Item 4 reveals not all classrooms have computers and Internet connection. This item was supported by Theme 3 in Table 10, which states that technical problems are other negative impacts of using e-book in classrooms. These two items show the characteristics of e-book. This means teachers are totally given problems in teaching and learning process. A study by Goktas, Yildrim & Yildrim (2009) found that crowded classroom, inadequate ICT-related course, lack of computers and lack of teachers' motivation to be among the factors that contribute to negative impacts of using ICT in classrooms. In another study by Salehi & Salehi (2012), it was found that there are three factors preventing teachers from using ICT in classroom. They are insufficient technical support from the school, limited access to the internet and ICT and shortage of class time.

Table 12: Factors that bring problem in using e-book

No.	Items	Mean	SD
1	Internet connection in school is very weak	3.77	1.06
2	I have personal problems in using the Internet to find resources	2.46	1.01
3	Not all e-books in the web are suitable for teaching and learning	4.17	0.60
4	Not all classrooms have computers and Internet connection	4.17	0.91
5	Printed e-book is costly.	4.27	0.74

Focusing on the analysis of Table 12, four items (item 5, 3, 4, 1) are identified as external factors that bring problems to teachers in using e-book. The definition of external factor in this study is the outside factors that cause the problems in using e-book. Only item 2 that read "I have problems in using Internet to find resources" is identified as an internal factor. The definition of internal factor in this study is the inside factors of individual that can cause problems in using e-book. But if teachers perceive ICT or e-book referred in this study as a beneficial tool, compatible with their current activities, easy to use and has observable outcomes, they will demonstrate positive attitudes towards ICT (Afshari, Kamariah, Wong, Bahaman & Foo ,2009).

The finding shows the respondents disagree with the statement. This proves that the respondents do not have problems in surfing the Internet to find any resources. This is supported by the details of Table 5, where more than half of the teachers always find teaching aids from e-book or any internet resources.

In addition to investigate other factors that can bring problems in using e-book, the researcher carried out three themes, listed in Table 11. Theme 2 and Theme 3 achieved the same percentage, 39.58 percent. Many respondents wrote in Theme 2 that e-book is hard to understand. This is supported by Table 6, which states that many teachers use e-book for teaching and learning purpose less than once a week. The accepted reason is the teachers do not want to use e-book during teaching and learning process. This is why it is difficult for them to apply e-book in classrooms. This is more to teacher's attitude

in teaching. Theme 3 states that limited time can bring problems in using e-book. When teachers want to find e-book of related topics as a teaching aid, it will consume a lot of time. This is supported by Bauer and Kenton (2005) who stated that students did not have enough time at their computers and teachers needed extra planning time for technology lessons. This action can disturb the teaching process from running smoothly.

4.4 Level of Teachers' Computer Knowledge influence the use of e-book in Teaching

In question 4, the researcher wanted to identify the level of the teachers' computer knowledge that can relate with the first research question, the preference of teacher in using e-book in teaching Science. The result of this study shows that two out of the five given statements were agreed by the respondents, while two items (item 9, 7) were undecided and only item 6 was disagreed. The highest scoring in Table 13 is item 8 which specifically reads "I feel comfortable using computer in my classroom" which received a mean of 3.98. A possible explanation for this might be that Science teachers are familiar using computer so they are confident using computers during teaching in class. Computer literacy among the teachers is also important in determining the use of e-book in classrooms. In studies by Afshari, Kamariah, Wong, Bahaman & Foo, 2009), and Knezek and Christensen (2000), educators with higher levels of skill, knowledge, and tools would exhibit higher levels of technology integration in the classroom. It was followed by the second highest scoring, item 10 that reads that" I often integrate computer knowledge in my teaching activities". Based on the finding (Question 4, Section B of questionnaire), most respondents use e-book for teaching and learning purpose and it is used less than once a week. A study by Bauer and Kenton (2005) supported the finding, showing that even if the teachers were educated and skilled with technology, were innovative and adept at overcoming obstacles, they did not integrate technology on a consistent basis as both a teaching and learning tool. However, these findings do not encourage the research question to identify the level of teacher's computer knowledge in the use of e-book in teaching. The researcher identified that the teachers have good computer knowledge but because of some factors, they

could not apply it in classrooms.

Table 13: Respondent's Computer Knowledge

No.	Items	Mean	SD
8	I feel comfortable using computer in my classroom.	3.98	0.70
9	I am very proficient in using a wide variety of applications in my classroom.	3.48	0.80
10	I often integrate computer knowledge in my teaching activities.	3.60	0.68
7	I have attempted to use computer in my classroom but I still require help on a regular basis.	3.21	1.05
6	I have no experience with computer.	2.00	1.26

CONCLUSION

From this study, it is clear that the awareness of Science teachers in using e-book for teaching and learning is low. More study should be done in all districts in Selangor to know exactly the teacher's perceptions on using e-book in Science. Besides that, an advance research about the level of awareness using e-book among teachers in school also can be done purposely. The awareness of using e-book can be compared between teachers from urban schools and teachers from rural schools. Based on this study, it can be found that teachers' attitude plays a role in having the e-book implemented in schools. Another further study can be done by investigating the factors that affect the teachers' attitude in using e-book for teaching and learning process.

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The Importance of ICT in English Learning: Indigenous Students' Perspectives

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Abstract: The increasing dependence of people on technology nowadays is evident through the transformation of various sectors, placing ICT as an enabler in enhancing human capabilities and participations as a member of society. Policymakers and educators agreed that ICT is a supreme factor in leveraging positive effects on the students' achievements at large. Although myriad of studies have focused on ICT integration in education of students from the rural communities, the ICT issues among indigenous students have been sidelined. This study intended to address this gap by focusing on the views of indigenous students on the importance of ICT in learning English. A total of 94 Indigenous students from three districts in Pahang, Malaysia were involved in this study. A quantitative approach was employed where questionnaires were used as instruments to gauge the participants' views. The findings revealed that the indigenous students have low ICT competence but have positive attitude in the use of ICT in teaching and learning. The level of ICT use in classroom was found to be low and, surprisingly, most of them preferred to have Internet-related activities in learning English.

Keywords: *ICT, Teaching and Learning, Indigenous students, Learning English*

INTRODUCTION

The advancement of the technology has profoundly altered lives of people as the world progresses into technologically more sophisticated age. The expanding network known widely as the Internet, has tremendously improved communication and enabled retrieval of information with ease. Acquisition of knowledge and means of communication seem to be effortless with more advanced technology available. This has led to creation of the term Information and Communication Technology (ICT) to describe the closely intertwined relationship of technology, communication and technology. A good example of this is the smart phones and tablet computers, to cater to the increasing dependence of people on ICT.

The proliferation of ICT in the digital age has also transformed the educational field in myriad of ways; among others are the setting, the teaching and learning process and the teaching aids used in classrooms. ICT also provides vast opportunities for learners to expand themselves. According to UNESCO (2004), ICT enables the access to vast stores of knowledge beyond the school that includes the multimedia tools (Anderson, 2005). When everything is ICT related, it is irrelevant to continue educating students in the traditional environment. As stated by Bingimlas (2009), traditional educational environment is insufficient to make learners to be productive in today's workplace. The current society requires competent workers who are technologically literate and able to utilize technology for optimum productivity. ICT is also recognized as an enabler for more effective learning as it gives fast and accurate feedback to students by speeding up computations and graphing. Hence, students have more opportunity to focus on strategies and interpretation. In addition to that, a study by Look (2005) revealed from a review of 219 studies on the use of technology in education found that the students who experienced technologically rich environment recorded positive effects on their achievements in all subject areas.

As ICT integration could provide students with more benefits, it is seen as vital for schools and institutions to provide the best ICT integrated education to their students. It is not a surprise anymore when ICT could actually improve students' performance and boost their achievements.

INDIGENIOUS PEOPLE

Indigenous people are also known as the aborigines. They are approximately 370 million of this population worldwide, living in 90 countries and with a majority of them (70%) residing in Asia (Cultural Survival, 2012). Indigenous populations are communities that live within, or are attached to, geographically distinct traditional habitats or ancestral territories, and who identify themselves as being part of a distinct cultural group, descended from groups present in the area before modern states were created and current borders defined.

They generally maintain cultural and social identities, separate from the mainstream or the dominant society and culture (World Health Organization, 2012).

In Malaysia, the indigenous people are referred as Orang Asli-a term given to the aboriginal people of Peninsular Malaysia. According to the Aboriginal Peoples Act 1954 (2006), an aborigine is:

i. any person whose male parent is or was, a member of an aboriginal ethnic group, who speaks an aboriginal language and habitually follows an aboriginal way of life and aboriginal customs and beliefs, and includes a descendant through males of such persons;
ii. any person of any race adopted when an infant by an aborigine who has been brought up as an aborigine, habituallyspeaks an aboriginal language, habitually follows an aboriginal way of life and aboriginal customs and beliefs and is a member of an aboriginal community; or
iii. the child of any union between an aboriginal female and a male of another race, provided that the child habitually speaks an aboriginal language, habitually follows an aboriginal way of life and aboriginal customs and beliefs and remains a member of an aboriginal community.

According to the Department of Statistics Malaysia (2010), 76.9% of the Indigenous population still live below the poverty line while 35.2% is said to live in hard-core poverty compared to 1.4% nationally. During the English

colonization era, through the Aboriginal People Ordinance 1954, indigenous people were excluded from development with the excuse of forbidding exploitation and retaining their traditional lifestyle. This however led to the underdevelopment of indigenous people population. They were forced to live in the traditional way and stay away from development. However, the independence of Malaysia in 1957 resulted in providing more attention and consideration on the needs and rights of indigenous people population. A department was set up to cater to any issues pertaining to the aborigines in Malaysia, with the responsibility of managing the development and welfare of Indigenous people. The department is known as Jabatan Kemajuan Orang Asli (JKOA).

According to Jabatan Kemajuan Orang Asli (2011), the indigenous people population has increased from 141,230 in 2006 to 178,197 in 2010. However, they are still the minority who made up only 0.7% of the country's population. There are three main groups of indigenous people known as Senoi, Negritos and Traditional Malay/ Proto- Malay. Of these three groups, Negrito made up the smallest population followed by Traditional Malay/ Proto Malay. According to the information from JAKOA, Senoi group favours uphill areas and builds big huts occupied by several families. The majority of the Traditional Malay/ Proto- Malay groups live in the Southern part of Peninsular Malaysia while the Negrito population lives in the remote area and practices the nomad life style.

Table 1. Indigenous population according to states

State	Negrito	Senoi	Traditional Malay / Proto Malay	Total
Pahang	925	29,439	37,142	67,506
Perak	2413	50,281	605	53,299
Kedah	251	19	0	270
Selangor	3	5073	12,511	17,587
Kelantan	1381	12,047	29	13,457
Terengganu	34	818	41	893
Negeri Sembilan	0	96	10,435	10,531
Melaka	1	28	1486	1515
Johor	1	55	13,083	13,139
Total	5009	97,856	75,332	178,197

The majority of indigenous people community live in the rural areas. Poverty has always been associated with this community, leading to limited access to facilities and development which includes opportunities to education.

2.1 ICT and aborigines elsewhere

Literature has reported few models that were carried out and was found to reinforce the knowledge by the indigenous people. In a study involving 19 schools serving indigenous pupils of United States, it was found that the use of ICT in the "4 Directions Project" fostered networking among the pupils with the immediate people from their social circle, a strong school-community and school-home focus as well as encouraging aborogines' life-long learning through the technological support provided (Resta, 2011). A similar effort of integrating ICT can also be seen in Thailand in a project called "Thailand Indigenous Knowledge Initiative" where a policy of making indigenous children have more culturally responsive learning oppoturnities was introduced (Kaewdang, 2000). It was believed that by doing so, the indigenous peoples in their countries can fully participate in knowledge societies. From the scarce literature, it infer that the indigenious people worldwide has rather high acceptance to using ICT and are gradually moving towards favourable adoption of ICT to improve the well-being of their people and their knowledge. However, there is a need for a study to further look into this in the local context.

PROBLEM STATEMENT

The emerging trend of ICT in education has leveraged the education in Malaysia. As ICT is important and crucial in the development of knowledge-based society, its integration has been placed as one of the objectives of Malaysian education. However, digital divide has inhabited the initiatives of Ministry of Education (MOE) to expand the digital literacy to all. Anderson (2005) has highlighted the definition of "digital divide" as a gap between those who have ample access to ICT and those who lack such accessibility. Although it is understood that ICT improves teaching and learning process, it is vital to look at the use of ICT among indigenous students. The majority of

indigenous people live in rural areas with limited access to ICT. The digital gap may be wider as many of them could not benefit from the integration of ICT in education. While other students could experience the use of ICT in their teaching and learning process, indigenous students might not have the equal chance to experience it.

The current study intends to explore this problem, focusing on the learning of the English language. Specifically, this study investigates the level of ICT competency of indigenous students, the differences of ICT competency that may exist between male and female indigenous students, the level of ICT usage in English classroom, as well as the perceived importance of ICT in English learning among the indigenous students.

RESEARCH QUESTIONS

The research questions are:

i. What is the level of ICT competency among the indigenous students?
ii. What are the attitudes of indigenous students towards ICT?
iii. What is the level of ICT integration in English classroom?
iv. How do indigenous students perceive the importance of ICT in learning English?

RESEARCH DESIGN

A quantitative approach was employed in this study. Questionnaires were used in order to obtain information on the ICT competency, gender differences in ICT competency, attitudes towards ICT, level of ICT integration in English classroom and their views on the importance of ICT in education. The participants for this study were the indigenous students in secondary schools in Pahang. 94 Indigenous students ranging from form two until form five from three districts in Pahang were selected to participate in this study. Table 2 shows the distribution of the respondents according to their gender and age.

Table 2. Distribution of Respondents by Gender and Age

Gender		
Male	30	33
Female	63	67
Age		
12 - 14	24	26.6
15 – 17	69	73.4
Total	93	100.0

RESULTS AND DISCUSSION

6.1 Level of ICT competency of Indigenous Students

It was found that most of the respondents have computer access at home, as shown in Table 3.While for the Internet access, as shown in Table 4, more than 90% of the respondents do not have internet access at home. Access to computer and the internet is seen as an enabler that will help to increase the competence level in ICT among the students. With the adequate infrastructure such as computer and the internet, the students could have the experience of utilizing them and, indirectly, this helps to improve their ICT competence. This is supported by Luu& Freeman (2011) who claim that students with ICT access at home will have more ICT experience. This is similar to the finding of a study by Zuhariet al. (2009) on rural community college students. Their finding reveals similarity with the present study where internet accessibility and computer experience are related to the students' computer competence.

Table 3. Statistic of respondents' Computer Access at Home

Access to computer	Frequency (n)	Percentage (%)
Yes	56	59.6%
No	37	39.4%
Total	93	100%

Table 4. Statistic of Internet Access at Home

Access to Internet	Frequency (n)	Percentage (%)
Yes	3	3.2%
No	90	96.8%
Total	93	100%

It can also be found that most of the respondents are in the low category of ICT competency. Among the four skills listed, the indigenous students seem to be most competent in general computing skills. The lowest mean value goes to email application skill. It indicates that the indigenous students perceive email application skill as the hardest compared to the other skills. The highest mean value is for playing computer game. This shows that the indigenous students rated themselves highly in playing computer games. This is not surprising as playing computer games is interesting and may attract the students' attention. They are more likely to be motivated in using computer for games. It is also visible from the findings that installing software is perceived as the hardest skill to perform by the indigenous students. Installing software requires users to understand the instructions and procedures. This might be hard for the indigenous students as they have limited English proficiency and all the instructions and procedures provided are in English. To further elaborate on the email application skill, it was also found that the indigenous students are more competent in creating emails than adding attachments to emails. The students are taught how to create and send emails at schools, thus, they were confident in rating themselves as competent in creating emails. The ability to add attachments to emails may be harder for them as the process is quite complicated when especially users have limited computer knowledge and limited English proficiency. This is supported by Teck & Lai (2011) who stated that English proficiency affects ICT competence. This proves that in order to have better skills in ICT, one must have sufficient knowledge in the English language. This is due to the fact that English is the language used in most ICT tools.

6.2 Indigenous Students' Attitudes Towards ICT

It can also be found that the indigenous students have positive attitudes toward ICT. This finding contradicts Musa et al. (2014) report, which claimed that negative attitudes in ICT are always the norm among people in rural areas. As most of the indigenous communities reside in rural areas, they are expected to have negative attitudes towards ICT. However, this study found that the indigenous students are positive towards ICT. The finding of the present study, however, is similar with the one reported by Tengku Faekah (2005). TengkuFaekah (2005) found that the students in rural areas have positive attitudes toward ICT but have low level of ICT skills. In the present study, the indigenous students have positive attitudes toward ICT despite their low ICT competency.

The findings are further elaborated on ICT attitudes according to the computer and internet accessibility. It can also be found that more positive attitudes were exhibited by the students who have access to computer with internet. Accessibility to computer with the internet means that the students are exposed more likely to the way to using them. Thus, it helps to cultivate positive attitude towards it. The same notion was echoed byAfshari et al. (2009), mentioning "positive attitudes are developed when users are sufficiently comfortable with technology and are knowledgeable on its use".

6.3 ICT Integration in English Classroom

The third research question of this study focuses on the level of ICT usage in English classrooms. Four ICT-related activities were highlighted in the questionnaire and the respondents were asked to rate the frequency of use for each activity in their English classroom. Based on Table 5, it can be found that most of the respondents had never experienced all the ICT-related activities highlighted in their English classroom.

Table 5. Integration of ICT in classroom

Theme	Frequency (n)	Percentage (%)
Limited use of ICT in classroom	9	9.6
No ICT integration at all	46	48.9
ICT is so confusing	5	5.3
ICT is fun	8	8.5
Given access to computer during the lesson	21	22.3
Teacher help to use ICT	7	7.4

The findings indicate that teachers did not fully integrate ICT in the teaching and learning of English. Teaching may still be conducted according to the traditional method. Teachers might face barriers in integrating

ICT in their English lessons. The barriers can be classified into two levels - teacher-level barrier and school-level barrier. As for the teacher-level barrier, the barriers include lack of time, lack of confidence and resistance to changes. School-level barrier, on the other hand, encompasses the lack of effective training and shortage of resources. A study by Goktas et al. (2009) found that crowded classrooms, inadequate ICT-related courses, lack of computers, and lack of teachers' motivation to be among the factors that had impeded the ICT integration in class. The finding of that study might be relevant to this study. Teachers might not fully integrate ICT as they have limited ICT infrastructure and the condition of the classroom might not permit the utilization of ICT. From the observation of the researcher when conducting the research, most of the classrooms in the schools involved were not large enough to cater to the big number of students. This situation might hinder the utilization of ICT as the teachers need to focus more on classroom management. When the teachers teaching in the classrooms that are not equipped with computers need to apply ICT, they always ask the students to go to the computer laboratory.

Limited use of ICT in the classroom means limited experience and exposure to ICT for the students. When students are not exposed to ICT and the benefits of using it, they will not see the benefits and

goodness of the technology. Noiwan et al. (2005) reported that students who are confident in using computers and understand the benefits of the computer have better attitudes and tend to use computers more if compared with their counterparts who do not share the same perception. This indicates that the level of ICT usage in classrooms will affect students' perceived usefulness of ICT.

6.4 Perceived Importance of ICT in Learning English

In finding the views of the indigenous students on the importance of ICT in learning English, five open- ended questions were formulated. Responses from these questions were used to determine the indigenous students' perceived importance of ICT in learning English and were then triangulated with the findings from the previous research questions.

Most of the indigenous students agreed that ICT helps them in learning English. This indicates that the indigenous students are aware of the advantages of ICT in education. This is due to the exposure to ICT they received in school. They know the importance of the internet today, thus, it is not surprising if they hold positive perceptions on ICT's role in enhancing their English learning. This was found when the researcher asked the students if they knew what the internet was. Almost all stated that they knew what the internet was and they knew what Facebook was.

In order to further explore the students' views on the importance of ICT, they were asked how ICT could help them. The responses from this question reflected the indigenous students' knowledge of ICT. To answer this question, they need to know what ICT is and what ICT can do. Based on the results, most of the students agreed that ICT could help them to seek information. The internet is abundant with overwhelming information. Thus, the use of it in class helps the students in their learning process. Zuhari et al. (2009) echoed that ICT offers a lot of resources and information. The internet provides students with fun activities as "websites are full of animations, colours, sounds, pictures, interactive forms and digital video clips; promoting students' motivation and helping them enjoy the learning process"

(Gitsaki& Taylor, 1999).

Table 6. How ICT Help in Learning English

Theme	Frequency (n)	Percentage (%)
Easy to understand	23	24.5
Seek Information	64	68.1
Guidance	7	7.4

Most of the students are not satisfied with the level of ICT integration in their English classroom. This happens as there is no ICT element at all in their English classroom. This feeling of dissatisfaction from the students implies that they yearn for ICT usage in their teaching and learning process. The use of traditional method in teaching may not be suitable anymore. However, most of the students have positive views on their current English learning. They felt that their English learning process is interesting, satisfying and very good. When the researcher asked to provide reasons for their responses, it is however quite surprising that most of the students chose to give no opinions on this matter. From observation, the students might not feel secure to state their reasons. This might be attributed to the presence of a teacher who helped the researcher in conducting the survey. However, from the reasons stated by the students, 24.5 % agreed that they had funny and helpful teachers. This reason contributes to the positive views on their English language learning.

Almost all of the indigenous students hold the belief that ICT means computer and the internet. Thus, when asked on their preferred ICT-related activities to be conducted in their English class, the majority mentioned the use of the internet. This is related to the second question asked to the respondents previously. As mentioned by the indigenous students, they felt that ICT could help them seek information. This is also depicted in the second highest preference for ICT-related activities where the students want to be given access to computer to find information. When students are given access to the internet, they can enhance their higher order thinking skill (Singhal, 1997). This can be achieved when students search information on the internet and evaluate the usefulness or the authenticity of the information on their

own.

The responses from the open-ended questions reveal that the indigenous students do perceive ICT as important in learning English. This finding supports the findings on ICT competence and ICT attitudes of the indigenous students. As indicated in the previous sections, Orang Asli students have low ICT competence. As they are not exposed to the use of ICT in school, they have limited ICT competence. Most of the indigenous students come from rural areas. They have limited access to basic infrastructure such as electricity. They also do not have the internet coverage at their residential area. Even when they are given the 1Malaysia netbook, they cannot fully utilize it due to the limited access to electricity and the internet. The indigenous students are provided hostel facility but most of them stay in hostel during weekdays. Hence, they are not allowed to use electrical appliance in their hostel. Thus, the situations limit them from fully utilizing the netbook.

The indigenous students possess positive attitudes toward ICT. This supports their view on the importance of ICT in learning English. Their positive attitudes affect how they view ICT. According to Afshari et al. (2009), an important factor in computer implementation is the users' acceptance and the acceptance is influenced by their attitudes. When the students have positive attitude towards ICT, they will accept its diffusion and able to see the benefits that stems from it. Thus, it is acceptable to say that the indigenous students surveyed have defied the odds by not only having positive views about ICT but also by being ready to embrace modernization that ICT brings. In the context of education, the indigenous students are also receptive to the digital transformation in teaching and learning.

CONCLUSION

This study has successfully shed light on competency of ICT, ICT attitude and the perceived importance of ICT in English learning among the indigenous students.The findings revealed that the indigenous students posses low ICT competency despite their positive attitudes to it. The present study provides a platform for a better understanding of the inadequate skills of the indigenous students who are often marginalised. The Ministry of Education, various stakeholders and educators should place more priority to ensure better use of ICT among the indigenous students and to ensure that they receive equal opportunities for quality education. Although the indigenous people are minority in Malaysia, their rights to equal education must not be denied. It is important to note from this study that the indigenous students already have the right attitude towards ICT, inferring that ample supports and efforts in improving their ICT competence could bring major success in learning. It is also important to note that the indigenous students have limited internet access leading to the lack of knowledge in ICT among them. This is further exacerbated by low ICT integration in their English lessons. As ICT has been proven to help ESL learners, initiatives in enhancing the utilization of ICT in English classes should be further strengthened.

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Learning Styles Via Interactive Digital Media: Malaysia History

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ABSTRACT: Interactive digital media refer to a product or service on the digital computer-based system, which responds to the user's action by presenting content inclusive of text, moving images, animations, and audio. This study aims to assess learner's perceptions and the feasibility of implementing interactive digital media (Malaysian History) and a guideline of designing interactive digital media to learning styles based on the Visual, Aural, Read or Write and Kinesthetic (VARK) model. This is a quantitative study which uses survey as a research design by distributing questionnaires to a total of 71 high school students residing in Kedah Darul Aman, Malaysia. Findings revealed that using interactive digital media in learning history is a significant digital tool in today's digital era, both in content and mechanics due to digital inclusion factor. This study justifies how digital and media research in the education landscape affects the learning styles and consequently instill interest in offering a deeper and more immersive learning experience. The discussion provided in this study adds on to the discussion of the current education and digital platform research to remain relevant in the era of rapid change and the era of the Industrial Revolution 4.0.

Keywords: *Malaysia history, interactive digital media learning, digital literacy, VARK model*

INTRODUCTION

The national education transformational stipulated in the Malaysia Education Blueprint 2013 - 2025 (Preschool to Post-Secondary Education) in shift 7 in relation to the leverage ICT, the quality of learning in Malaysia should be at the highest quality. Regardless of the geographical issues and students skill level, this inspiration stresses on maximizing the usage of ICT in encouraging self-paced learning and distance learning with high-quality teaching (Ministry of Education Malaysia, 2013). According to the Ministry of Education Malaysia (2013), learning in the 21st century is defined as a learning process that focuses on a student-centered approach based on elements of communication, collaboration, critical thinking, creativity, and values and ethical applications. Hence, this study is conducted to achieve a few objectives. The Ministry of Education Malaysia also introduced Elemen Merentas Kurikulum (EMK) which is an added value to teaching and learning . One of the elements from EMK is information technology and communication which requires creative interactive teaching materials to enhance the quality of learning process. However, the integration of technology should be appropriate and in line with the subject to maximize student's full comprehension towards the subject.

Based on the issues mentioned, the main objective of this study is to assess learner's perceptions and the feasibility of implementing interactive digital media for Malaysia History subject based on the learning styles of the students. The interactive digital media is proposed as a method to instill interest and make learning history more interactive and exciting among the 21st century learners today. This interactive digital media also aims to offer the community a deeper and more immersive learning experience since the moral value of the story plays a role in shaping the society and the future actions. This interactive digital media also adapts and utilizes the technology in today's digital age inline with the Malaysia's mission and vision. This study will also discuss the implementation of using VARK model as an effective learning style in generating the interactive digital media (Malaysia History).

1.1. Learning Style Using Interactive Digital Media

As stated by Honey & Mumford (1992), learning style is defined

as a way of acquiring information or knowledge where it is used as a learning strategy of technique to give knowledge to learners. Interactive digital media are a combination of electronic text, graphics, moving images, and sound, that has been integrated into a structured digital computerized environment that allows people to interact with the data. There are three characteristics involved with interactive digital media which are interactive multimedia content, networked interactivity and digital convergence based on underlying communication and technology concept (Jayanthi, 2016). Interactive multimedia content requires participants active engagement whereby the content needs to be simple for readability. Besides, the network interactivity is associated with those message qualities which invite people and make people gravitate to group learning. For digital convergence, it is based on digital technologies and digitized content which encompasses converged devices, converged applications and converged networks. Basically, all of the three characteristics are interconnected and useful in developing an interactive digital media.

1.2 An Overview of History Education in Malaysia

Learning history is fundamental since it offers a storehouse of information about a particular place, event, culture or even about prominent figures. History education has been taught in the Malaysian education system for more than six decades. Policies have changed from time to time , and the subject syllabus has been improvised (Lee Bih Ni, 2013). History is a fundamental subject for secondary schools learners. Starting from the year 2013, the history subject was enacted as one of the compulsory subjects and the students are required to achieve the passing mark to obtain Sijil Pelajaran Malaysia (SPM). SPM is a national examination which is taken by all form five secondary school students in Malaysia. Definitely, the history education is essential, as the subject allows us to understand the past, present and how to mold the future. Other than shaping patriotism among the students, it provides us with insights into our cultures of origin and a platform to understand the country, and the world.

In the year of digital technologies, educators (teachers) need to digitize their teaching materials instead of using the traditional textbooks.

According to Hazri Jamil (2003), learning history in school is less challenging for students' minds and intellectual development and learning by memorization also does not encourage students' analytical and critical thinking. This is also supported by Abdul Razaq (2009) as he mentioned that teachers are still using the traditional methods in delivering lessons in class probably due to the lack of expertise in implementing the latest digital tools. The one-way interaction and the memorizing technique such as "Chalk and talk" of facts only contributes the subject to be "the dead man curriculum". In the eleventh shift of Malaysian Education Blueprint 2013-2025, it is also mentioned to scale up the quality of learning which is leveraging on ICT in order to thrive the fourth industrial revolution IR4.0 (Star Online 2019). Therefore, the implementation of interactive digital media as an alternative method in learning history subject is a requirement in today's digital learning environment and definitely relevant for the IR4.0.

THEORETICAL BACKGROUND : VARK (VISUAL, AURAL, READING OR WRITE AND KINESTHETIC) MODEL

VARK (Visual, Aural, Reading or Write and Kinesthetic) Model was launched by Neil Flaming in 1987. This VARK model introduces four (4) primary types of learners : visual, auditory, and kinesthetic. Each learner learns and gasps the lesson in different ways. According to Muniandy et al (2016), visual learners learn the best ways by seeing pictures, posters, movies, and images. To understand the message conveyed to them, they use to take notes and observe their teachers' gestures. Different for auditory learners where they gain their knowledge by obtaining the information via listening especially with discussion or role-play activities whereas read and write learner kinesthetic learners are movement-oriented where they prefer enjoying physical action and touch-oriented. All of the learning styles explained, have been interpreted into one model which is the VARK model. Based on Virleen (2010), the characteristic of VARK learning style model can be used in developing a multimedia course such as interactive digital media. Hence, this VARK model is the framework and guideline for the development of the interactive digital media proposed. Table 1 below explains the learner styles, learning process and the focus of each learner.

Learner style Learning process Focus Visual Learner The design interface and storyline of the interactive digital media will be created as a method in learning history subjects.Color, design interface and layout, buttons and character design

Auditory Learner The uses of narrative voice in explaining the information for the interactive digital media Narrative voice for information and story of warrior with discussion

Reading Learner An observation will be used during pre test to see if there is read / write learner Student that taking notes, text and reading

Kinesthetic Learner To see there are kinesthetic learners, the use of the tablet as a sense, a flashcard/games or hand- on activities will be applied during the pre test research Use of the senses by using a tablet to overview the interactive digital media. Flashcard / games as medium to test either they were kinesthetic learners

Learner style	Learning process	Focus
Visual Learner	The design interface and storyline of the interactive digital media will be created as a method in learning history subjects.	Color, design interface and layout, buttons and character design
Auditory Learner	The uses of narrative voice in explaining the information for the interactive digital media	Narrative voice for information and story of warrior with discussion
Reading Learner	An observation will be used during pre test to see if there is read / write learner	Student that taking notes, text and reading
Kinesthetic Learner	To see there are kinesthetic learners, the use of the tablet as a sense, a flashcard/games or hand-on activities will be applied during the pre test research	Use of the senses by using a tablet to overview the interactive digital media. Flashcard / games as medium to test either they were kinesthetic learners

Table 1 : The guideline of designing the interactive digital media based on VARK Model for the learning process

As the model relates closely to learning styles, it is important to identify an individual's interaction and response towards the learning environment (Duff, 2000). According to Duff (2000), there are three dimensions involved in determining the learning style of an individual ; cognitive composite, affective and psychological.

a) Cognitive

The cognitive refers to a variety of mental processes that includes attention, perception, memory, reasoning, etc. Based on Piaget's stages of cognitive development years of 12 and above are more likely is on formal operational where the hypothetical events/ situations from abstract reasoning.

b) Affective

For affective side, it's focusing on personal goals where it emphasizes the motivation to learn in how they view the learning environments.Also featuring with awareness, emotion, incentive, curiosity, boredom, concern and frustration.

c) Physiological

Related to the most directly into classroom design and learning environments are environmental, educational, human factors (engineering), and social psychology. It placing the most importance for course content will up chances that capture people's attention.

METHODOLOGY

This study uses the survey method as the main methodology. The questionnaire acts as the research instrument for data acquisition through sampling which was randomly selected to represent today's digital learners. The questionnaire is constructed based on the VARK model. A total of 71 students from secondary schools in Kedah, Malaysia were involved in this study. The questionnaire is conducted via Google Form with the aim of

providing insights into their interests and opinions for interactive digital media as an alternative method in learning.

FINDINGS & DISCUSSION

The data obtained from the questionnaire is analyzed using descriptive statistics which provides descriptive coefficients that summarize all the data collected. Descriptive statistics measures the variability of data. In this section, the study presents three types of results. Firstly, the researcher presented a descriptive analysis of the distribution of 71 questionnaires using google form to give an overview on the pattern of demographic characteristics of respondents. Secondly, the researcher provided insight of respondent's preference on history subject as well provided with the reasons of unfavorable of the subject. Lastly, the information about the exposure and usage of devices of assessing the information.

5.1 Demographic characteristics

Demographic data in Table 2 shows that the majority of respondents engaged in this study are female (91.5%) as compared to male respondents (8.5%) and most of them are in the age group of 16 - 21 years old (77.5%). However, the respondents are mostly from secondary institution (74.6%).

Item	Frequency	Percentage (%)
Gender		
Male	6	8.5%
Female	65	91.5%
Age Group		
12 - 15 years old	16	22.5
16 - 21 years old	55	77.5
Institution		
Secondary School	53	74.6
IPTA/IPTS	18	25.4

Table 2: Demographic characteristics

5.2 History Subject

Figure 1 shows the respondent's interest towards the Malaysia History subject. From the figure below, it can be concluded that the interest towards the subject led by 1.4% only. Even the percentage difference is small, this study has indicated that the respondents are communicating that the subject learned in school due to few factors.

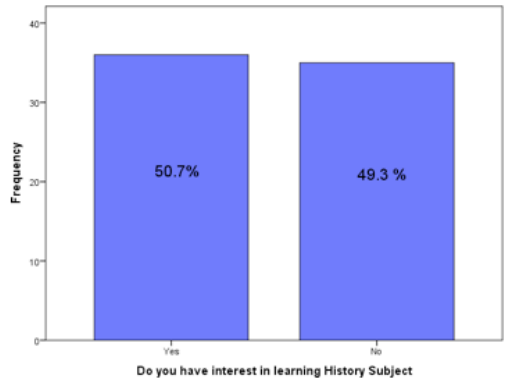

Figure 1: Interest towards History Subject

Based on Figure 2 below, there are seven factors that answers the reason why there is a lack of interest towards the subject. The respondents are allowed to provide multiple responses for this section. The highest percentage with a total of 38% stated that it is difficult to memorize the fact about history, and due to that, this is the main factor. This is followed by too much text used in learning (28.1%) this subject. While the remaining of the reasons contributed less that 20% responses in this question.

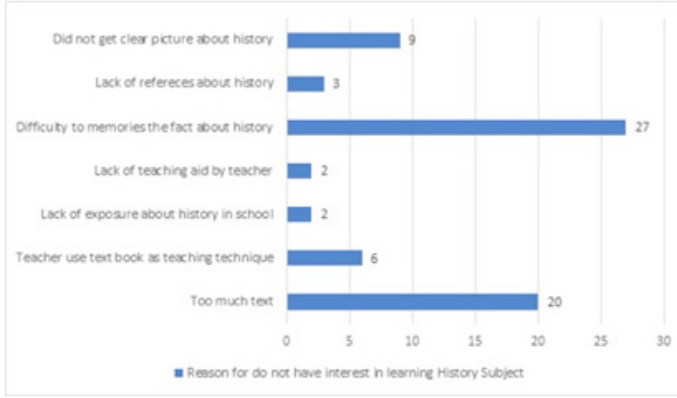

Figure 2: Factors of no interest in History Subject

The majority, or 75.0% of the respondents, reported that textbook is the main teaching technique used by their teachers in teaching this subject, followed by slide presentations (36.6%). While additional notes are reported the least teaching technique of the subject.

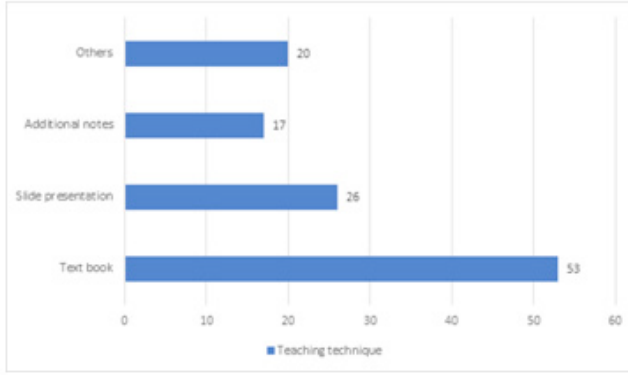

Figure 3: Teaching technique for History Subject

5.3 Exposure and frequency usage of devices

Based on the findings, majority of the respondents owned a device. A total of 80% of the respondents owned a computer or a laptop and less than 40% of the respondents reported owned an iPad/tablet.

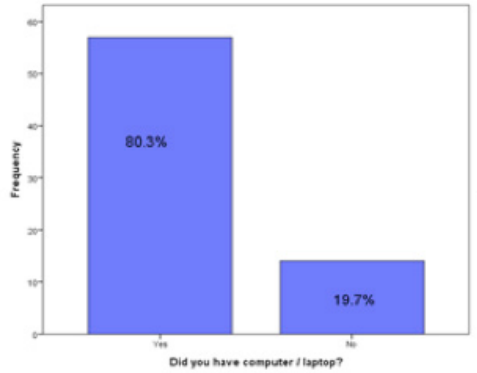

Figure 4: Frequency Usage of Device (computer/laptop)

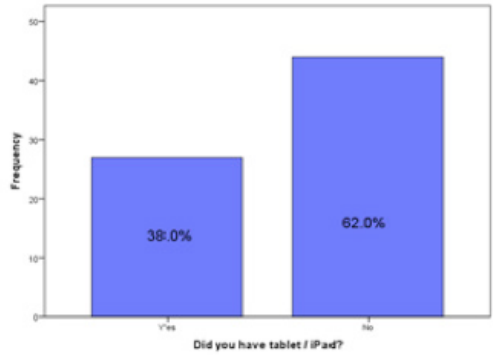

Figure 5: Frequency Usage of Device (Tablet/iPad)

As referred to the graph below, the majority of the respondents spend their time at least two to five hours per day in using computer or laptop in accessing information. Meanwhile, those who access information using a tablet or iPad reported the highest usage less than one hour.

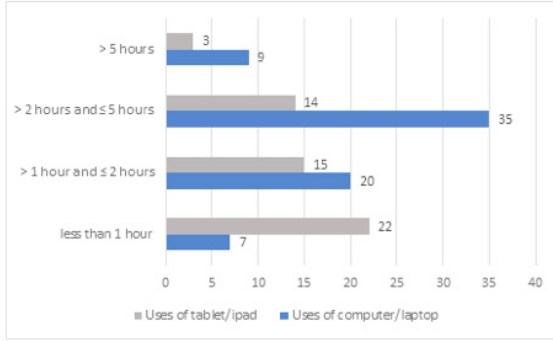

Figure 6: Time Consumption of Device Usage

5.4 Awareness of interactive learning

From the figure below, the majority of the respondents stated that their awareness regarding this particular interactive medium is just average, probably due to the lack of exposure of this medium in school. However, even the exposure is minimum, their interest and intention towards this interactive digital medium is high.

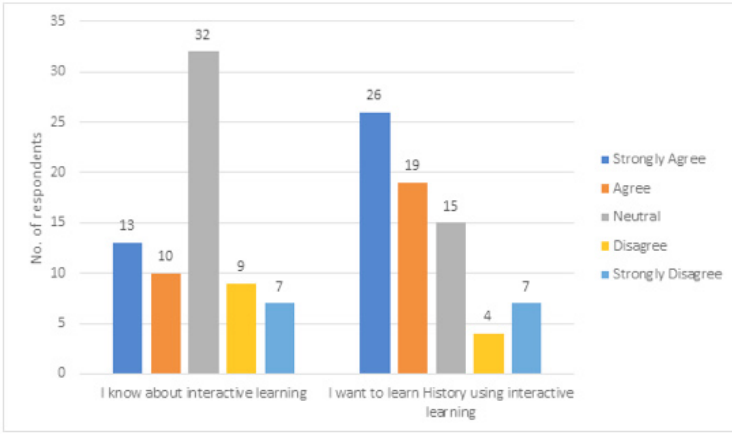

Figure 7: Awareness of interactive learning

CONCLUSION

This study has justified that educators should play a significant role in ascertaining the implementations of quality lessons, specifically in maximizing the usage of technology. The learners today look forward towards interactive and interesting lessons, and depends on technology to provide them with a creative learning process to stimulate interest in learning Malaysia history. The study also has proven that students are digital learners, and they utilize technology in their daily lives. In a media-driven world today, the use of the Integration of Information and Communication Technology (ICT) has been expanded and has a positive impact in life. The impact of technology has influenced the education system since various techniques and teaching styles need to be adapted to the latest development of the country. History has been indicated as a priority subject among most of the subject in Malaysian schools where The Deputy Prime Minister in 2013, Tan Sri Muhyiddn Yassin, stated that history has become a compulsory subject for Malaysian high school students starting from 2013 due to the decreased percentage of satisfactory results and interest. Empirical research justifies how technology plays an important role in increasing an individual's literacy (Potter 2010). Also, technology enhances the motivation, achievement, problem-solving skills of a student as well as fosters student-teacher and peer interaction which in turn will result in meaning teaching-learning process in the classroom (Mitchell 2003). Hence, this study justifies there is a significant relationship between secondary school students and interactive digital media towards the Malaysia history subject due to digital inclusion factor.

ACKNOWLEDGEMENT

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Ameliorate the shortcoming: A quantitative inquiry on How Engineering Educator Can Improve Students Self-Learning trough MOOC

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Abstract: With regards to the ninth shift in Malaysia Higher Education Blue Print 2015-2020 which is Global Online Learning, the Massive Open Online Courses (MOOC) initiation has become central attention to Higher Learning Institution (HLI) in innovating the teaching delivery. With training support given by the academic office, more than 300 courses are now offered in UiTM MOOC. The presented paper has applied flipped classroom approach combine with the use of MOOC in its course for three consecutive semesters. It is off interest to know now how well the designed MOOC for the course is helping the students in their learning and what is the suggested improvement base on the students' preference. From the factor analysis conducted using Rasch analysis, it is found that the students having no difficulties to agree on the educator's clarity of using the MOOC. However, their level of agreement differs when it comes to their perceptions on the use of MOOC. Hence, suggestion of improvement informed by students from the open-ended section of the survey were frame, based on corresponding students on the specific item related to MOOC. The results will serve as an evidence base for the engineering educator in the improvement of MOOC teaching practice.

Keywords: *Engineering Education, flipped classroom, MOOC, thermodynamics*

INTRODUCTION

With the advancement of technology nowadays, it's inevitable to embed online learning with teaching practice. If educators well equipped with specific training, teaching trough online learning platform does come in handy. Among other progressive steps taken by a higher learning institution (HLI) is Massive Open Online Learning (MOOC). In developing the MOOC content, the educator experiences a parallel process shift; learning to create the content and adjusting their delivery from physically present in the classroom to virtual existent. These processes could lead to educator shortcoming in ensuring the learner's acceptance. It's argued that with the supposed training support given by HLI's academic office such shortcoming can be addressed early. However, the process of creating MOOC content is strenuous especially to those educators who are not familiar with teaching and learning theory. Thus, this quantitative paper examines the specific shortcoming of MOOC content delivery informed by the learners and their suggested improvement that researcher deem as preference which could enhance educator's teaching delivery trough MOOC.

BACKGROUND OF STUDY

Thermodynamics is part of the fundamental subject in Mechanical Engineering programme. It is an unfavourable course to students as they perceive it as a tough subject with a record of high failure rate. This issue has been going on for years. From the observation and experience in teaching the course for students in diploma programme, it is found that students have difficulties in understanding the concept in Thermodynamics. The work of Balmer has highlighted this poor grasp of thermodynamics concept results from its jargon used in explaining the concepts derived from Greek words (Balmer & Spallholz, 2006). Even though the textbook used in teaching thermodynamics able to describe the Greek term into English, the set of students in this research context are non-native English speaker thus, it looks like two times of 'memorization' to understand the concept.

This unaddressed issue is then further, causing hitches for the students in solving the problems in Thermodynamics. On the other hand, for the educator to cater the difficulties in understanding the concepts at students'

pace is somewhat wearing. The face two face (F2F) contact hours allocated will be insufficient, pushing the educator to keep up with the content instead. It could at some point become tedious especially when there are four groups of class to teach for the semester. Thus, the teaching delivery method comes in question, how can it be improvised?

To overcome the two identified limitation namely the poor conceptual grasp among the students and the insufficient face two face class session, the flipped classroom approach has been implemented. It is an adoption from presented various published work (Lo, 2018; Nouri, 2016; Roehl, Reddy, & Shannon, 2013). The approach offers sufficient time for the educator to focus on students' capability of problem-solving during F2F class and allocate times for the students to grasp conceptual understanding trough content uploaded via MOOC platform; which in turn promotes students self-learning and fully utilize the students learning time (SLT) designated for the course. Since the approach employed has been going on for three consecutive semesters, it is of interest to gain the students insight on two things, their acceptance towards the flipping approach and the preference of content uploaded in the MOOC. However, this paper will only cover the findings on students' MOOC preference.

METHODOLOGY

3.1. Context of Study

The study was conducted for three consecutive semesters among second year Diploma in Mechanical Engineering students' who enrol in Thermodynamics course. The course is delivered over 14-week semester, covering six chapter. The first three chapter is on Thermodynamics concepts e.g. energy balance, First and Second Law of Thermodynamics, close and open system and type of working fluid. The remaining three is on the applied part of these concepts namely; Steam Power Plant (vapor power cycle), Gas Turbine Plant and Internal Combustion Engine (gas power cycle). However base on educators' past experience, it is observed that students having difficulties in distinguish between closed and open system, thus in the MOOC content, the topic are separated into two, one for '1st Law

Applied in Closed System' and the other is '1st Law Applied in Open System'. Hence making the overall content for MOOC consist of 8 topics.

3.2. Course delivery

The contact hours for this course are four hours per week, where three hours is spent for F2F class and remaining one hour is for self-learn via MOOC platform. The students will be assigned prior to class to watch the video uploaded in MOOC according to topics that they will solve in the next following F2F class. Since part of the motivation of this teaching approach is to shift the responsibility towards learning to the students thus, there is no specific monitoring system impose on them during their self-learn session. However, in order to get them to engaged in the learning process especially on the topics that contribute to high failure rate, the educator will ask them to list at least three questions from the watched video. It's either directly listed in the forum or comment section or sometimes they need to bring it into F2F class discussion. This in turn not only informed the educator the level of understanding as the students watch the video but it also indirectly monitored the used of their self-learning time. The flowchart in Fig. 1 summarizes the teaching delivery activity.

3.3. Instrument use

The registered Thermodynamics MOOC course is developed using UiTM MOOC platform. Students who sits for this course were asked to enrol on this Thermodynamics MOOC. Different kind of videos were uploaded, where some of the videos are shared directly from other YouTube user and some are produced by the educator using the Explain Everything (see fig.2) and Screencast-O-Matic applications. For all the videos made by the educator, only the voice of the educator and some interactive problem solutions are presented. For a quick assess on students understanding from the video they have watched, they were sometimes asked to answer quizzes made online using Socrative applications.

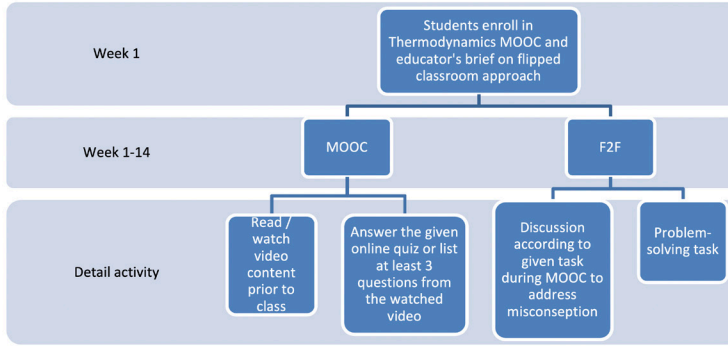

Fig. 1: Flowchart of Teaching delivery

In gathering the student's insight on the content delivered via MOOC, an online survey feedback was given to the students at the end of the semester. The survey questions are adapted from various study on flipped classroom (Love, Hodge, Grandgenett, & Swift, 2014; Ogden, 2015; Zainuddin & Attaran, 2016) and MOOC (Abeer & Miri, 2014; Hone & El Said, 2016; Yousef, Chatti, Schroeder, & Wosnitza, 2014). The 5-point Likert scale survey, ranging from strongly disagree to strongly agree consist of four sections which covers the students' demography, educator's clarity, students' perception and open-ended questions in acknowledging their preferences. However, in this study, only the item that related directly with MOOC simplified in table will be discuss further.

Table 1: Survey Item

Section 1	**Students' demography: Item 1 to 3**	
Section 2	Educator's clarity: Item 4 to 6	
	A1	Educator has stated clearly the outcome of each module.
	A2	The video on YouTube made by others, chose by educator on concept explanation are understandable.
	A3	The problem-solving example video made by educator is clear and understandable.
	A4	How much do you enjoy the power point lecture with the educator voice?
	A5	How much do you enjoy the blackboard/whiteboard style?
	A6	How much do you enjoy a lecture with physical presence of the lecturer? (In the tiny window frame at the corner of recorded video)
Section 3	Student's perception: Item 7 to 21	
	B1	The MOOC is more engaging than traditional classroom instructions.
	B3	The MOOC gives me greater opportunities to communicate with other friends.
	B12	MOOC helps me in practicing problem solving of thermodynamics problem.
	B13	I am more motivated to learn Thermodynamic problem solving in MOOC.
	B15	I feel I'm more motivated to study on my own after introducing with MOOC.
Section 4	Open ended questions: Item 22 to 26	
	C23	What are the disadvantages of the MOOC?
	C25	What improvements would you recommend improving learning in the MOOC?

RESULT

The survey conducted will gives latent trait of data in which can be measured using Rasch Model analysis. Items in section C as listed in Table 1 will tell us the students' level of acceptance and the hierarchy of endorsed item, based on tabulated Wright Map (Wright & Linacre, 1994). The quantitative results in examining the specific shortcoming will be support with the open-ended answers given in section 4 as means of suggested improvement.

The data gathered from the survey was analyse using Rasch analysis software (WINSTEPS) to evaluate the consistency of students' responses to each and every item on the survey(Smith, 2005). The result shows that the survey produce +.95 item reliability and +.75 person reliability, which according to Rating Scale Instrument Quality Criteria(Fisher, 2007) categorise the reliability of surveyed item as 'excellent' and surveyed population as 'satisfactory'. The person and item reliability are presented as follows;

Item Reliability

Table 2: Overall statistics of the 21 Items in the instrument

	Total score	Count	Measure	Model Error	Infit		Outfit	
					Mnsq	Zstd	Mnsq zstd	Zstd
Mean	248.7	66.0	.00	0.16	1.00	-0.1	1.01	-0.1
SD	31.4	.0	.75	0.01	0.35	2.0	0.40	2.2
Max	293.0	66.0	1.80	0.20	1.77	4.2	2.05	5.3
Min	165.0	66.0	1.26	0.14	0.55	-3.0	0.56	-3.0
Real RMSE 0.17				True SD .73	separation 4.21		Item reliability .95	
S.E. of Item MEAN = .17								

Person Reliability

Table 3:Overall statistics of the 66 students in the instrument

	Total score	Count	Measure	Model Error	Infit		Outfit	
					Mnsq	Zstd	Mnsq zstd	Zstd
Mean	**79.1**	21.0	1.02	0.29	1.09	-0.1	1.01	-.3
SD	8.2	.0	.68	0.3	0.77	2.1	0.66	2.0
Max	99.0	21.0	3.22	0.46	3.72	5.5	3.27	5.0
Min	59.0	21.0	-0.41	0.25	0.22	-3.9	0.22	-3.9
Real RMSE **0.34**				True SD .59	separation 1.72		Person reliability .75	
S.E. of Item MEAN = .08								

Wright Map

Further analysis on variable map or Wright Map was done to evaluate the students' level of acceptance and the hierarchy of endorsed item. Base on Table 2 and Table 3, the mean value measure for person and item is μPerson = 1.02 logit and μitem = 0.0 logit respectively which indicates the students are capable to answer all the 21 items. The Wright Map below provides better visualization on the capability and likelihood of individual students to endorse all the item in the survey.

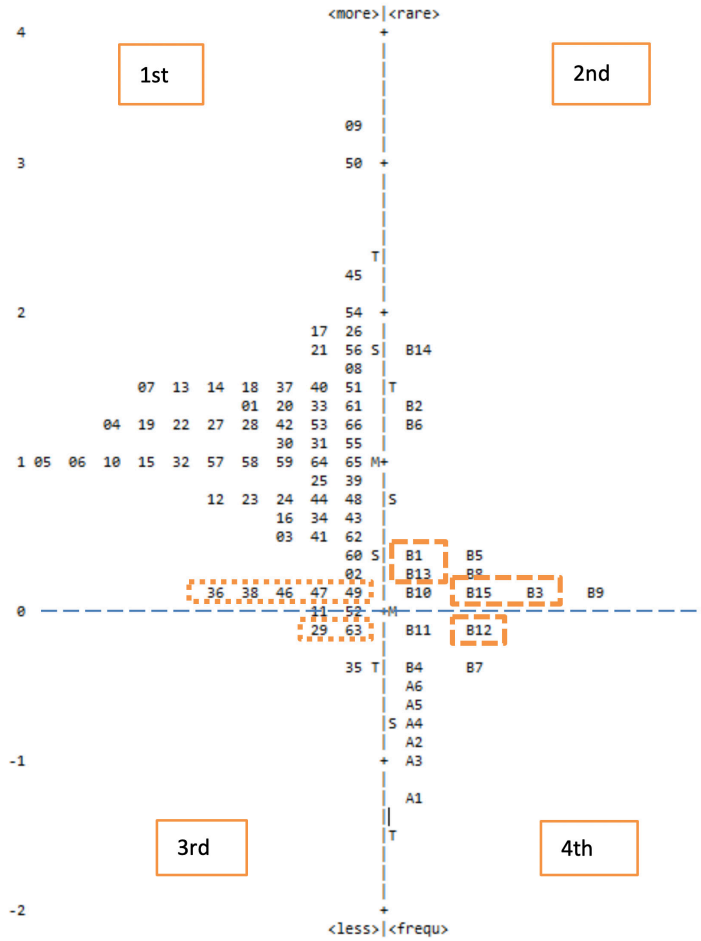

Fig.2: Wright's Map

For better explanation, the Wright map in fig.2 is divided into 4 quadrants labelled as 1st, 2nd, 3rd and 4th. The left side of the wright map labelled with number 01 to 66, represent respondents' capability in endorsing the given item whereas the right side labelled with A1 to A6 and B1 to B15, represent items' difficulties. Any number assigned as respondents that falls in the 1st quadrant indicates that the respondents have high capability and those in 3rd quadrant having low capability in answering the items given. Next in order is the 2nd quadrant indicates the most difficult item to endorse

with and 4th quadrant is the very least.

Respondents in the 1st quadrant are capable to answer all the given items that falls in the 4th quadrant but only some of them capable in answering item in 2nd quadrant. For instance, respondent's number 36 and 38 having difficulties to endorse item label B1 and B13 and having 50-50 chances to agree with item label B3 and B15. For respondents labelled as 09 and 50, both are highly capable to endorse all the item given in the survey, thus they are placed on the top level of 1st quadrant. Respondents that falls on the 3rd quadrant only capable to answer the item in 4th quadrant with respondent labelled 35 are the very least capable person to agree on all the given item. Base on the result, further discussion will focus on item labelled B1, B3, B12, B13 and B15 and the correspond respondents parallel to its left side of the wright map.

DISCUSSION

The focus of this research design is to framed specific shortcoming and suggested improvement given by the respondent in this study. We hypothesize that students who have difficulties in approving the item related to MOOC are the perfect candidates who will gives suggestions for the MOOC improvement. On the other hand, students who have no difficulties to agree with those items are believed to has no improvement suggestion. Base on the Wright's Map in Fig.2, students labelled 36,38,46,47 and 49 are the correspond respondent who have 50-50 chances on approving for item B1, B3, B12, B13 and B15. Whereas students label 17,21,26,45,54 and 56 has fully agree on the said items. Their answers for item C25 in section 4 of the survey gives a specific suggestion that they have in order to improve the MOOC delivery. The mapping over corresponded item with suggested improvement were simplified in Table 4 below;

Table 4: Correspond person with item C22 and C23

Ability to approve the MOOC items	*Respondent*	*What are the disadvantages of the MOOC?*	*What improvements would you recommend improving learning in the MOOC?*
Less able to approve	36	Difficult to ask	Create another segment on asking questions
	38	I'm not sure what is flipped classroom	I'm not sure what is flipped classroom
	46	Not very understanding	Make sure all student understands
	47	Some student doesn't listen it	More detail explanation
	49	Not good for me on manage time	Patient
Able to approve	17	Not with lecturer	More example
	21	Nothing much I see	Make more video of a lecturer in it rather than someone else. It would be much more understandable
	26	Make students become lazier	Discuss the application in daily life will make students more understand
	45	It makes me feel lazy if it not madam's video	more understanding on how to solve problems
	54	Easy to learn	explain more effectively
	56	MOOC is using the internet.	Put more picture or design so student will not boring watch it.

Base on tabulated answer in Table 4 it shows that the provided open ended section does helps in a sense of giving the students space to voice out their perceptions. However, the answers given by less able students are very generic; further in-depth interview will help researcher to understands more by using the open-ended answers given as guidance. Suggestion made by the more capable students are quite the opposite as expected. They specifically suggest on more problem-solving example video need to be put on the MOOC and suggesting that the present of lecturer who teach the subject in the made video will helps in the learning.

CONCLUSION

Base on the Rasch analysis, we can identify two sets of students who are able and less able to approve with the proposed teaching delivery approach. We then framed their specific suggestion based on the open-ended section where the students were asked to suggest anything in improving the MOOC. The findings defy our hypothesis; where the more capable students are the

one who gave constructed suggestion on improvising the MOOC delivery. Whereas the less able students are having difficulties in expressing their thoughts. Hence, for future research, further in-depth interview must be conducted in order to gain insight from their perspectives. It is important since this will keep on motivates the students in self-learn via MOOC platform.

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Implementing Team-Based Learning Pedagogy in an Undergraduate Hospitality and Event Management Course

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Abstract: Previously, the Special Events Coordination course was conducted using a traditional lecture approach. The Special Events Coordination is an advanced level course where students learned about leadership and communicate direction for the production of an event. Realizing that the nature of the course requires more teamwork, starting in 2015, team-based learning (TBL) pedagogy was introduced to the course. TBL is a teaching method that encourages team development among students using active small groups. This study was designed to examine the effectiveness of using the TBL approach in teaching hospitality and event management students. Approximately 10 to 13 students participated in five different focus group sessions where participants shared their actual experiences with the course. The majority of the participants preferred the TBL approach compared to the traditional lecture, particularly when the courses require students to work on projects or coordinate events like this course. After experiencing TBL, the participants believed that the TBL method not only can help improve their academic performance but also prepare themselves for future careers in the hospitality and event management field. Additionally, this study found that more than 30 participants who agreed to reveal their final grade earned "A" for this course. While the findings are interestingly good and can benefit other hospitality and event management courses, there is still room for improvement. Future research could utilize TBL when teaching other hospitality and event management courses and compare the students' team development progress every semester until they graduate from the program.

Keywords: *education, event, hospitality, team-based learning*

INTRODUCTION

Team-based learning (TBL) is a teaching strategy that shifts the content delivery by instructors to the application of the course content by students working in teams. Students learned to make collaborative decisions and develop problem-solving skills that could prepare themselves for working in the future workplace. It is important to note that the hospitality and event industry requires employees to be able to work in teams effectively to satisfy customers. Teamwork is also crucial for the reputation of the company. Likewise, contributions by each member of the team are important and everyone in the team needs to feel like their opinion matters and valued by other team members. Therefore, becoming an effective team player is key for business success.

Importantly, TBL is slightly different than the normal working in groups as there is a structured forms of small-group learning. At least four core elements should be included in a TBL classroom, which is: (a) strategically formed, permanent teams, (b) readiness assurance test for individual (iRAT) and team (tRAT), (c) application activities, and (d) peer evaluation. According to Balan, Clark, and Restall (2015), the application activities or the classroom exercises rely on students using their self-gain knowledge; hence, TBL requires students to pre-learn the course materials before a teaching session. In other words, student pre-preparation or preparation before their class time is crucial to help the student excel in the readiness assurance tests (both iRAT and tRAT) that normally conducted in-class. While TBL offers many advantages, Frash, Kline, and Stahura (2008) recommended instructors using peer evaluation to reduce social loafing among students in the TBL classroom.

The TBL method is widely known among educators teaching medical and science courses (e.g., medical pharmacy, nursing). Using questionnaire, Mohammad-Davoudi and Parpouchi (2016) found significant results for team motivation ($b = 0.197$), team enjoyment ($b = 0.418$), and team cooperation ($b = 0.205$) on the learning results of medical science students. From the path analysis, they found that when the team motivation, team enjoyment, and team cooperation increased, the students' learning results will subsequently be increased. For one thing, a TBL classroom structure allows students to engage in the learning process, hence, students' learning

becomes deep. The TBL structure allows for a deeper understanding of content and prepares students more effectively for assessments (iRAT and tRAT) and overall course performance. Not to mention, one of the key factors of learning is motivation. Students will enjoy and willing to engage in the classroom when they have the motivation to learn. Using a classroom engagement survey, Faezi et al. (2018) found a high level of engagement in the TBL classroom structure (M=26.7, SD=3.70) compared to lecture-based classroom structure (M=23.8, SD=4.35). As mentioned above, TBL encourages students to engage in the classroom, thus promote a collaborative environment which consequently increases students' overall satisfaction.

Generally, most TBL studies found positive impacts of the TBL structure on student engagement. In addition to that, the TBL structure could help improve student academic performance. Swanson et al. (2017) found that TBL improves student classroom engagement, final grades, and performance in tests. Liu and Beaujean (2017) meta-analyzed 38 publications related to TBL on academic performance and found that on average, courses using TBL structure resulted in better learning outcomes compared to other teaching methods. Later, Chen et al. (2018) meta-analyzed 13 publications and found TBL classroom structure increased student examination scores, attitude towards learning, and learning skill. In a more recent study, Lang et al. (2019) found that the TBL helps improved student learning enthusiasm, communication skills, thinking ability, as well as, student ability to study by themselves.

Based on the aforementioned literature that is mostly from medical or science fields, it is important to note that a lack of studies is found examining the effectiveness of the TBL method for teaching social science courses. Although the TBL method is well-known for teaching medical or science-based courses, the method is becoming increasingly popular among social science instructors (e.g., humanity, hospitality) (Frash et al., 2008; Harde, 2015). Furthermore, many of the TBL studies found were using quasi-experimental design or quantitative approach to gather their data. This study is unique as the authors used focus groups to gather qualitative data, which include a planned discussion and interview with a small homogenous group of students conducted by a moderator which is the researcher (Kruger & Casey, 2000). This study examined the effectiveness of implementing a TBL method for Special Events Coordination, a capstone course. The

course was divided into five modules and each module follows a team-based learning module comprises of the readiness assurance tests to the application activities. At the end of the projects, students are required to complete peer evaluations individually to assess their team members' performance. Approximately 30% of the course grade is contributed by the team performance and a majority of the course assessments are team-centered, compared to the individual.

METHOD

2.1 The focus group interviews

A qualitative method was used whereby all students who enrolled in the Special Events Coordination course had an equal opportunity to participate in the focus group interviews. According to Anderson (1990), as cited in Dilshad (2013), a focus group consists of a group of individuals, with similar characteristics, who will discuss a given issue or topic. Morgan and Krueger (1998) emphasized that focus groups are guided group discussions that are used to "generate a rich understanding of participants' experiences and beliefs" (p.11). In this study, focus group interviews were used to collect narrative data based on participant's experiences in the classroom, other than to elicit participants' perceptions about the effectiveness of using TBL in the Special Events Coordination course. This method is useful as it allows participants to provide detail information about the topic while at the same time, the researchers can control the ordering of questions (Creswell, 2014). The majority of questions focused on two main topics: factors motivating students to do their pre-class preparation and whether the TBL approach helps improve student academic performance. There were a total of five focus groups, ranging in size between 10 to 13 participants each. All focus group sessions were conducted in a private discussion room in the university library. Sessions averaged one hour to two hours and were conducted by the researcher who acts as the moderator, with the help of a trained postgraduate student.

Data collection period begins from February until March 2017.

This study has been approved by the Institutional Review Board at the university. Each participant completed two informed consent documents. The first informed consent document detailed instructions about the research procedures including the participant rights (i.e., participation in the sessions was voluntary) and the measures are taken to ensure confidentiality of the records (i.e., participant identity will remain confidential). The second informed consent document is for permission to access student grades after the course is completed and the grades are submitted by the instructor. The moderator commenced each focus group by requesting the participants to read the informed consent document and to sign their names if they agreed to participate. Then, each participant was asked to introduce themselves at the beginning. As the role of the moderator is to encourage interaction among participants, the moderator used focus group protocol to maneuver the discussions and ensured all participants responded to at least some of the questions. With permission from the participants, all focus group interviews were audio-taped and transcribed verbatim using professional transcriptionists. The data were then triangulated to examine the similarity of the responses among the different focus groups as described in-depth in the results and discussions section.

RESULTS AND DISCUSSIONS

A total of 61 undergraduate students comprised of seniors (80%) and juniors (20%) participated in the focus group interviews. The majority of the participants were females. The Special Events Coordination is a required course for event management major, hence, justified the reasons for having more than 50% of the respondents from event management major. Other respondents who participated in this study were from other majors such as hospitality management, psychology, apparel design, agricultural communications, and public relations. A mixed of different majors allows each participant to contribute uniquely to this study as they will view the topic from different angles. This section will discuss the common themes and the different themes found from the focus groups. Direct quotes will be included to report the focus group interviews.

Common Themes

The participants of all the focus groups suggested that the most important aspect of learning is learning how to apply or use that information in new situations in addition to learning information including facts, principles, and concepts. Multiple quotes follow. One participant stated, "The most important thing… applying what we learned because the event management field is such a hands-on field, that if you don't have that real-world experience, you're not really getting much out of the class that you're taking" while another participant mentioned, "That's why I like the class, cause like somebody [referring to guest speaker] does come in, and it's like we're actually applying it to something real instead of just like going off of the books".

Related to the aspect of learning that participants think can be done effectively outside the classroom on their own or with their teams, most participants agreed about the importance of meeting outside of the classroom time to work on projects. Even though the instructor allocated all Fridays for project meetings, not all teams utilize the time to work on their projects. Also, the frequency of the meeting varies between the teams. One participant stated, "Everybody has a really different schedule. It was really hard to meet outside, except like the Friday which technically a class". However, one participant stated, "Everybody had to at least try to meet every other week. Not every Friday but every other week. Everybody had to attend the meeting." In a similar tone, one participant claimed, "It's really hard to find a schedule that works for everyone, so we just meet on Friday." Based on the interviews, most participants reported that they meet every Friday. For example, one participant stated:

"We divided the projects up into segments, and then each person did their project. And then we came in on Fridays and talked over with the group about what should we change, what we should do different, what's good, things like that. Then we would go for another week to work on that again, and then meet on Friday again and just keep doing that. So we met every Friday."

For things that are needed to do to be successful in the course, all focus groups felt that students need to do their learning (referring to self-directed learning) and not to procrastinate their work. One

participant stated, "There's a lot of work that you're responsible for learning on your own and that's not going to be re-lectured in class. Like, you're expected to know that." Similarly, another participant stated, "Just staying on top of things…we had to take a lot of courses… so, just making sure you stay on top of that. Time management is important." In line with that, one participant stated, "Time management is important since there are deadlines, so, we have to make sure to get everything done as a group". Participants highlight the importance of working on projects as a group and communicating effectively with the team members. For example, one participant mentioned, "Staying up to date with your team...if anyone is falling behind or doesn't respond, it's really hard to communicate with them to get work done."

For a successful implementation of the TBL classroom, the students need to play their role and to prepare prior to each class. For example, one participant mentioned, "Reading is really beneficial and I think reading textbooks is difficult. In this class, I feel like it's almost necessary so that you are comprehending the information within the chapters." Another participant believed that watching the lectures (referring to PowerPoint video lectures) was very helpful because the readiness assurance tests (iRAT and tRAT) will include information from the video lectures. Regarding students' preparation before coming to class, one participant mentioned, "Preparing outside of class, making sure that you're doing the readings before coming to the class so we have something to discuss on, and then just putting in the extra effort with the group project because we don't have a lot of time within the class to work on it, so just like holding yourself accountable for that." A TBL structure teaches students to be accountable to both the instructor and their peers.

The participants were asked to share their learning experience with the course, as well as, experience working in teams. Across all focus groups, concerns were expressed regarding conflicts that often occur when working on projects together. One participant mentioned, "It's a good experience to be able to work with other people and know what conflicts they're going to have when working in a team…making a contract and being able to decide what the firing process is…That's good for future learning." Nonetheless, one participant stated:

"At first, getting to know each other and then the next step was like we're trying not to step on each other's toes. We make sure no one was upset but right now we're all kind of like there's definitely very different dynamics in my group. There's been some conflict with people not getting their things done on time and others having to pick up the workload for others and so the one thing that's very hard about the class is working together. We did like the DISC profile analysis with the different personality types and it is really hard to get certain people motivated if they really don't want to work."

The nature of TBL pedagogy is about collaboration where every team members work together towards a common goal [referring to the special event projects] and coordinate their work amongst themselves. Normally in the TBL classroom, the teams will be strategically formed by the instructor and the teams should be permanent until the end of the semester. Instead of randomly assigned students into teams, instructors can creatively use various methods (e.g., DISC®, Myers-Briggs Type Indicator®) to group their students accordingly. In this course, the instructor utilized the DISC personality test to strategically formed the teams at the beginning of the class. Most participants felt that there will be a mixture of individuals with at least four different traits (i.e., dominant, inspiring, supportive, cautious) in each team. One participant stated:

"One thing was really good with this class is, you got the personality assigned, so someone automatically becomes a leader. They help you take care of the group, and people who're better doing their own stuff, they can focus on you know not to waste energy on leading, but then actually focus on their part."

Generally, there will be no specific leader assigned either by the instructor or by the team members in the TBL structure. For that reason, each member should share the leadership roles and work together as a cohesive unit. Nonetheless, the DISC personality test somewhat allows students with a dominant character to lead the team. For example, one participant cited, "When we took the personality assessment, one of the personalities was called dominance. So, they naturally were the leader." Similarly, one participant stated, "There are people who take over leadership roles, but there is no specific leader." Another participant mentioned, "We split up our project… It was kind of almost hard to have just one leader because we're all kind of leading our part. But there was one person that like submitted everything for us. I was kind of the one to follow up with that person."

The majority of the focus groups were in agreement about delegation of the task either voluntarily or based on their expertise. For example, one participant stated, "It's kind of like mixture. Usually, it's a volunteer. You don't really like have to tell someone this is what you have to do. Like in this class, people in the group want to do something, so they'd rather volunteer than be assigned something." One participant stated, "We delegate the task, but it does have a deadline. Sometimes, other people have to step in and help out and figure that out but the team evaluation has been good though cause it keeps you in check with that." All focus groups mentioned the importance of communication, time management, teamwork,and accountability when asked about things that team members need to do for the team to work effectively and successfully. In regards to communication techniques, other than meeting face-to-face, participants mentioned using technology applications such as Google Docs, GroupMe, emails, and text messages to help each other through the process of completing the projects. One participant mentioned, "Communication is huge. My group created a GroupMe on the app so that we can all text each other all the time. And then we're just constantly emailing each other to make sure that we have a report on Google Docs so everyone can work on it at the same time, so that really helps." Onother participant stated, "Communication was really important…We had some team members that had to miss because of certain things like sickness and weather, so I think we did a good job of just communicating [usually through technology] with each other. And then if they weren't able to be there, the rest of the group kind of pitching in more and saying how can we make sure that this section gets done." One participant cited, "Communication was the key. You keep communicating with each other and just making sure that everything's getting done."

Other than communication, the participants realized that the importance of having a good time management strategy is to ensure that the projects will be completed on time. One participant stated, "Just focus on time management…the instructor gave us this project in the beginning of this semester. Every Thursday, the instructor kind of brought it up [to remind the students], but we didn't start working on it till a little later on and so, we kind of just relaxed for a little bit, and then it all kind of just started piling up. So, I think that's important

to have time management for future students." Another participant highlighted, "Everybody has to read, definitely read, and go through the PowerPoint before taking the testa. So, if anyone in the group like literally missed questions…everybody kind of together support you. Then, do the study on your own because you have expectations from other people, so you kind of uphold that with yourself as well." Another participant stated, "Willingness to put in the time. Since we don't have a class with the instructor on Fridays, we still have meetings with the group, and using this time to meet up is important too."

In addition to communication and time management, two other important things mentioned by most focus groups were related to accountability and teamwork. For example, one participant mentioned, "A general idea is just to hold yourself accountable, and other group members accountable. Because you're expected to know the knowledge [referring to the course content]. So holding yourself accountable and communication are the biggest things that you need to have in a group to be successful." Another participant stated, "I would say teamwork and taking the initiative to actually do it on time. Like even if it's not due, we have our own due dates." Similarly, one participant stated, "Helping each other out as well as keeping others accountable and good communication; just making sure that we work as a team and not just like trying to do stuff on our own or go apart from the team." Another participant mentioned, "Being open to like your group members' ideas. Since we all come from different backgrounds and we're not all event management majors, I think we all have different ideas. Just be open to them, and then from there as a team, you can decide on what's right or which way to go." One participant stated:

"Our group was good at the tRATs. A lot of us had different answers for some questions, but we were very good at talking it over [discuss]. Then, the group came together to pick the best reason. Even though it might be wrong, we all came to a census of why the answer was right. And more than likely we got the answer right because we just talked it out with the team. So, our group did really well at reading, being prepared. Even though they might've got the answer wrong, they had a reason why they thought it was that answer. So, I thought we were really good at that."

Depending on the projects assigned by the instructor, most focus groups preferred to work in teams mainly like this course where students are required to coordinate a special event. One participant

mentioned, "You learn a lot more in teams because working by yourself, you only have your opinions and input. Working with other team members, you have people from all over the place, so they have different experiences and different knowledge sets." Another participant stated, "I like working in teams because it gives you more ideas, that you maybe would not have thought of that on your own." Some participants see the benefits of working in teams. For example, one participant stated, "It helps you lessen everything that you have to do and it helps you get feedback and make sure that the idea that you have is headed down the right track." Another participant stated, "I like it because you get different perspectives and have different opinions…people think differently, so maybe you're thinking about doing this way but then your team is like no I think it's a better way and then it makes you realize something else that you can do and it's just different perspectives."

Some other factors that should be taken into consideration such as the different personalities of the team members, as well as, the team sizes could influence team effectiveness. Some participants perceived six or seven as adequate size for a team. One participant cited, "It's harder to coordinate a bigger group like in this class, if there was only like three or four, it's easier. Especially since we all don't have the same schedule, it's so hard." Not to mentioned, some participants prefer to work alone as they perceived some projects are better to be completed individually. Two participants claimed, "I prefer to work by myself" and "I feel like some projects are better done individually". To elaborate more, for example, one participant stated, "Some projects like research papers where it's just easier to work by yourself because you know all the information and you can just organize it the way you want instead of talking to other people and having to communicate with them."

As mentioned earlier, at the beginning of the class, the instructor made each team come up with a contract and each team member was required to sign the contract before they embark on the projects. One participant stated, "At the beginning of the class, they made us sign a contract about what we could do if team members are not participating or not showing to class. We can fire a group member if they really

aren't. I like it because it keeps people accountable." One participant stated, "When we make the contract, we sit down and make a schedule about when we want every part of the project due and when we want to have meeting times. So, we try to stick to that. But sometimes people don't show up and then we change the dates that things are due and then it kind of messes up our original plan." Meanwhile, another participant shared their team strategy, "We have the dates, we did the same things, we set dates and all that stuff and we stick to the dates. If a team member doesn't show up then we just inform them of what we have discussed. We ask them if they have questions or anything. We still stick to our deadlines to make sure that we're still up to date."

All focus groups felt that most of the conflicts arises were due to different personality traits in the teams along with unaccountability issues. It is not easy to come into consensus with the team that consisted of different personality traits. For example, one participant mentioned, "Learning to work with a group that was picked for you with different personalities that you maybe would have never worked with before, collaborating on a project together and like having to organize a time when you can all meet." Another participant cited, "Just brainstorming your ideas and coming down to like a solid idea. Because with six-plus people in a group you have all different brains that are all thinking a different way. So it's good because you get more ideas and you figure out the best one, but like somebody's idea might be, they think theirs is the best and that person thinks theirs is the best. So that's probably, it's not a huge conflict, because you'll decide eventually. But it's definitely like a back and forth type of thing." It is worth noting that conflicts also can arise from unaccountability issues. For example, one participant stated, "There's been conflict in our group for sure. It's been like this people not holding up the end of their work and thinking that you can rely on someone to get something done. Especially if you have a section split with someone and you've done your part, but then they don't finish theirs. It's like turns into a big catastrophe when someone else has to finish it last minute." Another participant stated, "People sometimes don't show up to meetings and it's hard to do the projects and talk about it if people don't show up." One participant reported, "One of my team members doesn't really show up to class…always makes up excuses." Overall, the participants

felt the challenge of working together effectively; some managed to take the challenge positively while some struggled to keep up with the team.

Different Themes

Interesting themes emerged regarding the aspect of learning that students think can be done effectively outside the classroom by themselves or with their teams. These things were either appeared in only a minority of focus groups or shed different lights on themes reported from other groups. Among the differences was about how frequent they meet throughout the semester to work on their projects. Although the instructor allocated every Fridays as meeting times for projects, flexibility is given as long as students completed their projects on time. Some teams meet at least once a week and some participants mentioned that they will meet depending on how much they can get done in the meeting. The participants mentioned that some works can be done online via Google Docs or some other applications that permitted them working from a distance, which justifies why they did not have to meet face-to-face every Friday. One participant stated, "If you can do most of that on your own, there's not a lot of meeting outside of class." which in line with another two participants, "We rarely had to meet in our group because a lot of our things could have been done using Google Docs and things like that." and "Not every Friday. Unless if we need to, then we probably will." Depending on the tasks, one participant emphasized, "For collaboration work, we will make sure we're all on the same page. But other than that, we all did our individual portions on Google Docs." Even though there were teams that did not meet every Friday unless necessary, some participants did understand the importance of utilizing the allocated time to work on projects. For instance, one participant stated, "Most people probably meet on Fridays, the time we had allowed to meet and discuss for group projects." Another participant cited:

"Since we didn't have class on Fridays, I think that was a really good time to meet as a team. That was set up really well cause we had so many team projects."

Another difference between participants surrounded issues of their learning experience with the course. To point out, most of the

participants preferred the TBL method. For example, one participant stated, "I like this class because you kind of teach yourself on your own. Then, you come together with your team, and you talk about it, and then the instructor discusses whatever your team doesn't understand. So, it's kind of like you get three tries to really get it." However, there were participants expressed their concern about the teaching method since TBL is more about student self-directed learning that somewhat forces students to be more accountable towards their own learning. For example, one participant mentioned, "I don't like this kind of learning, because there's no incentive of coming to class. If I'm supposed to learn it all on my own outside of class, then, why do I need to come, other than the days that we have the quizzes [referring to iRAT and tRAT]…also it holds you accountable to quickly memorize the materials and I don't think you really are absorbing it." Other participants were more likely to view TBL as a teaching method that requires them to put extra effort for their team success. For example, one participant claimed, "I definitely put in a lot more effort for this kind of class. Because, it is like team quizzes and team-based learning, I don't want to let my team down by not knowing the materials. So, I definitely put in an extra effort because it's not just me and my grade by it's like the whole group." For some other participants, it was not about the extra efforts that concerned them, but rather the issues of having different personalities in a team and conflict that may arise resulted from different personalities. For example, one participant mentioned, "I like working in teams, but it can get frustrating because sometimes there are bigger personalities and sometimes there are quieter personalities. That's always a harder thing to balance but, overall I like the team-based learning because I feel like you get so many different ideas and stemming off of each other is always really entertaining and fun to get to do."

Some participants able to see the reasons behind the instructor's decision on forming the teams using DISC personality test and the importance of having different personality traits within a team. For example, one participant mentioned, "Working as an actual team and not break off individually. Be more positive about things. Some people can get upset or negative when things don't go right but it's important to stay positive about everyone. Everyone brings something

to the table, we don't need to always be negative about what's going on." Another participant cited, "You don't really form your teams in the workforce. You get chosen. That's how it works in the workforce. You don't get to choose your teams." As mentioned earlier, in TBL structure, the teams should be permanent throughout the semester, thus changing groups are not allowed unless permitted by the instructor. Simply incorporating permanent learning teams for projects instead of randomly assigned students can boost the team dynamic. One participant cited:

"The importance with the team projects is you know, not everyone's going to get along with the teams, and that's a perfect example of you figuring it out together as a team, using communication, and what works for someone doesn't work for someone else. You have to learn that along the way. This project was a perfect example of working in groups. What you're going to have to do like, I mean for me, I'm graduating soon so what I'll also be doing shortly [referring to working in the future workplace]. Some of my group members handled that very differently. Some things could've been handled in different ways. Everyone had different experiences."

Another different theme emerged from the focus groups was related to the use of technology such as instant messaging, Google Docs, and emails to work on projects. For example, one participant stated, "If we put it on a Google Docs and then everyone gets their own part, we don't actually meet as a team and then we're only learning the certain part where we're supposed to go over as opposed to learning all of it and then working together to work on the whole thing. So, I think it's easier because it's done quicker to do it that way [referring to Google Docs] but I also think we're missing out on the other aspects about working in a team." To put it another way, as TBL requires students to work collaboratively in a team, it defeats the purpose of using TBL when each student in a team merely focused on completing their part. In that case, students should use the time allocated by the instructor or alternatively, do virtual meetings via Skype or Zoom to discuss and work together on the projects.

Based on the focus group interviews, it is interesting to found that some teams not only have different personality types but also with a combination of different majors and minors. For example, one participant claimed, "That kind of help breaks up the different tasks. If someone knows a lot about marketing, then they can take on that section. That helped a lot to kind of further the project process." Having

different personality types and different majors/minors also challenged the students' ability to work in teams. For example, one participant cited, "It's nice but at the same time you don't know anyone. You don't know what the personalities are like."

While other focus groups mentioned about those with dominant traits will automatically become the leaders, some focus groups perceived that every team member should be equally treated as leaders for the teams. For example, one participant stated, "My group didn't necessarily pick out a leader. We all led the group. We all tried to hold up our end of the deal and complete our part of the work." Similarly, one participant quotes, "We all equally take initiative cause we're all like, at this point we're all seniors and we just kind of want to get stuff done and we're all kind of motivated." Another participant stated, "We all just kind of take turns. We all work together. We do have some people that may think they're more in charge than others. That's fine. But that's just because when you put a bunch of personality with leadership-driven people in a group. In general, put a lot of leadership-driven people and you're going to get conflicts. You're gonna get overpowering people. That's just how life is. You just have to know how to work with them."

Given that there were five focus groups, it is remarkable to discovered how many themes were commonly conveyed by most groups of participants. Participants' agreement on similar themes provides reasoning about how qualitative data shed important light on relevant issues for more qualitative or quantitative research regarding this topic in the future. In addition to the rich data found through focus group interviews, when the semester has ended, the researchers contacted the academic department to retrieve the final grades of participants who were willing to share their final grades. It was found that at least 30 participants who participated in this study earned "A" for this course and no student has failed the course. Based on the empirical data and students' final grade, it seems reasonable to say that the TBL structure helps improve student academic performance, particularly in the Special Events Coordination course.

CONCLUSIONS

This study provides evidence to show that TBL is more effective than other teaching methods in improving student classroom engagement, as well as, student overall academic performance. Therefore, TBL should be gradually introduced to other hospitality and event management courses. The higher education institutions should consider revising the current curriculum to include more team activities because, in reality, the hospitality and event management industry will hire graduates with the ability to work in teams. For instance, if you are working in hotels, either in the front office department or the food and beverage department, teamwork is a must to ensure the overall hotel operations run smoothly. With that, higher education institutions need to equip students with important skills for them to succeed when working in the industry. Additionally, this study found that TBL is a profoundly effective teaching method although requires the instructor to spend a lot of time prepare the course materials. Once the course materials, the readiness assessment tests, and the rubrics are completed, much instructor efforts will be spent on ensuring students' engagement and learning satisfaction in every class time.

Whilst this study found rich data from through focus group interviews, one of our limitations was the data gathered were specifically focused on one course. However, since the purpose of this study was examining the effectiveness of implementing a TBL structure for the Special Events Coordination course, focusing on one course allowed us to explore the issues in depth. Moreover, this study did not compare the effectiveness of the TBL structure with the other teaching methods; thus, a comparison study is recommended to examine the effectiveness between TBL and lecture-based learning in teaching hospitality and event management courses. Future research could also compare the students' team development progress every semester until they graduate from the program.

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Using Experiment To Help Understanding Valuation Issues

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Abstract: Traditional teaching method using lectures are unable to relate to real property valuation processes. Recent explorations of the experimental method have lead to its applications into the field of real estate. Experimental method utilize experiments and demonstrations to simulate real estate processes to examine various theories and hypotheses. The design of an experimental method involves: 1. Determine the learning outcome, 2. Design the experiment, 3. Implementation, 4. Statistical test and results. The main part of the study took place during three class days with the students divided into two groups. The Expeimental (EXP) Group is subject to observing a demonstration whereas the Control Group (CON) attend the normal lectures. The test scores are analysed using mean score of EXP and CON groups and mean difference analysis using ANOVA analysis. The ANOVA shows significant differences between the two groups of students in understanding valuation smoothing. The group that has undergone experiments is found to have a higher score in the test and shows better understanding towards the smoothing processes. Significant statistical difference in mean test values implies the success of the application. The experimental method is found to improve understanding theoretical principles and improve problem solving skills. Upon successful validation of the method, it can be applied to other similar topics/issues in the same subject or other subjects. Thus widening the teaching delivery options in the classroom other than lectures, tutorials, case studies etc.

Keywords: *experimental method, teaching and learning, valuation smoothing*

INTRODUCTION

The use of multimedia and case studies in the teaching on real estate topics are common these days. Subjects which involve practical applications tend to employ cognition practice and market research to train students. However these methods do not allow students to participate and experience first-hand the real property market processes and operations. Students could only observe and study as an onlooker without practical experience and involvement. This has prevented the students to have a deeper understanding of the processes or issues at hand. Traditional teaching method using lectures are unable to relate to real property valuation processes. Recent explorations of the experimental method have lead to its applications into the field of real estate. Experimental methods have been adopted recently to aid teaching not only in economics and finance but also recently in real estate (e.g. Yavas & Sirmans (2005), Seiler et al. (2013), Seiler (2014)). Experimental method utilize experiments and demonstrations to simulate real estate processes to examine various theories and hypotheses. Teaching that use experimental method is found to improve deeper understanding for students who do not have practical experience or having taken part in any of the economics processes.

LITERATURE REVIEW

Valuation smoothing is a temporal lag bias in valuations of real properties. As reported by Clayton et al. (2001), the lag bias is due to valuers valuing the same property in consecutive periods to anchor onto their previous appraised values resulting in more lagging than first time valuations. Due to infrequent transactions, valuers have to combine indications of value from the most recent comparable sale with past appraised values to arrive at the value that is actually reported for a given building each period. The extent of bias inducing behavior appears to vary over time and is affected by the quantity and quality of contemporaneous transaction information changes. Northcraft & Neale (1987) show that anchoring and adjustment perspective introduce biasness in the determination of property picing. This temporal lagging is further actuated with the aggregation of property values within an index. This problem arise due to the fact that each valuation is not conducted at the same point in time. When property values are appraised at different points in time throughout each calender quarter, yet all these

valuations are averaged together to produce the quarterly index, then the index will be a moving average of spot values. This can result in smoothing with the volatility of the indices being lower than actual market values thereby understating the variability of returns in the property market. In another words the true standard deviation (or risk) is much higher for the de-smoothed indices. It tends to be worse for monthly & quarterly index series than annual series.

The implications of smoothing are as follows:

(a) Understate the variability of returns in the property market,
(b) The index will tend to lag underlying property market value changes,
(c) The smoothing will add significant positive autocorrelation (i.e. apparent inertia or self- predictability) into the index.

Barkham & Geltner (1994) study property indices and find that they are prone to smoothing and lagging. This is a result of the fact that property indices are based on valuations, which are lagged thereby understating the true volatility of property returns. The authors suggest that the smoothing of property indices can be great enough to bias investment policy and decision making. Zhang et al. (2013) incorporates experimental methods into the teaching of real estate education. An experiment was carried out on property pricing bubbles where students participate in the experiment to understand better the property asset pricing bubble theory. Students are given a certain amount of Experimental Currency Units and a virtual house to trade in buying and selling houses under double auction market. Students are free to make and accept offers. The price offered will become the the market transaction price when it is accepted by another student. All offering and traqnsaction prices are openly observable by all students. Prior to the experiment, the underlying concepts relating to a property pricing bubble is explained to the students. A bubble means the home's price is higher than its fair market value. The unique characteristics of real estate in terms of heterogeneity, immobile, low frequency of transaction etc. has prevented students of real estate in actual experience of buying, selling and trading of properties. The experimental method serves the purpose of providing the necessary exposure and experience to simulate actual economic processes that affect real estate . Nuriddin & Yavas (2012) using an experimental study approach found that cash flow volatility and price volatility affects pricing. Ong, S. et al. (2003) apply experimental method to examine oligopolistic

bidding and pricing in real estate.

RESEARCH METHOD

Experiments are an excellent way for the controlled testing of causal processes. The experiment tests the effect of an experimental stimulus (the independent variable) on a dependent variable through the pretesting and posttesting of experimental and control groups. It is important that the experimental and control groups be similar to each other. Neither the experimenter or the subjects knows which subjects are in the control and experimental groups i.e. double-blind. Radomisation is used to achieve comparability in the experimental and control groups.

The design of the experimental method for this research involves:

1. Determine the learning outcome
   The learning outcome is to understand better the valuation smoothing process.

2. Design the experiment
   The main part of the study took place during three different class days over three weeks. On the first day of assessment, the researchers came to class and distributed two types of materials to all students: math assessment and notes explaining valuation smoothing.

   In the next class period, students attended a traditional valuation smoothing lecture presented by their regular instructor. In the third and subsequent class period, all students first took a valuation smoothing assessment (i.e., pre-test 1). Following pretest 2, the CONTROL (CON) group was excused from class and the TREATMENT (TRTMT) group stayed to watch the 30 minutes demonstration and experiment. Immediately after the demonstration and experiment, the TRTMT group took the valuation smoothing assessment for the second time (i.e. post-test). In our study design, we did not assign the CON group a different intervention.

3. Implementation stages
   a Explain the theoretical principles to the students
   b. Conduct the experiment

4. Analysis
   Analysis are carried out using mean score of EXP and CON groups and mean difference analysis using ANOVA analysis. Significant statistical difference in mean test values implies the success of the application.

Students in this study are students enrolled in a Masters programme during the 2016-2017 academic year. Apart from the treatment group's use of demonstration and experiment, efforts was made to maintain homogeneity both between and within the control and treatment groups. The number of total contact hours between the students and lecturer was equal, except the treatment group has one extra 30 minutes demonstration and experiment session. All students in the sample use the same required lecture materials and covered the same topics.

Analysis of variance is used for assessing the statistical significance of the relationship between categorical independent variables and a single continuos dependent variable. It evaluates experimental hypothesis by assessing treatment effects by comparing the means between two groups of subjects that are treated differently. It is assumed that differences between the scores of the groups will be due to a combination of a systematic treatment effect and unsystematic group differences (random error). It is also assumed that differences in the scores within each group will be due to unsystematic individual differences (random error).

RESULTS AND DISCUSSION

The data is of categorical nature where the values refer to the number of cases that fall within particular categories. For categorical data, a non-parametic test is applied. The non-parametric test can be applied to non-normally distributed sampled populations. The participants are unrelated samples as one group has been subject to an experimental treatment while the other group has no treatment. Table 1 shows the mean score between the two groups before the experiment. The F-statistic shows no difference

between the mean values of the two groups.

Table 1. Comparing the means of scores between Control group and Experimental Group (pre-experiment)

Group	Number	Mean	Standard Deviation	F stat	Sig
Control	18	43.29	19.45	0.000	0.987
Treatment (Pre-experiment)	18	42.86	18.74	0.000	0.987

Table 2 shows the mean score between the two groups. The mean score of the Treatment Group is higher than the Control Group. The F-statistic shows significant difference between the mean values of the two groups.

Table 2. Comparing the means of scores between Control Group and Experimental Group (post experiment)

Group	Number	Mean	Standard Deviation	F stat	Sig
Control	12	44.63	19.62	0.000	0.987
Treatment (Post-experiment)	12	50.50	19.85	2.307	0.987

It can be concluded that the experiment method has contributed to the improvement of understanding of the valuation smoothing process by the students. It can also be inferred that the experimental method is the intervention in the learning process that has contributed towards a better understanding of valuation smoothing by the postgraduate students.

Like all research methods, experimental method has its strengths and weaknesses. The strength of experimental method is the clear ability to isolate the independent variable which permits causal inferences. Experimental methods are also relatively easy to be replicated. There are scientific rigour in the methtodology of experimental methods.

The primary weakness is the artificiality whereby what happens in an experiment may not reflect what happens in the real property world.

Also experimental findings may not reflect real life situations, hence the issue of external validity on the results of experiments. Another limitation is that there might be interaction between testing and the stimulus which could affect external validity.

CONCLUSION

One of the main cause of valuation smoothing are valuers use historic comparable transactions in the property valuations and are slow to adjust values for new public information. The experimental method is found to provide a teaching tool that could make the valuation process explicit thereby enhancing the learning experience and understanding of students on the valuation smoothing issue. Further topics on the valuation of land and buildings can be investigated to examine its suitability to be taught using the experimental approach. The experimental method is found to be suitable for valuation processes that are implicit and not observable. Further successful application of the experimental method will provide evidence that the experimental method could contribute as a useful teaching tool in the teaching and learning of real estate valuation.

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Effectiveness of Active Learning Strategies for Soil Science Course

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Abstract: Common teaching methodologies which are teacher-centered learning do not enhance students' engagement and encourages passive learning which does not develop higher-order thinking. Thus, it contributed to low students' performance which caused increasing failure rate for soil science course continuously within three semesters. Active learning can foster the growth of thinking skills through participation among students and lecturer. The aim of this study to compare the effectiveness of two different type of teaching method applied for soil science course. Participants were randomly selected from Diploma Planting Industry Management (AT110) students from Faculty of Plantation and Agrotechnology. Soil science course was conducted through traditional method or teacher-centered learning in second semester of 2016. Student performances for the semester were analysed and students who were failed and have to repeat the course were identified. Those students who repeat the course was re-enrolled the course for first semester of 2017. For this semester active learning methods were used, consisting of collaborative learning in the field, visual-based instruction and case studies. Student learning was evaluated using classroom tests and final examination results. The best teaching method was applied and monitored from second semester of 2017 until second semester of 2018. T – test show significantly improvement on final examination result of soil science course between traditional teaching method and active learning method ($p<0.05$). Final examination result shows that student performance was increased between 20-30% when compared with teacher-centerd learning. Students actively participate during learning session and

gained interest toward soil science course through active learning methods and the failure rate was decreased which are less than 10%.

Keywords: *teacher-centered learning; active learning; student performance*

INTRODUCTION

Soil science has been recognized as natural science in its own right (Ruellan, 1997) and this course of study deal with a material that has unique properties and behaviour (Churchman, 2010). Therefore, it is important for teachers to relate the unique properties of soil to other disciplines so that the student able to understand the whole concept of this course. This is because soil is integral to many ecological and social systems and it holds potential solutions for many of the world's economic and scientific problems, including scarcity of food, fuel, and water, as well as climate change (Flannery, 2010; Harte mink and McBratney, 2008). Currently, the common teaching methodologies which are teacher-centered learning do not enhance students' engagement. Most of teachers more prefer teacher-centered learning because lecturing provides a convenient and efficient way to deliver content to large numbers of students, particularly in large lecture halls. However, a number of studies indicate that lecturing is not a particularly effective teaching format. This is because it encourages passive learning, results in poor information retention, and does not develop higher-order inquiry and thinking (Ahern-Rindell, 1999). Frequently students stay passively in the classroom they will disconnect from the lecture and start actively with their gadget such as mobile phone. It also fails to stimulate student motivation, confidence, and enthusiasm (Weimer, 2002). Furthermore, teacher-centered learning only allow students observed without actively engage in the process of learning in the classroom which prevents the students to obtain a deeper understanding of the theories or process in the course. This situation might contribute into low student performance. Final examination report had shown increasing trends of failure rate for soil science course from Diploma Planting Industry Management students. The result from the Lecturer's Professionalism Monitoring (PROPENS) showed that most the lecturers apply teacher-centered learning. Soil science course was traditionally taught using a combination of lecture and laboratory sections. Active learning has received considerable attention over the past several years. It often

presented as a radical change from traditional instruction (Michael 2004). Active learning is generally defined as any instructional method that engages students in the learning process. Furthermore, the teacher can meet these complementary goals by focusing on remedies that make content relevant to the intended audience, increasing student-student interaction in class, and encouraging conceptual understanding rather than rote memorization of facts. This learning environment helps teacher to interactively engage with students cognitively and scientifically in the learning process which student able to define concepts, explain theories verbally and writing. It also drives to achieve the course learning outcome stated by the university. Quite remarkably, consistently poor academic performance by the majority of students is basically linked to application of ineffective of teaching methods by teacher to impact knowledge to learners (Adunola, 2011; Elvis, 2013). Nowadays, questions about the effectiveness of teaching methods on student learning have consistently raised significantly interest in the related field of educational research (Hightower, 2010). Therefore, the objective of this study was to compare the students' academic performance through traditional and active learning methods for soil science course.

METHOD

The population for this study was undergraduate students from Faculty of Plantation and Agrotechnology who were enrolled soil science course on semester three (3) at Diploma level. In the second semester of 2016 the students were instructed through traditional teaching methodology for the whole course content within 14 weeks. Students' performance was analyzed through three (3) times of classroom test and the final examination. Students who were failed and have to repeat the course were identified. Those students who repeat the course was re-enrolled the course for first semester of 2017. On first semester of 2017 different methods of active learning were adopted in soil science course to encourage students' engagement in classroom and also to initiate higher-order thinking skills. The active learning approaches that were carried out are consists of visual-based instruction, collaborative learning in the field, and case studies. This active learning was employed during two (2) hours of lecture time per week. Soil science course consists of nine (9) chapters and for the first three- chapter teaching and learning process were conducted through visual-based instruction and next three

chapter was employed collaborative learning in the field while the last three-chapter through case studies. The active learning strategies used for soil science course as follows:

Visual-based instruction:

Lecture of the topics is given together with video for every topic to enhance understanding among students. Instructor use visual physical and digital media to teach abstract concepts. Students are expected to be able to describe the process of soil formation and relate the several factors that affect the soil formation especially in Malaysia through presentation in the classroom. Through presentation it will encourage students to demonstrate what they 'know'.

Collaborative learning in the field:

Students were organized into group and the process of learning was conducted at field where student directly identify the properties of the soil in the field. Students actively feel and observe the properties of soil particularly physical properties followed by discussion with peers and the lecturer. This promote dialog between lecturer and students thus enhance students understanding about the topic given. The construction of knowledge occurs through the exchange of information, the asking of questions, and discussions about and reflections on reality.

Case study:

Students are provided with the real problems and lecturer as facilitator which guide the students find the solutions. Teaching and learning were followed with process a series of discussions of cases. For instance, students are expected to be able to identify the causes of unfertile soil based on its chemical properties and students able to identify agriculture practices to improve soil properties as well as support plant growth. To test the efficacy of different methods active learning versus traditional lecturing, we were comparing both result of classroom test and final examination results by analysing 70 students (n=70) from 110 students who registered this course

for second semester of 2016. Total sample were identified from Krejchie and Morgan (1970). The General Linear Model based univariate ANOVA techniques was applied to examine the effectiveness of teaching methods on students' test scores. The final examination result through teacher-centered learning and combination of active learning methods was compared using T-test. The data were analysed using the Statistical Package Social Science (SPSS) software. The most teaching methodology were identified and were applied from second semester of 2017. The student performance for soil science course were monitored every semester to ensure the effectiveness of teaching methodologies which have been identified and practiced from second semester of 2017 until second semester of 2018.

RESULTS AND DISCUSSION

3.1 Comparison of different teaching methods

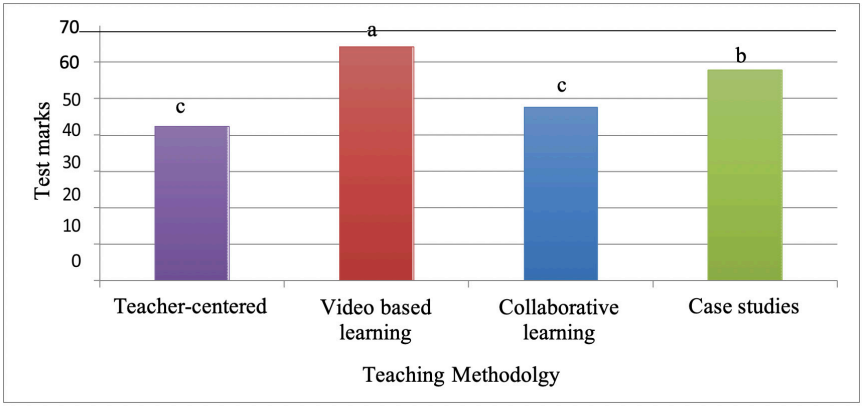

Fig. 1. Mean comparisons of student's test marks for soil science course

Fig. 1. shows video-based learning produced the high mean test marks (64.25%), followed by case studies (57.81%), collaborative studies (47.62%) and the lowest mean test marks was recorded for traditional teaching style (42.43%). The one-way analysis of variance (ANOVA) was employed to evaluate students' test marks according to difference types of teaching

methodologies. Tukey test shows students' test marks was significantly ($p = 0.000$) increased through active learning except for collaborative learning which no significant differences existed when compare with traditional teaching method. Video based learning was the best teaching methods that consistently with the finding by Shephard (2003) who reported that video can be a powerful teaching medium. Video seize students' attention thus motivating them and engaging them with the course especially for students who are 'visual learner'. It also can help students visualise how something works especially for the topics of soil formation which a lot of chemical process occur along the formation of soil where the process difficult to fully explain using text or static image (Schwartz and Hartman, 2006).

3.2 Comparison between teacher-centered and active learning

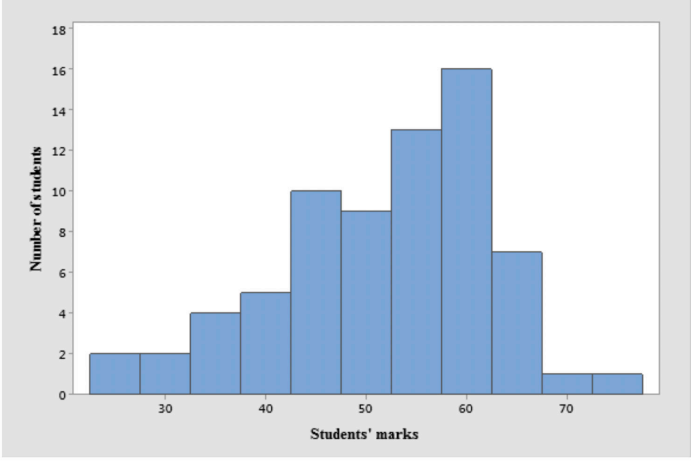

Fig. 2. Distribution of students' final marks through teacher-centered learning

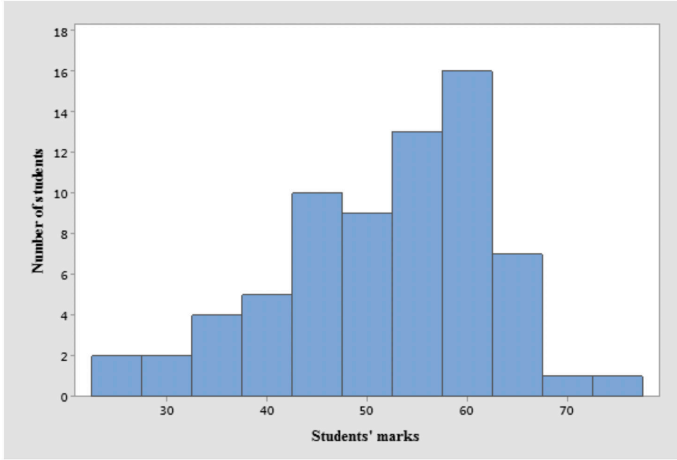

Fig. 3. Distribution of students' final marks through active learning

Fig. 2. shows the distribution of final examination marks from 70 students for soil science course on second semester of 2016 through teacher-centered learning. It shows the lowest range of final examination marks was 19-21 % while the highest range marks was 47-49%. It was noticed that, most of student obtained marks between 39% to 47%. Fig. 3. shows distribution of final students' marks which the students were instructed using active learning methods on first semester of 2017. It shows the lowest range of final examination marks was 22-32 % while the highest range marks was 72-77%. More than 60% of the students obtained marks over 50%. With the comparison between active learning methods and teacher-centered learning, it clearly shows improvement by the students during their study. The increment about 20% to 30% for each student through active learning methodologies.

Table 2. Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Teacher-centered	70	20.43	48.00	40.9466	4.99896
Active learning	70	24.00	75.00	51.9000	10.72063

Based on the teaching method applied, the mean reveal that active learning methods produced the high mean score for final students' academic

performance (mean = 51.90) and teacher –centered method shows slightly low mean score for final students' academic performance (mean = 40.94). This result is consistent with the finding by Lindquist (1995) who indicated that student-centered methods promote greater mastery of the subject than centralizing the flow of knowledge as a one-way channel from the lecturer to the student.

Table 3. Paired Sample T –test

	t	df	Sig. (2-tailed)
Teacher-centered– Active learning	-8.423	69	.000

Table 3 Shows paired sample T – test show the significant difference between final examination result of soil science student for teacher centered method and active learning method ($p = 0.000$). Through active learning engagement in the classroom and open activities during laboratory session at field, students actively participate and gained interest toward the soil science subject. Students involvement during learning session also help them to understand subject much better compare traditional method or teacher centered learning styles. Thus, it is confirmed that students' passively in the classroom or no involvement in the teaching and learning process could lead them score poor academic performance (Hake, 1998).

3.3 MONITORING ACTIVE LEARNING METHOD

Since 2014 until 2016 most of soil science lecturer were teach this course through teacher- centerd leraning. Fig. 4. shows the failure rate more than 10% for every semester within that two years except for first semester of 2015. The highest failure rate was 19.80% which involved of 81 students. Thus, the active learning method were applied for the course started from first semester 2017 until second semester of 2018. The implementation of active learning significantly shows student improvement for the course for the first semester of 2017. It was noticed that, the failure rate for the soil science course were decreased by semester after creating active learning environment in the classroom. It is not only improved student performance for this course but developed their higher order thinking and student

engagement through activities, discussion and group work.

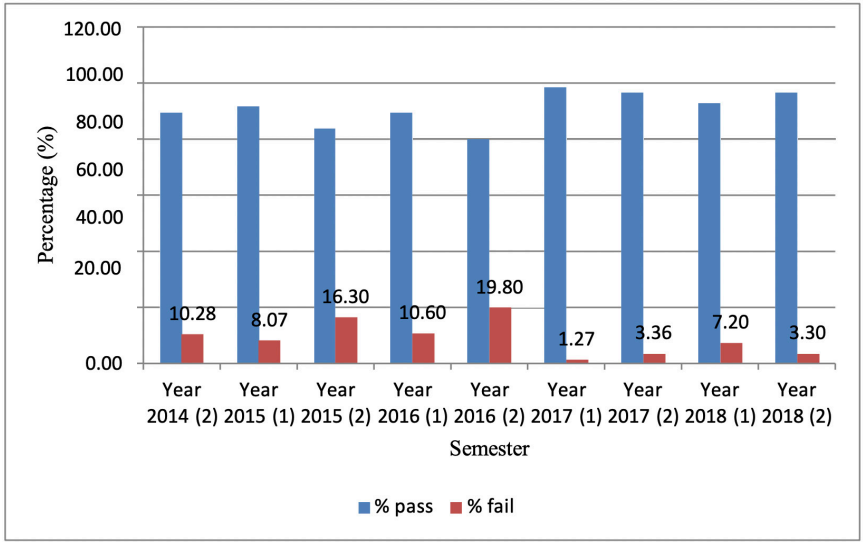

Fig. 4. Students' performance for soil science course from year 2014 to 2018

CONCLUSION

Teacher-centered learning environment with a presentation from the course neither promotes learners' participation nor build the required level of reasoning among students. Combination of active learning methods in soil science course significantly improved students' academic performance. Thus, teacher should create an atmosphere of interactive learning in classroom to enhance students' development and experiences as well as students' academic performance. Through this active learning also improved the other soft skill or competencies such as teamwork and collaboration, readily valued by employers which also can increase employability among graduates.

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Video learning for hearing impaired students through Massive Open Online Courses (MOOC)

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Abstract: Learning for students with hearing loss needs to have several criteria for them to learn effectively. Although various learning methods for these students are available, they are only available in specific courses. The video approach to learning for students with hearing loss has a positive effect. However, studies on the effectiveness of elements that should be present in video content should be emphasized. The purpose of this study is to identify the criteria that should be included in the production of Learning disabilities video for MOOC platforms. The semi-structured interview method was applied to five video specialists and hearing aids. The description of the analysis shows that video learning for students with hearing loss needs to have a language translator for each content.

Keyword :*Video Learning, Hearing Impaired, Massive Open Online Courses (MOOC)*

INTRODUCTION

Along with the current world development, Malaysia has applied Information Communication Technology (ICT) applications in all aspects of life. ICT has enabled MOOC as the medium in Education. ICT has been widely used in the economic, social, and educational. Educators need to apply MOOC in their teaching and learning whether they like it or not. Malaysia's Education has been through some changes in the curriculum system. Ministry of Education has change the direction to fit the country's future skilled resources workers and improves the quality. Intended direction has been taken includes primary, secondary, and tertiary Education. Ministry of Higher Education Malaysia (MoHE) has set the standard regarding

the development of a curriculum for the programs offered by different institutions. This standard includes Knowledge in Specific areas, Practical Skills, Thinking & Scientific Skills, Communication Skills, Social Skills, Teamwork Skills, Responsibilities, Values, Ethics, Moral, Information Management Lifelong Learning, Management, and Entrepreneurship. However, does the curriculum is suitable for all students? Especially for students who have hearing problems. The ability of deaf students is not the same as a typical student. They require a specific approach to understand it easily.

Computers that acts as a learning platform for Education is an essential technology development; thus, the humans' accessibility issues in Web applications are crucial. This includes the learning experience of Hearing impaired Learners. The Web evolutions given by legislation on Web accessibility have also motivated academics to include this theme in MOOC. Following a research on Web Accessibility, it is very crucial for societies to have the capability and right to use any software, hardware or any assistive technologies to understand and fully interact with the website content, regardless disability, geographical location, language barriers, or other impairing factor (Sierkowski, B., 2002). To support this, the Ministry of Education Malaysia has introduced the concept' Education for All'; this means that equal opportunities and education services should be for every student, without judging the aspects of religion, race, sex, and the individuals' difference, hence without unbalancing the normal-hearing and the hearing-impaired as well. This concept focused on the ability, functions, skills, development, power, and achievement of these students towards the Skill Development (Special Education Services, 1998). The Hearing-impaired Learners' higher Education is significant, as it allows them to attain valuable knowledge and skills for social survival and employment, just like the Normal-Hearing Learners. An individual with disabilities is integrated into as natural an environment as possible, as defined in Education in a fully inclusive model (Morrison, G. S., 2004). The Disable Ones shall not be let off from the education system just because they are disabled. Hence, for the disabled ones to further their studies, a logical amendment to suit the disable ones must be provided. This includes the infrastructure, equipment and teaching materials, teaching methods, curricula, and others.

Nevertheless, The Hearing-impaired Learners who cannot perceive sound

due to their loss in the sense of Hearing, this affects the ability to both receive and produce spoken language. Therefore, the Sign Language is used by these individuals to communicate with one another. In higher Education, numerous university institutions do have interpreters who are fluent in both signing and speech to support the students, teachers, and staff in the Education Process. In this research, this study investigates the problems and obstacles faced by the academics teaching the Hearing impaired learners in the Graphic Design Courses. Simultaneously, it investigates the interaction of Hearing impaired Learners' with MOOC in their Graphic Design classes.

ICT Education has increasingly become a painful subject in higher Education, not only for the ordinary individuals but for the Hearing impaired learners too. To ensure the Hearing impaired learners have full access to computer applications and programming tools, academic Educators teaching Graphic Design courses must make efforts to make this possible, alongside the existing tendency towards teaching Graphical User Interfaces (GUI). Subjects like Computer Graphics, Multimedia, Web-Design and 3D-Animation, are among the popular courses, as it attracts the vision of these Hearing impaired Learners, being hearing-impaired. These subjects are of course, taught, learnt and shown with the help of the Sign Language too. The continuous computer technology development has made e-learning, and Educational Technology becomes progressively more vital in Education.

Computer Education field offers high-paying careers yet rather challenging, which are accessible to the Hearing impaired Learners. Computing careers are potentially open to individuals with disabilities because of advancements in assistive technology that provide access to computers (Burgstahler et al., 2006). Moreover, ICT has unlocked many opportunities for the Hearing impaired because of most jobs in the Graphic Design industry use computers, which are hearing impaired-friendly. By using computers, many career opportunities are open up for the Hearing impaired in such areas as Data Entry, Graphics animation, Computer Operations, Computer Programming, Computer Technician, Software testing and development, Web Design Development, and more. There is a full acknowledgment in computing innovation that requires diverse workforces of qualified systems designers, computer scientists, information professionals, software developers, information systems analysts, technology teachers, computing faculty, and other computing professionals. Graphic Design Education is vital for

Hearing impaired Learners. Supported visual media aids like graphs, charts, and tables are frequently used for computer education, as these individuals have to depend more on vision due to their defect of hearing (Murakami et al. 2002). Since computers are adaptable to the Hearing impaired Learners, Computer education does fit for them, mainly for reasons like minimal supervision, enhances hearing impaired-creativity, as computers are Hearing impaired-Friendly. Because these individuals' have lost their hearing senses, the massive majority of them are highly skilled in visual aspects like drawing and designing. They tend to excel better in an area like Web Design, Visual Arts, and Graphics Animation. This perspective is suitable for the Hearing impaired to learn computer courses, as it studies how they interact with the learning materials via a computer.

PROBLEM STATEMENT

Hearing-impaired students have trouble learning graphic design courses because they have communication problems. Although these Hearing impaired students have the visual amenities interpreters, communication constraints still unresolved. Most institutions of higher learning that offer Graphic Design courses do not have specialized lecturers who will teach these hearing-impaired students. Most of them do not know how to use sign language. So, relying on interpreters happen. Disclosure of ICT to facilitate the learning of hearing-impaired students in Malaysia still under study. Certain of the interpreters who do not understand the course taught, indirectly failed to interpret the exact meaning of these Hearing impaired students. As a result, hearing impaired received the wrong information. Interpreter services are paid, and most of it is based on a volunteer basis. Students who can afford it are willing to finance these interpreters.

PROPOSE OF THE STUDY

To ensure that MOOC is a handy platform to enhance the understanding of hearing-impaired students learns graphic design courses. This MOOC course content and delivery of purpose-built for hearing impaired students. Explainer videos will be used in the delivery of the material that will come with subtitles. Hearing-impaired students do not need to get help

interpreters to learn about Graphic Design courses. Lecturers also do not need to communicate using sign language while teaching. By using MOOC, hearing impaired students can discuss with the forum to address the problem of understanding the courses taught. Researchers are also studying the effectiveness of explainer video, with subtitles influence hearing-impaired students' understanding. Then, develop the explainer video by using graphic communication theory to assure the effectiveness.

RESEARCH QUESTION

1. Can explainer video with subtitles enhance content delivery?
2. Can the Theory of Communication influence the effectiveness of explainer video?

MOOC

The massive open online course (MOOC) is presented as a novel idea created by maverick professors and further developed with a goal to further democratize Education on bases of quality and cost. The perception of this sequence of events as modular history has perpetuated a difficulty in developing MOOC-related research and critique within the fields of distance and online Education. At the center of this struggle is the MOOC acronym: its initial development was in 2008, and its use today happens in opposition to the theoretical and pedagogical elements of the 2008 MOOC.

GRAPHIC DESIGN

According to (Landa, 2011) Graphic Design is a form of visual communication used to convey a message or information to an audience. It is a visual representation of an idea relying on the criterion, selection, and organization of visual elements. The great graphic design imbues a message with more significant meaning. Graphic design is, therefore, one of the ways in which creativity takes on a visual reality. A graphic design solution can persuade, identify, motivate, enhance, organize, brand, rouse, locate, engage, carry, or convey many levels of meaning. With the advantages of belonging to the graphic features will help hearing-impaired students to

communicate more effectively.

HEARING IMPAIRED STUDENT

The term "Hearing Impaired" is a technically accurate description of someone who is hard of hearing or who has no hearing ability. Lack of Hearing causes difficulty in learning like an average person.

EXPLAINER VIDEO

An explainer video is a video that combines several techniques and graphical elements to make effective delivery compared to standard video. The aim is to keep the audience to understand the content to be. Usually, explainer video uses animation and graphic depiction to be able to give full attention to the audience while to see it.

LITERATURE REVIEW

There are many kinds of literature that focus on the interests and needs of MOOC, multimedia, and ICT in assisting the hearing-impaired student to learn content more effectively. There are some researchers who develop specific software to achieve specified objectives. Planning has been done for the Hearing impaired student's needs. According to (Bottoni, Capuano, De Marsico, Labella, & Levialdi, 2011) The production of multimedia materials Deaf-Centered Learning Environment (DALE) has been helping Hearing impaired in dealing with with learning disabilities. DALE is a multimedia-based learning platform Storytelling, Conceptual Metaphors, and adopts Cognitive Embodiment as a framework to address the critical subject.

According to (Bueno, Garcia, Borrego, del Castillo, & ACM, 2007), hearing impaired students have trouble finishing their studies at the tertiary level. The main problem faced by these students is reading comprehension. Nevertheless, after using the MOOC approach, student understanding was increasing. The use of technology in learning will have an impact on their lives. The hearing-impaired student could not wait but should continue to use MOOC as a learning platform.

Kumar et al. (2013), the Massive Open Online Course is a is the one way of learning in this digital social network world. MOOC is an Open, Participatory, Distributed, and Lifelong networked learning. It has the facility of various courses, with a start, end dates, and participants. It is a way to connect and collaborate while developing digital skills and engage in a learning process. MOOC can promote network learning for lifelong. People that have reputations for exceptional skills and innovative thinking besides a topic collaborate by opening an online course covering that topic. In a MOOC DHH, students can choose what they want to do, how they want to participate, and they can decide.

Although the use of MOOC is becoming more widespread, the effectiveness of the developed content is debatable. The use of video in MOOC platforms have become the norm, but how effective video for hearing impaired development is still to be made a proper investigation. According to (Debevc, Kosec, & Holzinger, 2010), adapting the learning materials for deaf and hard of Hearing required different approaches and guidelines to properly displaying sign language video. Therefore arbitrary video production may not have an impact on students. This opinion is supported by (Lopez-Colino, Tejedor, Porta, & Colas, 2011) that provides a mechanism by which teaching can be done with video wield but assisted with the subtitle generate by the tools given. Tools will convert voice into subtitles for the video provided.

Most studies of MOOC approaches just focus on language areas only. The exposure to other areas of the Hearing impaired is still minimal. However, there is some study that showed the importance of other areas and concern to the Hearing impaired student. Students who have hearing problems are more likely to give more focused on visual. The field of graphic design are using purely visual medium to communicate with others. In principle, the graphic design is the process of communication to convey information or content to the recipient. The details under field of graphic design are Web Development, Advertising, Illustration, Interactive Multimedia Content, Animation, and others. According to (Zaharudin, Nordin, & Yasin, 2011) the Hearing impaired student more interested in the field of graphic design as a visual field using computer involvement. She said the majority of the Hearing impaired student-tested, choose graphic design area for their future courses.

METHODOLOGY

Specific Methodology used to answer the research questions. To ensure that a study carried out successfully, several processes that have to be considered among them is the Research Design, Sampling, Internal Validity, Conceptual Framework, and data analysis. Researchers use Design & Developmental Research (DDR) to carry out this study. DDR has its own uniqueness because it structured the procedure. DDR is a systematic research tool that allowed the researcher to identify and solve the issues accordingly (Richey & Klein, 2007).

SAMPLING

The researcher uses the purposeful sampling method to identify an expert and hearing-impaired students. The experts must have the experience, and empirical knowledge on video making plus with capability to map with the Hearing impaired students' needs and preferences.

INSTRUMENT

According to Wimmer & Dominick (2011), the interview method is the question and answer where the researcher asked the respondent question with the opportunity for a follow-up question. There are several benefits in using the Interviews method as the respondent will give a specific answer by elaborating on their opinions, values, motivation, concern, and feeling. In this research, the interview was carried out to understand the topic accurately and to find an answer to the research question. The research used a semi-structured interview with the experts and hearing deaf students to get the criteria in developing explanatory video learning for hearing impaired students.

RESULTS

Researchers have interviewed five experts to identify the need for explanatory video learning for animation modules and learning disabilities. The five selected experts have experience with teaching hearing-impaired

graphic arts courses at SMPKV, Shah Alam, Malaysia, with permission from the Ministry of Education, Special Education Division, and School Principals. Researchers use semi-structured interview methods and use interview protocols because interviewers can ignore questions that they feel are inappropriate or add to the need (Robson, 2002). Each expert is interviewed individually so that their opinions are not influenced by the other teacher while the group is being interviewed as the researchers need to use the translator services at the same time.

Based on the analysis of student questionnaires and teacher interviews, there are some commonalities in developing video learning for hearing impaired students. The choice of graphic arts course is a priority for students with hearing impaired according to the opinions of three experts. The findings of this study also support studies conducted by Rozniza Zaharudin, Norazah Nordin, & Mohd Hanafi Mohd Yasin (2011) in which students with hearing loss are more likely to learn areas involving Information Communication Technology (ICT) related such as web design, animation, and multimedia applications.

Although graphic animation is one of the most popular areas for hearing impaired students, the findings show that graphic animation courses are the most challenging courses for students to see. This animation course is not only challenging for students with hearing problems but also for the average student to have difficulty mastering animation (Mohd-Riaz & Zaman, 2011; Zhang, 2015). Studies conducted by McKenna and Zeltzer (1990) also suggest that animation is a challenging course to learn because it involves creative thinking and imagination. However, experts think animation is one of the things that will interest students. This fact was supported by a study conducted by Kacorri, Huenerfauth, Ebling, Patel, and Willard (2015), who used animation in the learning of hearing-impaired students. According to a study conducted by Kacorri et al. (2015), animation has been used as a learning method, and it is different from this study because students with learning disabilities will learn to make animations. Researchers will, therefore, develop learning videos that focus on graphic animation courses.

As a result of the interviews, the use of sign language is an effective means of communication-based on students' Hearing impaired. This requirement supports the highlights of a study conducted by Le Bel, Pineda, and Sharma

(2009), who says the use of sign language for hearing impaired people still needs to be refined. According to a study conducted by Nagalingam (2008) states that although reading texts can help students with hearing problems, it cannot match the smoothness of communication with sign language. Therefore, this learning video will use sign language translation services throughout the content. The findings of this study are in agreement with the theory of cognitive-communication theory by Festinger (1957) and accommodation communication theory by Barnette (2009) because students have the right to choose the right type of communication to study graphic animation courses.

CONCLUSION

The analysis of students' Hearing needs further shows that technology plays a vital role in learning. As well as expert opinion, the interview results show the video should help students. This finding can be attributed to the instrumental theory of technology by Feenberg (2002), who argues that technology approaches such as video as tools in learning. From a specialist's perspective, video is a must for learning modules. Teachers feel that explanations in sign language need to be recorded and shared so that students can see them again and again. The use of video as a learning resource is also the highest view of students. This assertion is supported by a literature review by Al-Rousan, Assaleh, and Tala'a (2009), which explains that videos without audio require additional elements such as subtitles and translation. Therefore, every description in the graphic arts learning module needs to have sign language translation in the form of video.

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