ORAL COMMUNICATION APPREHENSION AND MUET SPEAKING PERFORMANCE
OF ENGINEERING UNDERGRADUATES IN A TECHNICAL UNIVERSITY

Subatira, B. , Indra Devi, S., and Linda K.M. S.
Centre for Languages & Human Development, Universiti Teknikal Malaysia Melaka,
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia
*Corresponding e-mail: subatira@utem.edu.my

ABSTRACT

It is highly noted that employers expect our local university students to possess good oral communication skills when they enter job markets. Fear of speaking especially in the English language has been found to be a hindrance to most local graduates during their job – seeking ventures. This study attempts to identify the level of communication apprehension among the undergraduates of the Mechanical Engineering programme at UTeM. It also aims to determine if there is a possible correlation between the undergraduates' oral communication apprehension (OCA) level and their performance in the Malaysian University English Test Speaking (MUET) assessment. The study involved 50 third year Mechanical Engineering undergraduates. Data was gathered through the use of the Personal Report of Communication Apprehension (PRCA-24) developed by McCroskey (1984) while the undergraduates' MUET Speaking component scores were used as a measure of their English language speaking performance. Statistical Package for Social Sciences (SPSS) version 22 was used to analyse the data. Results indicate that the undergraduates had a higher level of communication apprehension in activity like public speaking in comparison to other communicative activities such as group discussions, meetings and interpersonal conversations, which they experienced a moderate level of communication apprehension. The findings also show that there is a negative correlation between the undergraduates' communication apprehension and their MUET Speaking scores. With these findings, it is compelling to determine what causes the students to experience communication apprehension and how classrooms can lower their communication apprehension level.

Keywords: *oral communication apprehension, MUET, speaking performance, engineering undergraduates, technical university*

1.   INTRODUCTION

Despite the fact that the Malaysian education system provides a compulsory 11-13 years of English language learning in the formal classrooms, many students if not most, still lack the ability to speak the language competently without displaying any signs of speaking fears. These fears of speaking in the English language often hinder their performance at the tertiary level. This is more so as the medium of instruction in the Engineering programmes in the local universities are in English. When these students leave the universities to look for jobs, again the same problem arises during their job interviews. Mastery of the English language is utmost important nowadays. Competitions are very stiff and only the best graduates will be hired by the ever competing multinational

companies in the country. Thus being skillful in communicating in the English language is no longer a preference but rather a must for all Engineering undergraduates . Engineers are expected to excel in the workplace in every way which includes being able to effectively convey technical information and display acceptable social and communication skills in order to excel in the workplace (Hafizoah & Fatimah, 2010). Lack of communication skills among graduating engineers was discovered almost two decades ago where the Society for Manufacturing Engineers reported that there was a competency gap in the engineering education, and the one deemed one of the most prominent was the "lack of communication skills" (Sageev & Romanowski, 2001). Darling & Dannels (2003) claims that practising engineers maintained the importance of oral communication and formal presentations in their daily work.

Communication apprehension (CA) by definition is "the fear or anxiety associated with real or anticipated communication with others" (McCroskey, 1977). When faced with a situation that required an individual to communicate orally, he or she may experience a type of fear or anxiety. The levels of anxiety or fear people experience in form of CA differs. CA occurs in a variety of settings and often results in negative outcomes for both speakers and listeners. Mc Croskey (1984) further defines CA as more of a way an individual feels about communication and less about how they communicate. People who are highly communication apprehensive are those whose apprehension about taking part in discussions surpasses the anticipated benefits they feel they would derive in certain circumstances (McCroskey, 1970; Hassal, et al., 2013)

There are quite a number of researchers who have dvelved in the area of CA in the past decades. Wan Zumusni et al. (2010) discovered that the CA level among the final year Bachelor of Business Administration students was very high. The study reported that many of the respondents disliked participating in public speaking and claimed that they felt public speaking invoked fear and anxiety in them. In another study carried out much earlier, Shameem Rafik_Galea and Siti Yasmin (2006) found that their respondents had high levels of CA due to their poor language proficiency. Researchers Rosnah and Siti Norfishah (2009) claimed that most of their respondents recorded high CA. Indra Devi and Farah (2008) conducted a study involving Electrical engineering students and found that the students had moderate CA levels. Noor Raha and Kaur (2010) discovered that majority of their respondents from an engineering programme suffered from a moderate level of CA.

Thaher (2005) claimed students showed a significant level of CA which negatively affected their language learning outcomes. Fareed and Imran (2014) in their study involving 334 engineering undergraduates in a university in Pakistan found that 66% of their respondents experienced an average level of OCA and 18% had a high level of OCA. Amogne and Yigzaw (2013) did a study on 76 maritime engineering students and it was revealed that the students had a moderate level of communication apprehension , which means they were generally apprehensive towards performing oral communication tasks. Rasakumaran and Indra Devi (2018) in their study involving 24 freshmen from the Faculty of Medicine agreed that the respondents experienced a moderate level of OCA and that pedagogical interventions could help in overcoming their OCA.Similar finding was reported by Pitt et al. (2000) where a sample of 113 industrial salespersons recruited from offices of a major European vehicle manufacturer in six countries

within Europe and Asia. The results showed that there was a small but significant effect of communication apprehension on the performance of salespersons.

This study, therefore, was carried out in an attempt to finding out if students had a CA level that could be correlated to their performance in the Malaysian University English Test Speaking (MUET) speaking assessment. Mechanical Engineering students at UTeM are being trained in their English communication skills so that they can compete in the job market when they graduate after their four years of studies. There are two English courses that the degree students will have to take throughout their studies which are Technical English and English for Professional Communication. As the students are trained to be well versed in their Engineering content subjects, equal emphasis is also given to their English communication skills. This is to ensure these future engineers will be effective workers in terms of knowledge and communication skills.

Thus, this study aims at examining the level of UTeM Mechanical Engineering students' oral communication apprehension and its correlation (if any) with their performance in their MUET speaking assessment. This study specifically intends to answer the following questions:

a) What is the UTeM Mechanical Engineering students' level of communication apprehension?

b) What relationship (if any) does exist among the UTeM Mechanical Engineering students' level of communication apprehension and their MUET speaking assessment score?

1.1   Objectives of the study

The study aims to find out the level of oral communication apprehension among the Mechanical Engineering undergraduates of UTeM. It looks into the four specific communication contexts which these undergraduates often engage in namely group discussion, meeting, interpersonal communication and public speaking. It also aims to determine if the level of oral communication apprehension among the Mechanical Engineering undergraduates of UTeM has any impacts on their performance in the MUET Speaking assessment. Thus, the specific objectives of the study are as follows:

a) To identify the level of oral communication apprehension among the Mechanical Engineering undergraduates of UTeM

b) To determine if there exists a correlation between oral communication apprehension and the performance of the Mechanical Engineering undergraduates of UTeM in their MUET Speaking assessment

2.   METHODOLOGY

2.1   Participants

The 50 participants selected for the study were all 3rd year students pursuing the Bachelor of Mechanical Engineering at Universiti Teknikal Malaysia Melaka (UTeM). All these participants

were in the same class attending the English for Professional Communication (EPC) subject. The EPC subject exposed and familiarised them to workplace matters such as job application documents, interview processes, meeting skills and oral presentations. The instructor for the group/subject was the researcher herself. The EPC classes ran for 14 weeks with 3 hours of classroom instruction every week. This group comprised both males and females who mostly possessed a medium level of English language proficiency.

Table 1 shows a breakdown of the undergraduates based on gender while table 2 shows the English language proficiency in terms of MUET bands.

Table 1: Number and percentage of undergraduates based on gender

	Frequency	Percent
MALE	33	66.0
FEMALE	17	34.0
Total	50	100.0

Table 2: Number and percentage of undergraduates' MUET band

	Frequency	Percent
Band 2	1	2.0
Band 3	40	80.0
Band 4	9	18.0
Total	50	100.0

2.2   Instruments/Procedures

The Personal Report of Communication (PRCA-24) questionnaire developed by McCroskey (1984) was used to measure the students' oral communication apprehension level. The questionnaire contains 24 items which are aimed at measuring students' level of apprehension while communicating in the English language in various situations. The instrument is most widely used in college classes and measures overall anxiety as well as anxiety in four communication contexts: interpersonal or dyadic, small group, meeting or large group and public speaking. The PRCA-24 questionnaire requires the participants to rate each item by using the scale based on the rubrics stated. The instrument states that the individual scores should range between 24 and 120. Individuals with scores below 55 are considered to have a low level of communication

apprehension. Those with scores between 55 and 83 are considered having a moderate level of communication apprehension while scores above 83 indicate a high level of communication apprehension.

The PRCA-24 questionnaire is highly preferred by many researchers for the measurement of communication apprehension as the instrument has high level reliability (Cronbach alpha=0.94). Beatty (1994) concurred that the instrument is preferred in gauging the communication apprehension level of individuals due to its alpha reliability to be between 0.93 and 0.95. Other researchers (Gardner, Milne, Stringer & Whitting, 2005; Francis & Miller, 2008; Vevea, Pearson, Child & Semlak, 2009) agreed that the instrument has a high internal reliability of more than 0.90.

Another instrument used was the students' MUET speaking assessment score. The maximum score for the MUET Speaking assessment is 45. The MUET speaking assessment score was used to determine the relationship between the students' communication apprehension level and their speaking performance.

3.   DATA ANALYSIS AND INTERPRETATION

3.1   Measure of students' oral communication apprehension

Table 3 indicates the overall communication apprehension of the 50 students who completed the PRCA-24. The maximum score was 98 and the minimum was 40. The mean value of communication apprehension among them was 70.54 and standard deviation was 14.11.

Table 3: Analysis of 50 students' Personal Report of Communication Apprehension

Mean	70.54
Std. Deviation	14.11
Minimum	40
Maximum	98

Table 4 shows the details of PRCA scores of the students. The survey shows 32 students (64%) which is more than half of the total number of participants experience moderate level of communication apprehension. Only 8 students (16%) have low communication apprehension while 10 students (20 %) have high communication apprehension. It is pertinent to note that on the whole, 84% of the total respondents of this survey indicated that they are affected by problems of communication apprehension while communicating in the four types of settings such as group discussions, meetings, interpersonal communication and public speaking.

Table 4: Communication Apprehension score of 50 students

CA level	Frequency	Percent
Low	8	16.0
Moderate	32	64.0
High	10	20.0
Total	50	100.0

Table 5 shows the 50 students' sub scores for four communication contexts which are group discussions, meetings, interpersonal communications and public speaking. The data reveals that the students were most apprehensive in public speaking situations for which they had a mean apprehension level of 20.68 with a standard deviation (SD) of 4.55. The meeting mean value was 17.84 with SD of 4.62 while interpersonal communication had a mean value of 17.36 with SD of 4.59. Students were least apprehensive in communicating in group discussions where the mean value was 14.64 with SD of 3.83. It is to be noted that scores for the four communication contexts can range from a low of 6 to a high of 30. Scores above 18 reflect some degree of apprehension on the students' part (McCroskey, 1984).

Table 5: Descriptive statistics for students' level of communication apprehension in four contexts of communication

Contexts	N	Mean	Std. Deviation
Group Discussion	50	14.64	3.83
Meeting	50	17.84	4.62
Interpersonal Communication	50	17.36	4.59
Public Speaking	50	20.68	4.55
Overall Communication Apprehension level	50	70.54	14.11

These findings agree with the findings in Pitt et al.'s (2010) study which claimed the public speaking having the highest level of communication apprehension, and an overall high apprehension among students. Similar results were also claimed by Charlesworth (2008) in that the highest level of oral communication apprehension was contributed by the public speaking task.

3.2 Correlation between oral communication apprehension and MUET Speaking assessment performance

It is evident from Table 6 that OCA is negatively correlated with MUET Speaking assessment performance. Students' OCA and their MUET Speaking assessment performance were found to correlate at r= -.481, p=.000. This indicates that there is a relation between students' OCA level and their performance in the MUET Speaking assessment. Hence. the negative correlation shown implies the higher the OCA level of the students, the lower their MUET Speaking assessment performance will be.

The findings of this study concur with the view that OCA affects graded classroom communication ie. language performance (Allen & Bourhis, 1996). Allen & Bourhis (ibid.) stated that a 'superb' speaker could be expected to be more than 8 times more likely to be low in CA than high in CA. However, Indra Devi and Feroz (2008) reported that they found university's students' oral communication performance were not affected by communication apprehension. Rojo-Laurilla (2007) also reported that there was no significant relationship between students' EFL communication apprehension and oral communication competence.

Table 6: Correlation between OCA and MUET speaking assessment performance

Parameter		Overall CA level	Speaking Score
Overall CA level	Pearson Correlation	1	-.481[**]
	Sig. (2-tailed)		.000
	N	50	50
	N	50	50

[**]. Correlation is significant at the 0.01 level (2-tailed).

4.   CONCLUSION AND RECOMMENDATIONS

The results indicate the presence of CA among the Mechanical Engineering students albeit at a moderate level. English language instructors need to design their lessons in such a way which will lower the effect of communication apprehension in the students. With minimal communication apprehension, chances are great that our Engineering undergraduates will be able to upgrade their English communication skills. English language instructors are responsible in providing a non-threatening environment for a successful acquisition of the language. Fun speaking activities which do not inhibit learners' motivation and which encourage their active involvement in the speaking activities will definitely go a long way in churning out competent engineers who excel both in hard and soft skills. Higher learning institutions need to take into account of OCA effects on the Engineering students and devise their curriculum and syllabus which could counter its effects.

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PROTOTYPE DEVELOPMENT OF PERSONALISED LEARNING ENVIRONMENT FOR NUTRITION TOPIC FOR SECONDARY SCHOOL

Che Ku Nuraini C.K. M.* and Faaizah S.

Department of Media Interactive Faculty of Information and Communication Technology Universiti Teknikal Malaysia Melaka Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Corresponding e-mail: faaizah@utem.edu.my

ABSTRACT

In recent years, education field have moved rapidly towards integrating technology or computer in the process of teaching and learning. This is because computer has a great potential for enhance teaching and learning outcomes. Its purpose should be centered on humanity and public interest. The objective of this research is to develop personalised learning as a tool for students since Nutrition is one of the most important topic in Science subject but often difficult subjects to teach at the secondary school education level. Several surveys are developed to know about learning needs and goals and to construct the vision of PLE organization. This study adapted personalised learning method to get involved more closely to the phenomena of learning in such open online environments in which research her was able as a learner to participate in the various activities of the courses, interact with participants to explore the processes of learning and interaction. The findings show that the prototype is well designed in terms of using personalized learning elements which goes through a series of systematic testing stages. In turn, it is highly anticipated that the creation of the PLENut, would be an alternative approach so that all students could capture, in a richer and more meaningful manner, the concepts of Nutrition. This prototype will be a solution in using a variety of social media in teaching students to become effective self-regulated learners. Besides that, it can contribute to the society by humanizing the innovation and technology through Higher Education 4.0.

Keywords: *Multimedia; Science; PLE*

1. INTRODUCTION

Over the last two decades the use of E-learning technology increased to such an extent that the role of the traditional academic has been forced to change [9]. Today's younger generation, they are being called, have been taught how to use computers and various computer programs both at home and in their elementary and secondary institutions [3]. The use of information and communications technology (ICT) is one of the ways to encourage the process of learning, to support communication in learning settings, assess learning activities, manage resources and to create educational materials [4]. During the process of learning, students communicate, negotiate and talk each other to share their achievements [7]. Thus this is an area that is often described as 'learning technology' or 'technology enhanced learning', and where technologies are framed in terms of their association with learning example 'learning management systems' and 'learning analytics' [8].

Personalization is one of the recurring themes in education and has occupied a large amount of specialized literature, since its appearance in the 1960s [2]. The role of technology continues to play a role in bringing personalized learning to scale, personalized learning has made its way into the classroom. By integrating the principles of personalized learning with the tools of technology, some educators argue that they can create the kind of customized learning environment that has the potential for breaking schools out of the industrial-age model of education and bring about true 21st century school reform [6]. A reassessment of mobile learning, a critical exploration of the ideological underpinnings of national digital strategies, and pedagogical analysis of personalized and adaptive learning [8]. Academic help-seeking is one among many learning strategies students use to improve their learning, including studying more, organizing one's studying, note-taking, outlining notes and readings, reviewing, choosing engaging assignments, and managing expectations including lowering aspirations [1].

Current personalized learning there is a limited personalised courseware tools for e-learning contribute to the lack of students interest in Science. Personalization in online learning remains the focus of attention of many researchers nowadays. The use of multimedia, especially animation elements have the potential to help teachers deliver a scientific concept more clearly, as compared to oral delivery or static illustration [10]. The other problem is student's lack of connection between the formal, non-formal and informal environments in online learning which makes it difficult to improve learning processes [11].

In this paper, we analyse students' performance using PLENut as personalised learning approach in learning a Science course.

2. METHODOLOGY

Samples; Three separate sample pre-test-post-test design were used as a testing procedure in this study which involve form 2 students from secondary school in Melaka.

Design & Development; In the design phase, planning was made to specify the VAK teaching activities and identify learning contents. The questionnaire covers the Nutrition topic in Science subject, preferences types of learning styles in PLENut and checklist for PLENut. The design for PLE elements such as *Content, Communication, Connection, Community, Collaboration, Collection and Creation.* The content of the prototype is based on *Panduan Perkembangan Pembelajaran Murid Sains Tingkatan 2* according to Ministry of Educations Malaysia. The aims of the science curriculum for secondary school are to provide students with the knowledge and skills in science and technology and enable them to solve problems and make decisions in everyday life based on science attitudes and nobles values [5].

Implementation; The study was conducted by permission of a school administrator. The school administrator referred the researcher to the subject coordinator. The coordinator recommended the first group of respondents who consists of Science teachers based on their 5-year teaching experience to be invited for an interview and self-administered questionnaire with assistance by the researcher.

Instrument; Pre Test, Learning Styles Preferences, Consent Form, Post Test and PLENut Evaluation Form were used in this study. The aim of pre-test is to measure of pre-existing knowledge on the Nutrition topic. The performance scores were calculated using the sum of 50 marks as the scores for 100%.

Data Collection Procedure: Before conducting test for both groups, all students were given pre-test through a set of questions to test their prior knowledge. The students went through the treatment using PLENut for 6 weeks. After treatment 1, all students completed the questionnaire during post-test to see their student's increment. The evaluation tha   t involves testing of *PLENut*. Student performance involve for Visual Learning Styles, Auditory Learning Styles and Kinaesthetic Learning Styles. The testing using a non-parametric which is Pretest and Posttest. The evaluation of student performance use three separate sample pre-test post-test design.

3. RESULTS AND DISCUSSION

Table 1 shows 26 students in Visual 1 group scores after measurement (*Sum of Ranks* = 351.00), 25 students in Visual 2 group show scores after measurement (*Sum of Ranks* = 325.00) and 25 students in Visual 3 group show scores after measurement (*Sum of Ranks* = 325.00). The test indicated that all group is significant for Visual 1 group [z = -4.460, N-Ties = 3, p < .05], Visual 2 group [z = -4.374, N-Ties = 0, p < .05] and Visual 3 group [z = -4.374, N-Ties = 0, p < .05]. Therefore, a significant difference was found to exist between the pre-test and post-test score for all groups.

Table 1 Comparing pre-test and post-test learning style scores for Visual

Group	Post-test scores - Prettest scores	N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Visual 1	Negative Ranks	0	.00	.00	-4.460	.000
	Positive Ranks	26	13.50	351.00		
	Ties	0				
	Total	26				
Visual 2	Negative Ranks	0	.00	.00	-4.374	.000
	Positive Ranks	25	13.00	325.00		
	Ties	0				
	Total	25				
Visual 3	Negative Ranks	0	.00	.00	-4.374	.000
	Positive Ranks	25	13.00	325.00		
	Ties	0				
	Total	25				

Table 2, 12 students in Auditory 1 group show scores after measurement (Sum of Ranks = 78.00), 12 students in Auditory 2 group show scores after measurement (Sum of Ranks = 78.00) and 11 students in Auditory 3 group show scores after measurement (Sum of Ranks = 66.00). The test indicated that all group is significant for Auditory 1 group [$z = -3.061$, N-Ties = 0, $p < .05$], Auditory 2 group [$z = -3.063$, N-Ties = 0, $p < .05$] and Auditory 3 group [$z = -2.941$, N-Ties = 0, $p < .05$]. Therefore, a significant difference was found to exist between the pre-test and post-test score for all groups.

Table 2 Comparing pre-test and post-test learning style scores for Auditory.

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Group	Post-test scores - Prettest scores	N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Auditory 1	Negative Ranks	0	.00	.00	-3.061	.002
	Positive Ranks	12	6.50	78.00		
	Ties	0				
	Total	12				
Auditory 2	Negative Ranks	0	.00	.00	-3.063	.002
	Positive Ranks	12	6.50	78.00		
	Ties	0				
	Total	12				
Auditory 3	Negative Ranks	0	.00	.00	-2.941	.003
	Positive Ranks	11	6.00	66.00		
	Ties	0				
	Total	11				

According to Table 3, 7 students in group Kinaesthetic 1 show scores after measurement (Sum of Ranks = 28.00), 7 students in group Kinaesthetic 2 show scores after measurement (Sum of Ranks = 28.00) and 7 students group in Kinaesthetic 3 show scores after measurement (Sum of Ranks = 28.00). The test indicated that all group is significant for group Kinaesthetic 1 [z = -2.371, N-Ties = 0, p < .05], group Kinaesthetic 2 [z = -2.375, N-Ties = 0, p < .05] and group Kinaesthetic 3 [z = -2.371, N-Ties = 0, p < .05]. Therefore, a significant difference was found to exist between the pre-test and post-test score for all groups.

Table 3 Comparing pre-test and post-test learning style scores for Kinaesthetic.

Group	Post-test scores - Prettest scores	N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Kinaesthetic 1	Negative Ranks	0	.00	.00	-2.371	.018
	Positive Ranks	7	4.00	28.00		
	Ties	0				
	Total	7				
Kinaesthetic 2	Negative Ranks	0	.00	.00	-2.375	.018
	Positive Ranks	7	4.00	28.00		
	Ties	0				
	Total	7				
Kinaesthetic 3	Negative Ranks	0	.00	.00	-2.371	.018
	Positive Ranks	7	4.00	28.00		
	Ties	0				
	Total	7				

CONCLUSIONS

This study presents findings on the implementation of a personalised learning approach in secondary school. Results of the study shows that students' learning styles significantly affect student performance in the classroom and to improve teaching methods accordingly. These findings suggest that PLENut model could be used to inform the teachers or academicians about the important components or themes, learners, content and context that needs to be considered when preparing courses.

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MOOC WEB DESIGN FROM THE PERSPECTIVE OF MALAYSIAN TECHNICAL UNIVERSITY

Nlizwa R.[1*], Faaizah S.[2], Aina K.[1] , Sedek, M.[3], Samer S.[3]

[1)] Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2)] Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[3)] Institute of Technology Management and Technopreneurship Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*]Corresponding e-mail: nurulizwa@utem.edu.my

Keywords: MOOC, web design and perceived use

ABSTRACT – *MOOC is one of the evolving technologies in the field of education for online learning. MOOC has become a platform where no limitation and boundaries exist in gaining knowledge. Even though there are numbers of research emphasis on the motivation and acceptance of MOOC for higher education landscape, however limited research found in the areas of MOOC web design. Thus, this research is keen to investigate the significance web design of MOOC in the South-East Asia context, particularly Malaysia. This research measured MOOC web design factors such as site design, information usefulness, content, and interactivity toward perceived ease of use.*

1. INTRODUCTION

The Since 2013, MOOC is known as one of a popular trend in e-learning. MOOC is used in nation-wide as a platform that eases the process of knowledge access. According to Bozkurt et al, (2016), what makes using MOOC an effective teaching tool are because of course delivery, namely, preparation, attraction, participation, interaction, consolidation and post-course support.

With the existence of latest technology applied in the classroom, online education provides an advantage for student flexibility to access. Besides, one other aspect that indicates toward the opportunity of web-based learning is an advancement in Information Communication Technology (ICT) or the Internet which has changed how the world is now connecting and adapting towards the innovativeness (Nisiotis et al. 2015). Revolution in digital is one of the reason for the massive transformation that education world is now faced. From all area specifically education, a lot of efforts has been taken by the world and also Malaysia to improve the way of education is being delivered. Accessing knowledge through MOOC is the best approach and the simplest method as for knowledge transfer as in [1-2].

This study measures the relationship of web design factors, which are site design, information usefulness, content/material design and interactivity and perceived of use in the utilization of MOOC application. Web design is a complete structure indicate the blueprint, roadmap, or can also be storyboard of the project plan, including objective development, content, and plan for the course design in all perspective. [3] stated that the comprehensiveness of information is one of the five most important features to emphasize the design of MOOC website. The element of content has played a major role in the deliverable aspect of MOOC. Good content may influence positively the intention to continuously used MOOC with the perceived of timely access to content or easily find information that they desired. Apart from the impact on good content, interactivity among peers will eventually indicate toward the motivating influence for participant continuance and MOOC learning [4].

2. METHODOLOGY

The selected subject for this study is Multimedia System developed from Faculty of Information and Communication Technology (FTMK). The sample size for this study was 152 sample and unit of analysis consists of UTeM undergraduate students. Research design is through quantitative method. The set of question is being constructed correspond to the variables of this research which aims for a finding the web design factor of MOOC toward the perceived ease of use of UTeM technical undergraduates. The conceptual framework for this research draw as in figure 1 below:
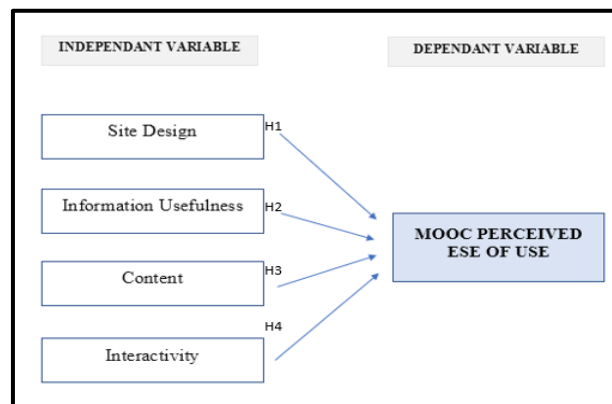

Figure 1: Conceptual framework

This research proposed that site design, information usefulness, web design and interactivity have positive relationship with MOOC perceived ease of use.

3. RESULTS AND DISCUSSIONS

Table 1 show the significant web design factors that influence MOCCs application among UTeM undergraduates the finding shows that information usefulness perceives as the most significant to the dependent variable perceived ease of use of student toward MOOC web design. Students will use MOOCs if they perceive that information usage is beneficial.

Table 1 Model Summary

Model	R	R Square	Adjusted R Square	Std. the error of the Estimate
1	.795[a]	.632	.622	.60706
a. Predictors: (Constant), Interactivity, Site Design, Information Usefulness, Content				

Table 2 Standard Coefficients

Model	Unstandardized Coefficients		Std Coefficient	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.033	.327		.100	.920
Site Design	.229	.085	.217	2.695	.008
Information Usefulness	.439	.103	.369	4.253	**.000**
Content	.079	.102	.074	.782	.435
Interactivity	.254	.089	.231	2.872	.005

a. Dependent Variable: Perceived Ease of Use

Table 2 indicates that Beta values which mean individual independent variables influences on dependent variables. The results showed that $\beta1 = 0.229$, $\beta2 = -0.439$, $\beta3 = 0.079$ and $\beta4 = 0.254$ respectively to all independent variables. It shows that information usefulness has the highest Beta value among other variables and strong influences on the perceived ease of use with Beta value 0.439. The relationship can be marked as the following equation from the analysis as below:

Y (perceived ease of use) = 0.033 + 0.229 (site design) + 0.439 (information usefulness)

+ 0.079 (content) + 0.254 (interactivity)

Information usefulness variable in this study is defined as the degree of ease associated with the use of MOOC among undergraduate students. MOOC improvement and application of higher education model should consider some external goals in terms of performance expectation or the usefulness of the information not only focusing on student insights and interest as previous author [5].

4. CONCLUSION

This research has several of implication for students and lecturer in terms of the ease to adopt the platform. It is undoubted that many researchers have been done to study the behavioural and intention to adopt, but the factor regarding the platform itself and why does the platform play a major role is yet not to be discussed much. Needs in understanding the necessary factors of student's perception in the MOOC web design resulting in clearer perspective on how to manage the site internally. As for the factor that affecting their intention to use it should come from their own self, and they will judge the platform before using. Therefore, an institution requirement is to consider factors that gives impact on students towards technology acceptance since the technology perceived ease of use is related to the technology acceptance. Having good web design with

excellent information usefulness and another factor that might indicate the web effectiveness might consequently influence student adoption. The proposed conceptual framework of this study is to examine factors of MOOC web design toward the perceived ease of use of the platform which is beneficial also by academics, and MOOC as organizations to determine their effectiveness of the platform internally to ensure success factors for implementing MOOC in their educational institutions. Future research can focus on measuring the relationship between web design and internet connection in order to achieve the best result and better improvement of MOOC.

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INTERACTIVE SIMPLE CARTOON DRAWING TUTORIAL FOR AUTISTIC STUDENTS

Muhammad Amirul A.[1,] Faaizah S.[2]

Fakulti Teknologi Maklumat dan Komunikasi, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

Corresponding e-mail: m031720014@student.utem.edu.my,faaizah@utem.edu.my

ABSTRACT – *This paper focuses on the development of a prototype interactive tutorial courseware for autistic children, specifically for ages 5 to 12. This courseware will teach autistic children basic drawing mechanics and shapes. Shapes are important to help in writing and drawing. This courseware will use the concept the Bloom taxonomy ID Model, where users are engaged in 6 concepts in sequence, remembering, understanding, applying, analyzing, evaluating and creating. These steps will ensure that by the end of the courseware, the users are able to achieve their learning needs and be able to draw basic cartoon characters.*

1. INTRODUCTION

Autism or autism spectrum disorder characterized with slow or stunted development basic social interaction and communication. Simple communication such as speech and movement can prove to be a challenge for people with autism. Autistic people also have trouble understanding emotions or social cues. Autistic people at first glance may look like they lack empathy, but they in fact do feel emotions. It is simply that they do not know the rhyme nor reason for certain emotions such as anger, sadness and envy. They do not get jokes and sarcastic remarks since autistic people are unique in their thinking process and as such only understand simple and clear instructions[1].

There is no clear cut way in generalizing and coping with autism. However, recognizing patterns for autism in childhood stages is very important. Children with autism will find it difficult to keep up with their peers. However, given enough attention and care, an educator will be able to develop in the interests and talent of autistic children. Based on observation, autistic children tend to like to watch cartoons. This is to be expected since cartoons are colourful, funny and educate them in ways that books and lectures are not able to. Cartoons can spark ideas for autistic children and as such autistic children require an outlet for those ideas. Drawing is a great way to help autistic children with self-expression and development of motor skills to aid in writing. Autistic children will be eager to be able to draw their favourite cartoon characters and show off to their peers and loved ones. This in hand not only gives a confidence boost in autistic children, but also helps autistic children to develop meaningful interests and healthy relations.

The problem here is that drawing something even cartoons can be stressful and hard for autistic children. Teaching them to draw will even be more of a challenge since autistic children are either unable to understand a drawing concept or easily bored and frustrated when their drawing is not similar to the real thing. Using instructional design[2], a simple program will help them in understanding the basics of drawing and how to draw simple cartoon characters. This program will help autistic children develop a passion for drawing and show simple steps on how to draw simple cartoon characters[3].

2. METHODOLOGY

The development of this project will be following the bloom taxonomy design [3] where viewers or students are engaged and 6 concepts throughout the courseware. These steps are as follows:

- **Remembering**: The courseware will start with the basics. Viewers are taught in simple but compact ways to draw shapes. Shapes are the foundation of understanding the structure of an object. There will not be a lot of text and with pictures to guide viewers.
- **Understanding:** Viewers are then shown how simple cartoon characters or shapes around them can be broken down using just shapes. An example is a snowman is basically 3 circles on top of each other.
- **Applying:** Viewers are then shown Level 1, where they will be shown a simple step by step guide on how they can use shapes to create a cartoon character. At the end of Level 1 viewers are given a brain teaser on how to draw a cartoon character without the help of the program[5].
- **Analyzing:** Level 2 will deal with more advanced perspectives and cartoon characters. Viewers are now taught on the concept of other more complex shapes, such as pyramids, cones and cylinders
- **Evaluating**: Using the newfound knowledge in level 2, viewers are now encouraged to try and experiment with the techniques. Using a cylinder viewers will understand how to draw arms and legs. A cuboid can be used to represent the body etc[6].
- **Creating:** Level 3 is where all previous concepts are applied. Viewers are now given a brief overview on how to draw cartoon characters from shows. An example would be Doraemon, his head is circle, his arms thick cylinders and so on[7]. Viewers are also encouraged to be creative and able to find the foundations of a subject.

3. RESULTS AND DISCUSSIONS

Figure1: Homepage

Figure 1 shows the homepage, where users are able to choose between 'Asas' or 'Tahap' Asas teaches the basics while Tahap uses the skill learned in Asas to draw and construct.
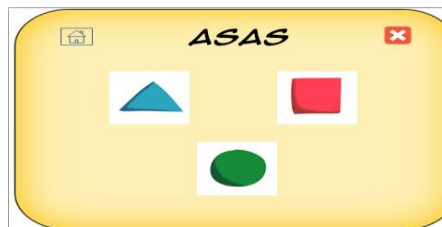

Figure 2: Basics

Figure 3: Example of Basics Page

Figure 2 and 3 shows the basics of drawing and forming a shape using lines. There is a slideshow and video tutorial provided on how to do it and text is minimal to engage audience attention.
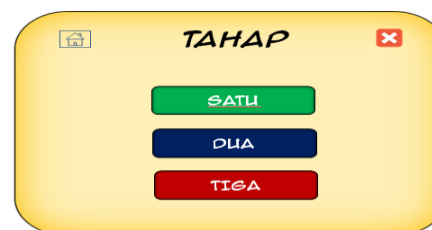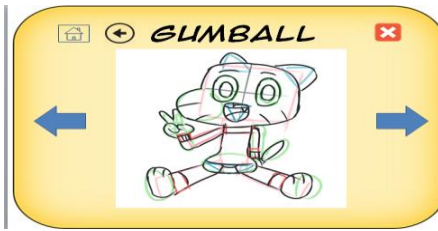

Figure 4: Levels

Figure 5: Example of Level 3

Figure 4 and 5 focuses on how the users utilize the knowledge they've gained in 'asas' in constructing a cartoon character. As seen in Figure 5, the character gumball is constructed using squares, triangles and circles.

Usability evaluation was then conducted to test the overall user's opinion about the performance of the courseware. A group consisting of 10 respondents with multimedia knowledge participated in focus group study on the usability of this courseware. After using the courseware, the focus group is required to answer two questionnaires focusing on the Bloom Taxonomy ID morel and the overall usability evaluation. The focus is group are tasked to rate the courseware with 1(not satisfy) until 5(satisfy) and their results are recorded in Table 1 and Table 2.

Bloom Taxonomy Aspects	1	2	3	4	5
Remembering	-	-	3	5	2
Understanding	-	-	2	4	4
Applying	1	3	4	2	-
Analyzing	-	-	3	5	2
Evaluating	-	1	1	5	3
Creating	2	1	4	3	-

Table 1 Bloom Taxonomy Evaluation

Gagné Nine Events	1	2	3	4	5
Users satisfactory (%)	5	8.33	28.33	40	18.33

Usability questions	1	2	3	4	5
Visibility of the content	-	-	-	5	5

User control and freedom	-	2	-	4	4
Consistency	-	-	2	5	3
Accessibility	-	2	5	3	-
Flexibility & Efficiency	-	4	2	4	-
Aesthetic	-	-	1	6	3

Table 2 Usability Evaluation

Usability Evaluation	1	2	3	4	5
Users satisfactory (%)	-	13.33	16.67	45	25

Overall Evaluation	1	2	3	4	5
Users satisfactory (%)	2.5	10.83	22.5	42.5	21.67

Based on the result in Table 1 only 18.33% respondents were satisfied with the courseware and says it follows the bloom taxonomy model while only 5% are not satisfied with the courseware. In usability evaluation, 25% of the users are satisfied and 13.33% are considered slightly dissatisfied and no users are considered not satisfied. Overall , the final evaluation is 2.5% of the users are not satisfied, 10.83% are slightly unsatisfied, 22.5% are unsure , 42.5% are slightly satisfied and 21.67% users are satisfied.

4. CONCLUSIONS

Based on the design and feedback obtained from the evaluation, it can be concluded that by using the concepts of the BLOOM taxonomy method, a courseware which caters to autistic children can be created. This courseware focuses on creating a baseline for autistic children to start their passion for drawing. Hopefully the children or audiences will find this courseware useful and spark their interest in drawing.

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INTERACTIVE VIDEO FOR AUTISM CHILDREN LEARNING BAKERY: USING GAGNÉ NINE EVENT AS A METHOD OF DELIVERANCE

Syahmie S.[1], Faaizah S.[*]

[1] Fakulti Teknologi Maklumat dan Komunikasi, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*] Corresponding e-mail: faaizah@utem.edu.my

ABSTRACT

Interactive video in learning can help to gain student attention as well as provide them a meaningful learning. A project based on using an interactive video to help autistic children to learn bakery was developed by using ADDIE model as the framework and Gagné Nine Events as a method to deliver the instructional material to the autism children. Although interactive video can be a good instructional tool to deliver instructional material a few special requirements were needed to be taken during its developments as autistic children style of learning are different than normal children.

Keywords: *interactive video; instructional design; autism*

6. INTRODUCTION

An interactive video (IV) prototype to teach autism children bakery was develop using ADDIE model as its framework because of the iterative nature of the model. Gagné Nine Events was used as the method to help in delivering the instructional material in the IV as it can help to deliver meaningful learning experience to the children.

1.1 **What Is Instructional Design**

Gustafson and Branch described the instructional design as a system of procedure for developing education and training programs in a consistent and reliable fashion. Furthermore, he also stated that instructional design is a complex process that is creative, active and iterative. Although the exact origins of instructional design (ID) process can be debated, there is an early attempt to apply general systems theory by Silvern (Silvern, 1965) and Bertalanffy (Von Bertalanffy, 1968)system analysis as an approach to solving problems. Silvern was particularly interested in how general systems theory could be used to create an effective and efficient aerospace and military training and published what might be considered the first ID model.

The writings of Branson (Branson, 1978)stated that the use of instructional system design (ISD) methods has been commonly used in all branches of the military by the early of the 1970s and had started to appear in industrial and commercial training applications. During the 1970s, ISD became accepted as a standard training methodology in the much large organization and now is used throughout the world.

Silvern's model and practically all other early ID models were based on behaviorism which is broadly defined as the philosophy and values associated with the measurement and study of human behavior. Although now much-associated behaviorism with B.F. Skinner and stimulus-response theory, most of the early writers held far more encompassing theoretical and philosophic perspectives. Early behaviorist believed as many ID practitioners believe today, that a wide variety of behaviors can be observed, measured, planned for, and evaluated in many ways that are reasonably reliable and valid. Cognitive psychologist, particularly the perspective of information (Gagne & Wager, 1992), have also made major contributions to the underlying theory of instructional design (Gustafson & Branch, 2002).

Although a variety of systematic instructional design processes have been described, all the descriptions have the same core elements of analysis, design, development, implementation, and evaluations (ADDIE) to ensure congruence among goals, strategies, evaluation and the effectiveness of the resulting instruction. Figure 1 represents one way to depict the relationship of ADDIE.
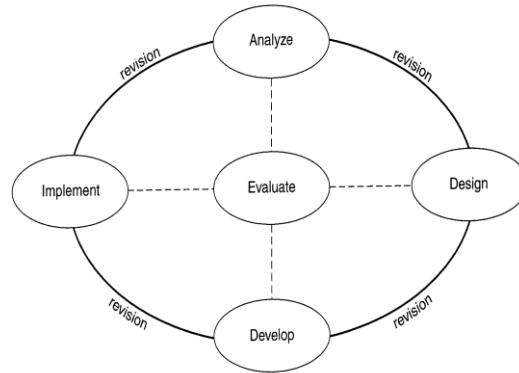
Figure 1: ADDIE Elements Relationships

1.2 What Is Autism

Autism is a complex biological disorder that generally lasts throughout a person's life. It is called a developmental disability because it starts before age three, in the developmental period, and causes delays or problems with many different ways in which person develops or grows(Willis & Ph, n.d.).

Autism is conceptualized as a behavioral syndrome of multiple neurological injuries associated with a wide variety of medical conditions. The possibility that the brain dysfunction might underlie a specific lack of a theory of mind is discussed. Autism is seen as possibly existing on spectrum disorders including both Kanner autism and Asperger Syndrome(Gillberg, 1990). These autistic children are known to be diverse in the group and the manner of how the autism manifests in each child is different as well(Siegel, 2003). Figure 2 shows the five main types of autisms and their characteristic(Adly, Noor, Shahbodin, & Pee, 2012).

Types	Characteristic
Autistic disorder	Markedly abnormal or impaired development in social interaction and a markedly restricted repertoire of activity and interests, usually noted within the first years of life.
Asperger's syndrome	Severe and sustained impairment in social interaction and the development of restricted, repetitive patterns of behavior, interests and activities. No clinically significant delays in language acquisition.
Rett's disorder	A specific and highly distinctive pattern of development regression following a period of normal functioning through the first five months after birth. Has been diagnosed only in females.
Childhood disintegrative disorder	Marked regression in multiple areas of functioning following a period of at least two years of apparently normal development.
Pervasive developmental disorder not otherwise	Severe and pervasive impairment in the development of reciprocal social interaction, but the criteria is not met for a specific pervasive developmental disorder.

Figure 2:Type of Autism (Adly et al., 2012)

Autism spectrum disorder (ASD) is a group of neurodevelopmental disorders comprising autistic disorder and related but less severe disorders: Asperger disorder and pervasive developmental disorder not otherwise specified (PDD-NOS). Children who have ASD exhibit characteristic impairments in social interactions and communication and restricted, repetitive, and stereotyped patterns of behavior (Kogan et al., 2009).

1.3 Interactive Video

Interactive video (also known as "IV") is a type of digital video that supports user interaction. These videos play like regular video files but include clickable areas, or "hotspots," that perform an action when you click on them. For example, when you click on a hotspot, the video may display information about the object you clicked on, jump to a different part of the video, or open another video file(P, 2011). In an instructional sense, the interactive video may be defined as "any video program in which the sequence and selection of messages are determined by the user's response to the material"(Schaffer & Hannafin, 1986).

1.4 Using Interactive Video as Learning Tools

The increased interaction with multimedia content has been recognized as a significant factor to improve learners' learning outcomes. As a result, interactive video lectures are increasingly being adopted in digital learning contexts for increasing interactivity(Hung, Kinshuk, & Chen, 2018). Use of video lectures has significantly increased in recent years in online courses because of the improvements in the Internet infrastructure to support high bandwidth streaming content. Literature suggests that video lectures contribute to better learning performance, compared to only reading-based learning content. Interactive video lectures are therefore being gradually adopted in digital learning contexts such as flipped classrooms, massive open online courses, and electronic textbooks[14-18]. Interactive learning activities (ILAs) embedded in between video clips provide the learner-content interaction and are essential for creating an interactive video(Hung et al., 2018). Through interactive video, the learning experience with rich learner-content interactions can increase learners' engagement and enjoyment(Deslauriers et al., 2011). Compared with reading-based content, video lectures have higher media richness, which helps learners comprehend complicated learning concepts and improve their learning performance. It also helps satisfying learners' expectations for more interactive and abundant learning experience than just learning solely with non-interactive video(Deslauriers et al., 2011).

7. METHODOLOGY

This project was develop based on ADDIE model as the main framework. Its name is an acronym of the capital letters of the words: Analyze, Design, Develop, Implement, and Evaluate(Mohd & Shahbodin, 2015). To deliver and prepare this interactive video project for autism children in learning bakery, Gagné's Nine Events was used as a method of instruction to make the interactive video for appeal to the children.

2.1. ADDIE Model

ADDIE model has five phases systematic model used to create sound instructional products for a variable setting. In each phase, the instructional designer makes the decisions that are critical for ensuring the effectiveness of the instructional experience(Ku et al., 2014). Each phase of the model has an important element of constructing the instructional design process. In each phase, the instructional designer makes the decisions that are critical for ensuring the effectiveness of the instructional experience(Mohd & Shahbodin, 2015). The ADDIE five steps each represent a guideline that can help in building instructional material.

Analyze where the analysis of the project requirement, user characteristic and requirements, task that need to be learned and special requirement based on this project. Design where the design idea is generated, the objective of the project is developed and choose an instructional approach to help to deliver this design.

Developed is the phase where the instructional material is created. In this phase sometimes can either be prototype or final product is developed. Implementation is when the instructional material is being delivered or distributed to the learners or users.

Evaluation phase involving the developers taking feedback from users based on their experience to make sure that the instructional materials achieved the desired goals and used the result to improve the product for future use.

2.2. Gagné Nine Events

Robert Gagné proposed a series of events which follow a systematic instructional design process that shares the behaviorist approach to learning, with a focus on the outcomes or behaviors of instruction or training. Each of the nine events of instruction is highlighted below, followed by an explanation of how each of the steps can be used to create instructional materials.

The following nine steps have been adapted from (Gagne & Wager, 1992).

1. **Gain the attention of the users.**
   The most important things first are to gain your audience attention. Do this by creating a compelling subject that can hook them from the start. Shows a good story, make awesome animations or questions that can surprise them. Audiences who are stimulated by these activities tend to stray their attention to the topic given.

2. **Inform users of the objectives.**
   State the goals or the objectives of the audience before they start to help them gain an idea of what they will learn and the outcomes that they will get.

3. **Stimulate recall of prior learning.**
   Help audiences make sense of new information by relating it to something they already know or something they have already experienced. Ask them questions about their previous experiences.

4. **Present the content.**
   Use strategies to present and cue lesson content to provide more effective, efficient instruction. Organize and chunk content in a meaningful way. Provide explanations after demonstrations.

5. **Provide learning guidance.**
   Even the most advanced users may need support when it comes to learning new skill sets and absorbing new knowledge. Otherwise, they may become discouraged or frustrated and disengage from the topic altogether. Gave them advice or aids to help them navigate through the topic.

6. **Elicit performance (practice).**
   Practice makes perfect. Gave them opportunities for them to apply knowledge that they have learns. Offer them branching scenarios and simulations that give them the chance to see where their decisions lead them, as well as the rewards and risks involved that come of their actions.

7. **Provide feedback.**

Give learners timely and constructive feedback to help them improve learning behaviors and identify their weaknesses and strengths. Offer personal feedback, rather than giving general praise or criticism to the entire audience, so that every learner knows which steps they must take to reach their goals.

8. **Assess performance.**

In order to evaluate the effectiveness of the instructional events, you must test to see if the expected learning outcomes have been achieved. Performance should be based on previously stated objectives.

9. **Enhance retention and transfer to the job.**

The audience must always be aware of how they can apply what they have learned once they finished their learning. As such, you should include real-world scenarios, stories and other learning capabilities that show them the applications of the information and skills they've worked so hard to develop.

RESULT and DISCUSSION

Usability evaluation was conducted to test user's opinions about the effectiveness of the interactive video in teaching autism children bakery. Usability inspection is the generic name for a set of cost-effective ways of evaluating user interfaces to find usability problems. They are fairly informal methods and easy to use(J. Nielsen, 1994). Usability inspection is aimed at finding usability problems in a design(Mack & Montaniz, 1994), though some methods also address issues like the severity of the usability problems and the overall usability of an entire design(J. Nielsen & Phillips, 1993).

To test the project usability evaluation, a group consisting of 10 respondents from the multimedia background were asked to test the project prototype for a couple of days. They were then, asked about usability issue that they encounter during the test period. They were given two sets of questionnaires with one asking about whether the project follows the Gagné Nine Events and another set was based on usability evaluation. They were asked to rate the project with 1(not satisfy) until 5(satisfy). Table 1 and Table 2 shows the results from the questionnaires.

Table 1: Gagné Nine Events Evaluation

Gagné Nine Events	1	2	3	4	5
Gain attention of the users	-	-	2	4	4
Inform users of the objectives	-	2	3	3	2
Stimulate recall of prior learning.	-	5	5	-	-
Present the content.	-	1	4	2	3
Provide learning guidance.	-	2	2	4	2
Elicit performance (practice).	-	2	5	3	-
Provide feedback.	1	3	3	3	-
Assess performance.	-	-	3	3	4
Enhance retention and transfer to the job.	-	3	4	2	1

Gagné Nine Events	1	2	3	4	5
Respondent's Satisfactory (%)	1.11	20	34.44	26.67	17.78

Table 2: Usability Evaluation

Usability questions	1	2	3	4	5
Visibility of the content	-	-	2	3	5
User control and freedom	-	1	2	3	4

Consistency	-	-	2	2	6
Recognition rather than recall	-	1	4	2	3
Accessibility & Learnability	-	2	1	3	4
Flexibility & Efficiency	-	2	1	4	3
Aesthetic	1	3	3	2	1
Effectiveness & Satisfaction	-	-	1	3	6

Usability Evaluation	1	2	3	4	5
Users satisfactory (%)	1.25	11.25	20	27.5	40

Based on the result in Table 1 only 44.45 percent respondents rated satisfied that the project is following the Gagné Nine Events while 21.11percent respondents rated that the project does not follow the Gagné Nine Events. For usability evaluation, 67.5 percent of respondents rated that the project does satisfy them on the usability term while 12.50 percent did not satisfy with the usability of the project.

CONCLUSIONS

There still a few improvements that can be made to this project in the future in order for it to fully follow Gagné Nine Events method of deliverance. Using an interactive video as a medium for learning can very good for autism children as it not only has visual aids, it also has auditory aids and kinesthetic learning. They also can practice their knowledge with quizzes along the way and there are several segments that can be clicks during the video when they having problems understanding the contents.

Using Gagné Nine Events can really help to deliver instructional material to students as it follows a systematic instructional design process that shares the behaviorist approach to learning, with a focus on the outcomes or behaviors of instruction or training. This combine with ADDIE model as a framework to build an instructional material can really help in developing a great instructional material

ACKNOWLEDGEMENT

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INTEGRATE AN INSTRUCTIONAL DESIGN MODEL FOR LEARNING PROCESS IN VIDEO DEVELOPMENT

Intan Syafinaz I.[1,*], Faaizah S.[1]

[1] Fakulti Teknologi Maklumat dan Komunikasi , Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*] Corresponding e-mail: faaizah@utem.edu.my

ABSTRACT

Integrating an instructional design video for learning process can help the students to pay more attention and understanding while learning in the classroom. According to the purpose, it would be more effective if this instructional design is developed by Addie or Dick and Carey's model as the framework. The purpose of the objectives is to know the details of every part of the learning system process. It is important for features to improve the autism's skill for better understanding while learning process happened.

Keywords: *Video; Instructional Design Model; Autism*

1. INTRODUCTION

Lately, the demand for instructional design in the learning process is increasing. (Ocak, et al, 2015) stated that instructional design models, is instruction about the nature and scope of instructional designers, that help in the decision process is one of the systematic procedures. According to institution needs, it must be used a several of the model systems while developing the instructional design process. The selection and use of instructional design model are changing and is shaped according to the educational needs. (Yimlaz.,S, 2008), instructional design (ID) or instructional system design (ISD) models have different training environments design, format and visual presentations are prepared to complete the instructional design process. Besides that, teaching solution also should be designed according to the instructional design model by using correct ways. Indeed, (Rachmawaty, 2018) it has been stated that in 2005, founded that many teachers use educational Youtube video as the learning resources and it's become demanding on online media.

Generally, need to define the part of the process and how to apply it in teaching, also what kinds of an instructional the model would be in. Additionally, instructional design needs to be considered with the individual skills, criteria, specific objectives determined by written criteria and based on that criteria need to overcome with the evaluation that really performed. Necessary equipment is performed to help the details of determining the strategies and planning of instructional design in ways to perform and gains the target performance level that needs to be achieved. Once use this the process, make sure it would be systematic evaluation and continues it until reach a higher level attainment of the desired goals.

1.1   Autism Context

Autism or autism spectrum disorder is going to refers to a range of conditions characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication, as by unique strengths and differences. The sign of the ASD is determined in early childhood. Thought would be diagnosed with early intervention, individuals with ASD can lead productive, inclusive and fulfilling lives. The diagnosis will be detected in behavioral symptoms or features. The features include the absence of or delay in typical development milestone and the presence of unusual behaviors.

(Eric., Z, 2005) mentioned, excerpted from existing sources, most children with autism have significant learning problems, especially mentally. However, behind them, they have a very high level of intellectual intelligence quotient (IQ).

Persons with Asperger's syndrome, which is a condition resembling autism, have average or above average intelligence. Autism behavioral defined-condition based brain dysfunctions that affect the brain's ability to handle information. Autism is a neurodevelopment disorder. They have been difficult while processing information such a perceiving, processing and interpreting information and learn new things.

1.2   Identifying indicators Video-Based Learning

Video-based learning has become a prevalent practice in schools and in higher education in the learning process. It will focus on integrating information literacy content in academic disciplines on the development of children's focus on their minds. Furthermore, a little research is needed to examine how the specific instructional approaches might be effectively exploiting the potential of video in learning education process. In education, the video would make it possible to overcome practical real-world constraints and explore the far greater possibilities. Indeed, there's are student-centered learning either within the classroom or at home.

Video also can be integrated into online learning system (LMS, portal, E-class, MOOC, etc.) and also can be in offline learning that can be combined with other services. For instance, (Giannakos et.al, 2014) said learners can use it in the parallel video and an online chat room, forum or even video conferencing to communicate with their instructors. And, it would be such a great combination of the video with other learning services that have a great potential to provide the students with an integrated online and offline learning process. In facts, it's can be a consensus among teacher educators to use video as a powerful tool for education.

1.3   Video as an Education Tools

By using the video as an education tool, it would be as a feature in the particular user to become huge of preparation while teaching. Indeed, the video would be considered to be intermediary tools in education process learning between theoretical and practical. (L, M Gomez., 2008) stated the video can serve as a particularly useful as intermediary tools between theory and practice. On the other hands, shows the videos that demonstrate course topics and providing supplementary video learning materials for self-study. (H, Zhou, 2018), to achieve the goals, a lot of effort is needed while generating an innovative of the idea, advanced in teaching method and facilities and unnecessary infrastructure. In the learning process, many of the instructors or teachers are implementing video lectures in a variety of ways, such a broadcasting lectures in real time, augmented recording of in-class lectures with a face-to-face meeting for review

purposes and delivery the lectures recordings to the class and then provide hands-on activities. On the other hands, for this paper, it considers knowing the ability of teaching are reflected in the classroom and generate it into instructional design action.

(Davis, 2006) Purposely, that ability is considered to be evidence of one's skill in developing the productive thinking about instructions and determine how well is going while teaching the students. Additionally, (Hiebert et.al, 2007) an ability develops to reflect on instruction and simulate the instructional among teacher in educations. (K, Choriananopoulos, 2018), to create an instructional video, need to identify the main of problems and distribution platform very well. It is to know either the platform are suitable to deliver to the participants.

Due to this paper, by integrating the instructional design for the video, we need to specify a simple and effective way to incorporate the techniques into practice. So, we will review some important method developmental principles of instructional video creation. However, all the kinds of the method need to be extended in accommodation of the rapid changes in the technology and teaching practice.

2. METHODOLOGY OF INSTRUCTIONAL DESIGN PROCESS

Instructional design is a complex process that determines creative, active and iterative. It also is known as a technology for the development of learning experiences and environment which promote the acquisition of specific knowledge and skill by students. It is a system of procedure to develop education and training programs in an effective, consistent and reliable fashions. Moreover, instructional design theories are to offers explicit guidance on how to better help people learn and develop the effective learning.

Instructional design will make a systematic design procedure be effective, efficient and relevant that less rigorous approaches to plan the instruction. The systems approach implies an analysis of how its components interact with each other and require coordination of all activities. Although, a variety of instructional design process model has been described that all the description would include all the elements which are analysis, design, development, implementation, and evaluation (ADDIE) to ensure that can achieve the goals and strategies while conducting the instruction systems. While ADDIE has their conceptual components to describe the ID models and indicates the process of ID, there's also have another method to be used while developing the instructional design which is Dick and Carey's model. It's quietly famous if want to compare between ADDIE and Gagne's model.
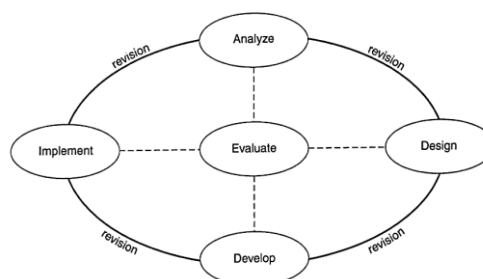
2.1   Addie's Method

Figure 2.1. Elements of the ADDIE Model

Figure 2.1 has represented one of the connections to depict the relationship among all the elements. All the connection seems to be connected with each other in the cycleways. In the ADDIE model, it determines that there's have five elements which are Analysis, Design,

Development, Implementation, and Evaluation. Analysis often used to conduct the needs of special requirements which include conducting a student's needs assessment. Determine the student's problems or identifying a performance problem in a classroom setting or some other environment. And come out with a goal. Design includes writing objectives in measurable terms, classifying learning as to type, specifying learning activities and specifying media. Development includes by preparing the students and teacher with materials (print and non-print) as specified during design. Implementation includes delivering the instruction in the setting which for the designed and delivered to the students. The evaluation includes both formative and summarizes evaluation as well as revision. Formative is about collecting the data to identify the special needs of the instructions, the summation is an evaluation that involves collecting data to access the overall worth of the instruction. And revision is involved making needed changes based on the formative evaluation data. It is important to state that ADDIE activities are typically is not completed in a linear, step-by-step but for convenience, they may be presented that way by several of the authors. For example, during the life of the project, as data are being collected and the development has gained new information's, it is often necessary to move back and forth among the activities of analysis, design and formative evaluation and revision.

2.2 Dick and Carey's Method
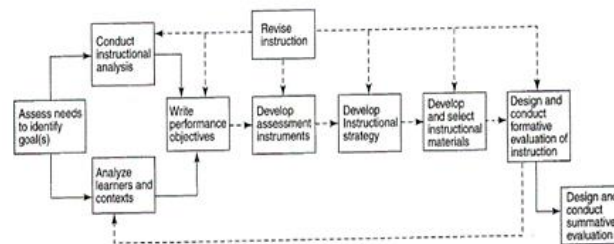
Figure 2.2 Elements of Dick and Carey's Model

The frequently use and a similar model with ADDIE is about the Dick and Carey model. Figure 2.2 is about (Lyn, T, 2004) Dick and Carey's models have served the purpose by describing how to conduct the various step that comprises the instructional process and finishes with summative evaluation. While proposing the instructional model into learning, the model requires to be understood by selecting and determine an appropriate instructional design either suitable or not. To make it achieve an objective, we need some guidelines to allow the learner to determine the extent to which the activity has been achieved. Learning for instructional design cannot be separated from the development model of instructional that is commonly used. According to Dick and Carey, the development of learning is a systematic way of designing, producing, evaluating and also use a complete learning system, either involves appropriate components and management. There is five elements core in all the ID models but in this model, we had to "slice and dice" the five core in many ways and use a wide variety of different terminology, all will contain the core elements in one form or another. Some models allow people to visualize the overall process and establish the guidelines for management. In addition, Gustafson and Branch have to suggest the model that be classified into three categories which are a classroom, likely to be delivered by the teacher. Products such as computer-based designed to distribute and large-scale in instructional are a system for entire distance learning to process. This model more focusing on real-world characteristics which are

learners needed, assessment learners, prior knowledge level and integrates learning in performing context to the instructional design.

In entry behaviors and learners' characteristics phases, assess what skills the students have out to determine the needed for the lesson. For performance objectives, need to figure out the specific goals and objectives for the lesson. In criterion-referenced test item phases, need to create a test that consistent with the performance objectives that reflect what will teach the students. In instructional materials phases, make sure have the needed as a ready for the lesson. For formative evaluation is about to evaluate how the lesson went. And but not least is about summarize evaluation which is revised all the above techniques that have been mentioned before for learning systems.

3. RESULTS AND DISCUSSION

All the results would be evaluated into the usability evaluation of systems. Usability plays an imperative role in the success of video development. For this paper, it has been conducted on 10 respondents between the ages of 20 to 25 years. All the respondents are from multimedia backgrounds. In this session, they have been a set of questionnaires about usability issues on the instructional system. Based on the data collected, it can be seen that most respondents are very satisfied with the components discussed in the fourth and fifth positions, 45% and 29%. Only a few who are less satisfied are in the first and second position, 9% and 1%. The rest is only satisfied with the third stage of 16%.

Table 1. Usability Evaluation Predicting Motivation to Learn

Different segments of the questionnaire	1	2	3	4	5
Visibility & Content	-	-	2	3	5
Navigation & Structure	-	1	2	3	4
Consistency & Relevancy	-	-	2	2	6
Error Prevention & Recovery	-	1	4	2	3
Accessibility & Learnability	-	2	1	3	4
Flexibility & Efficiency	-	2	1	4	3
Help & Support	1	3	3	2	1
Effectiveness & Satisfaction	-	-	1	3	6

Different segments of questionnaire	1	2	3	4	5
User's response (%)	1	9	16	29	45

4. CONCLUSIONS

The proposed ADDIE model and the Dick and Carey model can provide online educators or instructors to an effective learning guidance when designing online course materials. There is needed a proper and appropriate implementation of every the model that can support online student's engagement, involvement, motivation and focus on learning. Regarding results and findings, student and educators prefer mostly systematic linear instructional design models. Flexible instructional design models are preferred for making possible changes that related to the planning process. Meanwhile, instructional design is important to identify the relationship between the philosophy of the learning and application processes. To make it effective learning for instructional design, research studies about theories, teacher thinking, decision-making, and planning process are needed to be conducted, and it proposed ADDIE and Dick and Carey model that will provide online educators or instructors for effective guidance while designing online materials.

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iBAKERY FOR AUTISTIC CHILDREN

Shahbodin, F.[1,2*], Maria, M[2], Jaafar, N. A.[2]

1) Centre for Academics Excellence and Scholarship, Universiti Teknikal Malaysia Melaka,
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia
2) Faculty of Information and Communication Technology,
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Correspondence Author email: faaizah@utem.edu.my

ABSTRACT

iBakery is an electronic courseware in a form of iBook which helps children with autism to have skills and brighter future. This iBook contains three parts which are Baking Tools and Ingredients, How to Use the Tools, and Steps. A qualitative testing has been done in Special Education Unit in Sekolah Menengah Bukit Katil and the results show positive feedbacks from both teachers and students including the convenience usage and the contents. Through continuous usage of this iBook, children with autism are believed to have basic skills in baking and be able to develop their future career.

Keywords: iBook, Autism, Autistic Children, iBakery

1. INTRODUCTION

Autism or known as Autism Spectrum Disorder (ASD) is a disorder related to brain development which affect the presence of social cognition, communication, and imagination (Keen, Reid & Arnone, 2010). The three impairments are considered as the most familiar of the serious developmental disabilities and it could be noticed within the first years of life (Noor, Shahbodin, & Pee, 2012).

Autism could also be characterized by restricted or repetitive behavioural patterns (Zajic et. al., 2018). Autistic children tend to play repetitive and more focused on object oriented rather than people (DeFilippis & Wagner, 2016). It makes them to give full attention towards some certain objects or unusual interesting topics. The repetitive behavior can help in learning process – combined with the certain interest subject – Autistic children would tend to gain more information easily including skill development.

iBakery is an electronic courseware in a form of iBook and considered as an interesting application which adapt the step by step instructions for baking. It is developed to help the Autistic students from Sekolah Menengah Bukit Katil to learn about baking in a better learning platform and in an interactive way.

Technology which using natural interfaces involves gestures as the input from the user, it allows user to interact with the system easily (Hachaj & Baraniewicz, 2015). Having an interactive and interesting way of learning is an efficient way to help in memorising which could lead to developing basic skill (Xhemajli, 2016).

Autism could be diagnosed in the early stage of an individual's life (Clark et. al., 2018). However, many of Autistic children would still be facing problems in their life continued up to their adulthood especially in social life and independent living (Anderson et. al., 2018). Based on this case, iBakery is proposed to help the Autistic children to gain the basic knowledge and skills in baking.

2. METHODOLOGY

The methodology used for this project is ADDIE model which has five main phases to be followed; Analysis, Design, Development, Implementation, and Evaluation. ADDIE model has been considered as an essential element in educational development and training programs (Muruganantham, 2015). Hence, this model is suitable for this project including the development of the product.

Analysis; Problem of this study defined as the difficulties faced by the Autistic children in order to learn about activity which involves a series of steps which is baking. Draw their focus and attention is the main objective to be achieved. Followed by requirement analysis which focused on the user and technical part. User part focused on things needed to engage the Autistic children which is by implementing interactive elements such as images and animation videos to deliver the information. Technical part covers the platform and application chosen, which is iBook on iPad platform. It is chosen because it could deliver interactive elements needed.

Design & Development; iBakery in form of iBook consists of three main sections which are Baking Tools and Ingredients, How to Use the Tools, and Steps. The design includes the image, text, audio and animation to describe the information. All of the information collected directly from the school include the recipe and ingredients used.

Implementation; The main purpose of iBook is to attract the students to learn in a fun and interactive way. The teacher takes part in the implementation process by go through the iBook to get the idea of the contents before proceeding to let the students access the iBook themselves. The students required to do a small quiz at the end of the session in the iBook.

Evaluation; The testing phase conducted to get the evaluation of the iBakery system. It measures the effectiveness and efficiency of the iBakery. Data collected from the testers, both teachers and Autistic students. The teachers asked to fill up the questionnaire regarding the product, while the students were asked the questions from questionnaire verbally along with the direct observation to interpret their answers.

iBakery target user falls into two sides which are the teacher and student under Special Education Unit. The testing was conducted in Sekolah Menengah Bukit Katil which involved 2 teachers and 8 autistic students. Questionnaires are used in order to rate the effectiveness of iBakery along with the observation for notifying the direct responds of participants. Data collection conducted in the same day with the testing where a questionnaire was distributed to the teachers and students by the end of the session.

3.   RESULTS AND DISCUSSION

iBakery has been tested on the target users which are the Autistic students and special education teachers. Total participants are 10; 8 autistic students and 2 teachers. The instrument used for the testing is questionnaire which distributed to all participants after the testing done.

The following figure 1, 2, and 3 shows the results of the questions given during the conducted testing. The questions given by the tester in a questionnaire form. The results are categorized by three main concern; (i) Content Flow, (ii) Content Comprehension, (iii) Content Interest.
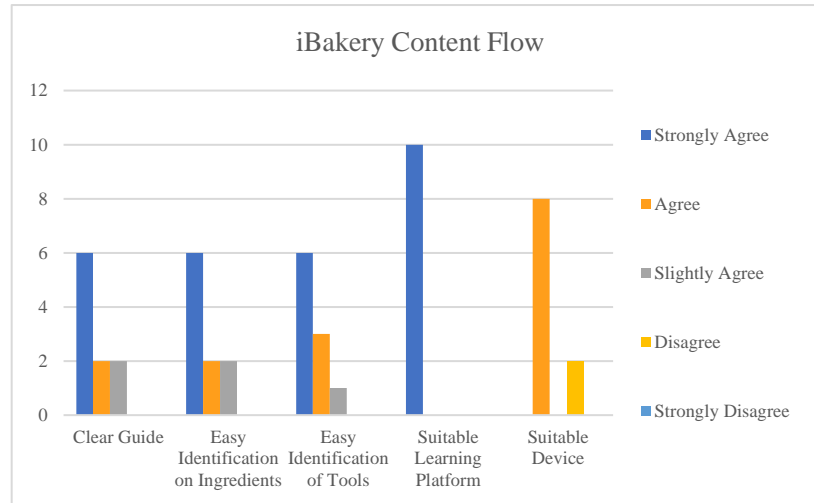
Figure 1: Results on iBakery content flow questions
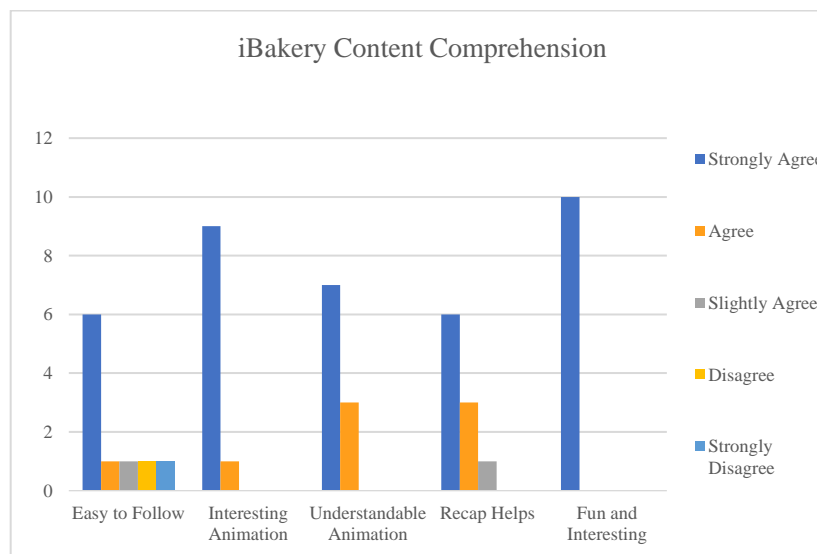
Figure 2: Results on iBakery content comprehension

The finding above shows more than half of the participants are agreed that iBakery is a user-friendly where they did not have any problem in using it. Two participants disagreed that the

product is a suitable device because they do not provide any iPad at school, they found it quite hard to access the iBakery if there is no iPad. While result in figure 2 points out the overall understanding of the participants during the use of iBakery. Few of participants could not follow easily while using the iBakery; the reason because they are not quite familiar with the use of iPad.
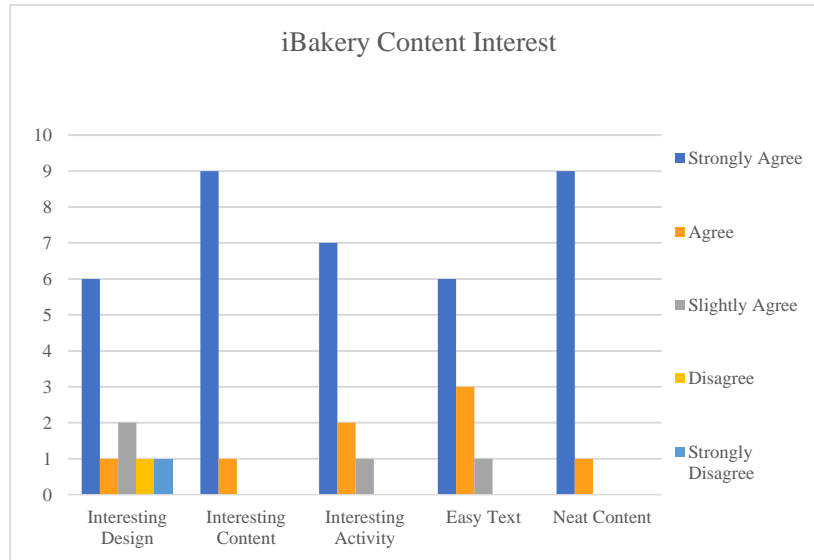
Figure 3: Results on iBakery content interest

The participants interest toward iBakery shown in the results above, where majority agreed that iBakery has interesting design, content, activity, along with the text display and neat content. All the results above indicate that the participants, especially the Autistic students are interested in iBakery. It draws their attention and focus on the content, ease the absorption of knowledge while they are enjoying the process.

4. CONCLUSION

iBakery presents both in animation videos and images which show the step by step instructions. The Autistic students along with their teachers who have tested the iBakery found that it is interesting and fun way to learn on how to bake by looking at the animation videos.

Findings shown that iBakery is a user-friendly application which could draw attention of the Autistic students as the main target and allows them to learn on how to bake in an interactive and fun way. It also helps the Autistic students to grasp the basic knowledge and skill of baking so that they could have a chance in the future to apply it in their real life as an effort to be independent.

However, further work for improvement will always be needed to achieve better results and impact on the actual targets. Changes in the structure and flow of the iBakery modules could help targets to easily follow the instructions. Another improvement could be in terms of the product platform, materials (images, videos, animations), and words of instruction.

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ENVIRONMENTAL MAINSTREAM TOOLS (EMT) PRACTICES IN MELAKA SMALL AND MEDIUM MANUFACTURING SECTOR: ADULT LEARNING APPROACH

Khoo N. K.[1], Hanipah H.[2*], Norida A.[3]

[1]Institute of Technology Management and Entrepreneurship (IPTK), Universiti TeknikalMalaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2&3] Centre for Languages and Human Development, Universiti Teknikal Malaysia Melaka,Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*]Corresponding e-mail: hanipah@utem.edu.my

Keywords: New Strategic, Self-Regulation, Environment Mainstream Tools

ABSTRACT –*This study is including Strategies practices as a new parameter in order to improve the skill and knowledge in EMT at work place through adult learning approach as Andragogy. These research highlight the problems of skill and knowledge among employer and employees probably due to lack of non-compliance of the requirements Guided Self Regulation Environmental Mainstream Tools (EMT). There are four components as understanding, commitment, practice and behavior influence the improvement of this research towards green environment practices. At end of the researcher will development a new strategy focus on Andragogy approach to achieve the EMT practices. This study will support Melaka state new policy as Melaka Excellence through Melaka smart, green and clean towards EMT. This study is to promote several management practices such education & training Environment management, understanding on self-regulation, enforcement and auditing.*

1. INTRODUCTION

OSH and Green environment movement in Melaka has been scrutinized due to lack of managing culture and non-compliance of the requirements of Environmental Act, This research compliance law, regulation practices and tools name Environmental Mainstream Tools (EMT)[12]. EMT has seven elements to measure the compliance of OSH manufacturing workplace towards green environment. The benefits of this practices and tools bring a solution for both parties (Melaka Government and Small and Medium manufacturing sector).

1. RESEARCH PROBLEM

The researcher is going to analyse the major problem in S & M manufacturing sector as Environment case keeps increase reported in S &M manufacturing rate 50% - 80% higher than big company[1],due to lacking management and conforming to the basic requirement.[2-3],poor connecting monitoring between industrial and enforcement department,[4-5]. No benchmarking on OSH and environment[6-7],lack of promoting safe work environment and culture practice at workplace[8-9].Small and medium manufacturing sector is contribute 36%of carbon oxide exposure.

2. METHODOLOGY

Methods to carry up in this research it will use triangulation data from different material such interview, survey open-ended questionnaire, observation, document study example journal, literature review, e-book, the research approach is qualitative, exploratory descriptive and contextual. EMT analysis and practices regulation were used as a method for primary data collection and triangulation analysis were used as a method data collection for Department of Environment (DOE) enforcement officer effectively. Primary data from 20 S & M manufacturing sector in Melaka was taken through Phone call interview survey on 14-15/12/2017. These research highlight the problems in Melaka manufacturing sectors which are probably due to lack of non-compliance of the requirements of environmental act (EMT)(FIGURE 3)

3. RESULT AND DISCUSSION

Figure 1: Research Design (Dr Edwards Deming)

In this research, understanding the need for the requirement, commitment from top management and employees, practice the right procedure in workplace and behaviour to practice the safe and healthy procedure at the workplace. This framework created a strategic name Andragogy to strengthens the process continually. In this research, a Deming Circle theory be using , Plan (P) , Do (D) Check (C) Action (A) – PDCA by Dr W. Edwards to managing[10] green environment at workplace.(Figure 1). Andragogy is a process where is recognize adult learner to upgrade to lifelong learning

process. Employees at workplace is adult learner, they need to been upgrade through Andragogy approach rather that pedagogy approach. Andragogy' refers to the particular detection of efficient curricular design and coaching delivery for adults. The basic theories of Andragogy, as developed by Malcolm Knowles and others, are used comprehensively in the design of adult-oriented training programs, where this very suitable for adult learning as Knowles assumptions 1984 such self-concept, experience of adult learner, willing to learn, orientation to learning and motivation for adult to learn, this assumptions with 4 principles as :

1. Adults need to be involved in the development and valuation of their training

2. Understanding (including mistakes) provides the foundation for the learning performance.

3. Adults are most attracted in teach subjects that have direct significance and contact to their job or own life.

4. Mature education is problem-centred rather than content-oriented. (Kearsley, 2010)

Environment Mainstream Tools (EMT) has seven elements to measure the compliance of manufacturing workplace towards green environment as (figure 2).

<div style="border:2px solid;">

Seven Element Tools

1.Environmental Policy (EP)

2.Environmental Budgeting(EB)

3.Environmental Monitoring Committee (EMC)

</div>

Figure 2 :Major Tools. (www.doe.gov.my/emt)
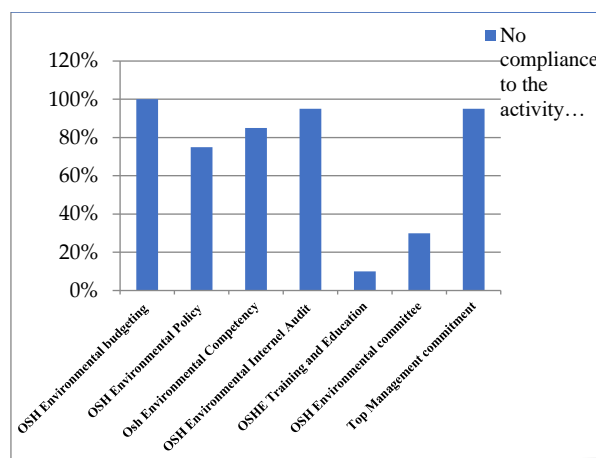
Figure 3 : Non Compliance To Activity

Environment policy is compulsory for organization (figure3 – 75% non compliance), OSH & environment committee is needed for most of the S&M Manufacturing (figure3- 30% non compliance), training and education in OSH& Environment is needed as requested by OSH Act 1994 Section 15,and DOE Act, including internal audit (figure3-95% non compliance).Top management commitment is the key words to the success of the EMT management system, the key index measurement on this matter is from their

Environment policy, environment committee and auditing is involve to all organization, it under Department of Environmental Director General Order through Guided of Self Regulation (GSR). To provided a skill and knowledge for employees, employers must understand the concept of Training Need Analysis (TNA) to achieve the goals of EMT towards green environment at work place

4. CONCLUSION

The research objective is to investigate the practice of managing conforming to compliance EMT and Environmental act, identify collaboration among employees, employers, enforcement department through new strategy (figure 1) of promoting EMT towards green environment. Data from figure 3 prove that S&M manufacturing sector need a transformation towards skill and knowledge improvement. Promote Adult learning Andragogy assumptions and principles with management practices such training and safety management, understanding on self-regulation, enforcement and auditing towards EMT practices. Through Andragogy learning, it can achieve Melaka Excellence, Smart, Green and clean, together we achieve more in Andragogy learning among Melaka Small and Medium manufacturing sector. In this matter, it very important for employer to train a competency person such in schedule waste management (Cepswam), Showing commitment through Environmental Policy, Environmental committee and others as mention in Figure2

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COMPARATIVE STUDY FOR THE BACHELOR OF ELECTRICAL ENGINEERING STUDENTS' PERFORMANCES BASED ON DIFFERENT CURRICULAR STRUCTURE

Aziah K.*, Nur Ilyana A. A.& Nor Aishah M.

Faculty of Electrical Engineering, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Corresponding e-mail: aziah@utem.edu.my

ABSTRACT

This study measures the effectiveness of two curricular structures in Faculty of Electrical Engineering, Universiti Teknikal Malaysia Melaka (UTeM) that are based on the conventional academic program and the broad-based program referred to as conventional electrical engineering (EE) and BEKG, respectively, for Bachelor of Electrical Engineering courses. Three categories of subjects were selected to compare the evaluation and assessment in the students' performances for the conventional EE and BEKG, i.e., mathematics and basic science, laboratory, and electrical subjects. The results show that the performance of BEKG students outperforms the conventional EE students in all the categories.

Keywords: Teaching Performance; Electrical Engineering subject; Student Performance

1. INTRODUCTION

Preparing electrical engineering graduates to fulfill the Engineering Accreditation Council (EAC) and the Malaysian Qualifications Agency (MQA) requirement brought a challenge to the academic community in Malaysia. Assessment plays a significant role in the continuous improvement of the quality of the electrical engineering program [1]. Since 2010, the teaching and learning activities in Faculty of Electrical Engineering (FKE), Universiti Teknikal Malaysia Melaka (UTeM) are conducted based on outcome-based education approach that is based on the conventional academic program, namely the conventional electrical engineering (EE) courses. For conventional EE courses, the curriculum content is based on 60% practical and 40% theoretical [2]. Starting academic session 2013/2014, FKE substitutes the curriculum of conventional EE to a new broad-based program for Bachelor of Electrical Engineering course with the specialization starts in the second semester of the third year, referred to BEKG [3]. To date, there is no study that investigates the quality of EE programme in FKE in terms of evaluation and assessment in the students' performances. Thus, this paper provides a comparative analysis for the conventional EE and BEKG programme based on the difference in the curriculum structure. The findings in this paper provide a promising step for improving the quality of EE programme in FKE. In the following section, the details of these curriculum structures are generally explained and reviewed.

2. DESCRIPTION OF CASE STUDY APPROACH

2.1 Conventional Electrical Engineering

In the conventional EE programme, the students are divided into three major courses at the beginning of the programme, which is industrial power (BEKP), power electronics (BEKE), and control (BEKC) [2]. All student needs to follow the curriculum structure that has been provided by the faculty, which can be divided into five main categories as illustrated in Figure 1. Basically, there are 136 total credit hours for conventional EE programme. Figure 1(a) shows the summary of curriculum content for conventional EE taken by the students' FKE, UTeM that is divided based on the total credit hours. Based on Figure 1(a), the conventional EE is more focusing on the electrical engineering subject and general knowledge as it contributed 60% and 17%, respectively, contents of the programme. This is due to the principle of FKE, UTeM that to inspire more students with good basic of electrical engineering knowledge. Moreover, FKE stakeholders such as the faculty's external examiner, visiting professor, adjunct professor, and industrial advisory panel have revised the curriculum structure.
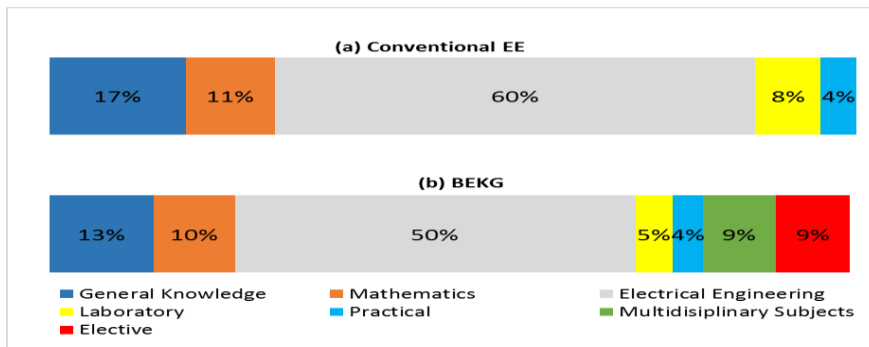
Figure 1: Summary of Electrical Engineering Curriculum Content based on total credit hours for (a) Conventional EE and (b) BEKG.

2.2 BEKG

In the BEKG programme, the student follows the curriculum structure provided by the faculty until their fifth semester of study, as illustrated in Figure 1(b). The student will select the subjects according to their interest in semester 6, 7 and 8, where faculty offered another 9% of the curriculum structure, named as an elective subject. This elective subject is selected based on three major courses offered previously in FKE, UTeM, which is BEKP, BEKC, and BEKE as tabulated in Table 1.

Table 1 List of new subjects proposed in BEKG

Categories	Subject	
Multidisciplinary	Engineering Materials; Engineering Graphic and CAD; Introduction to Mechanical Engineering; Engineering Economy and Management; Entrepreneurship Technology	
Elective	Industrial Power (BEKP)	Distribution System Design; Power System Protection; High Voltage Engineering; Renewable Energy
	Control, Instrumentation & Automation (BEKC)	Industrial Control and Automation; Intelligent Control Systems; Digital Control Systems; Industrial Robotics

Power Electronics & Drives (BEKE)	Industrial Power Electronics
	Modern Electrical Drives
	Intelligent Motor Drives
	Special Machines

Generally, BEKG courses were conducted with 80% of contact hours that highlight the theoretical and 20% meeting hour, involving the practical or laboratory experiments, computer-aided learning and problem-based learning (PBL) [4]. Meanwhile, in order to fulfill the government campaign towards technology-enhanced learning, additional 10% multidiscipline subject were added, where the subjects are listed in detail in Table 1.

To date, there is no study that investigates the quality of EE programme in FKE in terms of evaluation and assessment in the students' performances. Thus, this paper provides a comparative analysis for the conventional EE and BEKG programme based on the difference in the curriculum structure. The findings in this paper provide a promising step for improving the quality of EE programme in FKE.

3. RESULTS AND DISCUSSION

3.1 Mathematics and Basic Science Subjects Performance

Mathematics and basic science subjects play a fundamental role in supporting EE education mainly because engineering problems are based on mathematical modeling, and basic science is vital frontiers of modern technology [4]. Ideally, students with a strong knowledge of these fundamental subjects should perform well in engineering subjects.

This study aims to evaluate the performance of mathematics and basic science for conventional EE and BEKG. The evaluation is done by comparing the grades obtained by students in both programmes as shown in Figures 2(a) and 2(b), respectively. Figure 2(a) shows that most of the conventional EE students scored grade C and less than 5% of students scored grade A in computer programming. Conversely, over than 10% of the BEKG students scored grade A in computer programming as depicted in Figure 2(b). For the mathematics subjects, it is found that the performance of BEKG students outperformed the conventional EE students, where the percentages of students scored grade A in mathematics for the BEKG were higher than the conventional EE. This finding proves that the performances of students based on the mathematics and basic science subject from the BEKG have better performance than the conventional EE.
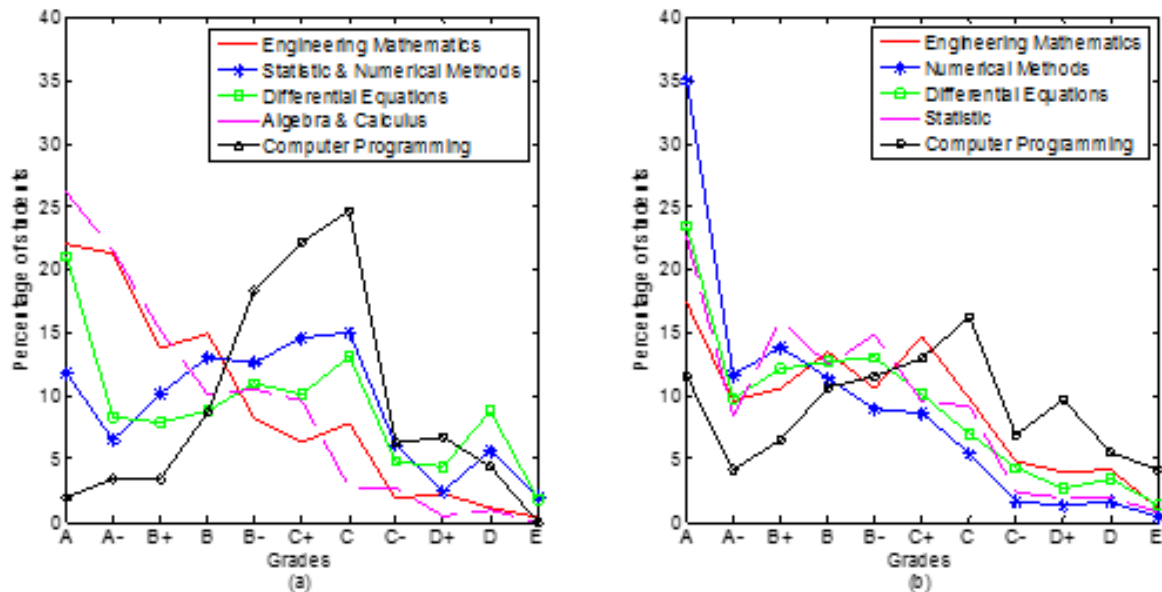
Figure 2: Mathematics and Basic Science for Cohort (a) 2013 Conventional EE and (b) 2014 BEKG

3.2 Electrical Subjects Performance

In the new curriculum of the BEKG, there are several subjects that have been improvised and upgraded from the conventional EE. To capture the effectiveness of this overall shift from the conventional EE to the BEKG, we only consider 4 electrical engineering subjects as a sample that is shown in Figure 3. The performance based on the electrical engineering subjects in the conventional EE, i.e., Instrumentation and Measurement (Instrument), Electromagnetic Theory (EMT), Introduction to Power Engineering, and Electrical Circuit 1, are compared to the BEKG, i.e., Instrument, EMT, Power System and High Voltage, and Circuit Analysis. Firstly, for the Instrument subject, the performance of the BEKG students is better than the conventional EE, where nearly 20% of students scored grade B in the BEKG, whereas nearly 20% of students scored grade C+ in the conventional EE. Next, the performance of the Introduction to Power Engineering subject is compared to the performance of the Power System and High Voltage (HV) subject. Similarly, it is found that the performance of the BEKG students outperformed the conventional EE, where nearly 20% of the BEKG students scored grade B whereas 12% of the conventional EE students scored grade C+.
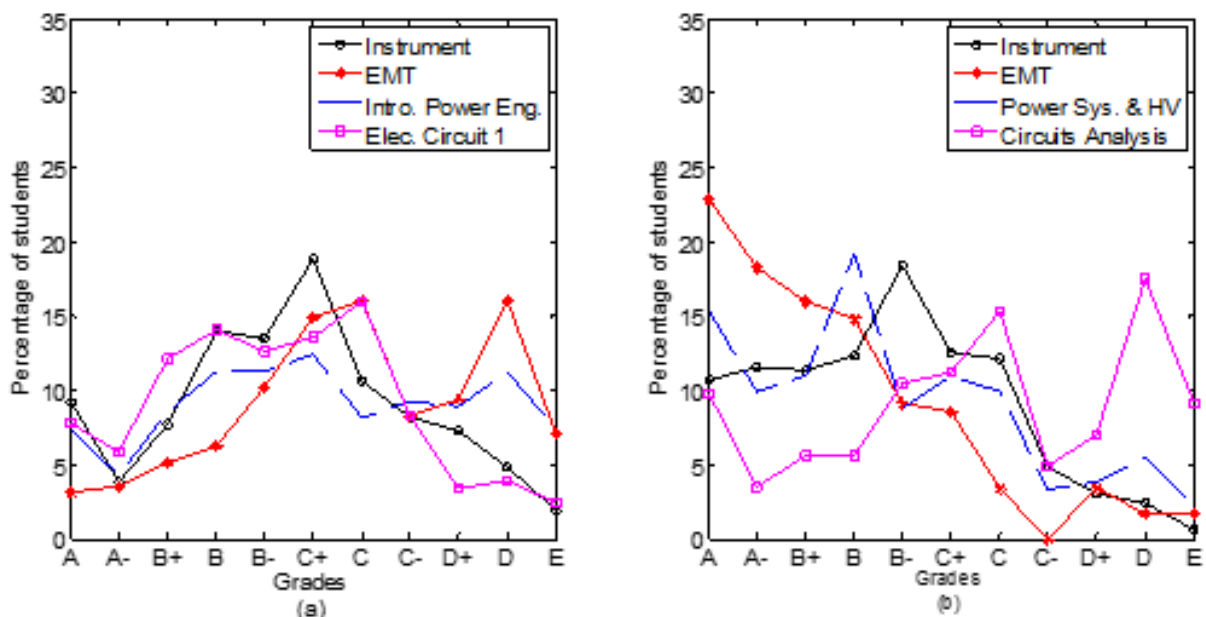
Figure 3: Selected Electrical Engineering Subjects of the (a) Conventional EE (b) BEKG

Another interesting finding is that the performance of students scored grade A in the EMT subject for the BEKG improves to more than 20% as compared to the conventional EE. This indicates that the students of BEKG have a better mathematics background compare to the conventional EE, which concurs with the observation in Section 3.1. Meanwhile, the conventional EE student obtained better performance in the Electric Circuit 1 subject as compared to the performance of the Circuit Analysis subject in the BEKG. Hence, it is advisable for any lecturer who will teach the Circuit Analysis subject to evaluate the continuous quality improvement (CQI) report for improving the performance of the students in the subject. Thus, supporting the importance of each lecturer role in the CQI of BEKG program in FKE.

3.3 Laboratory Subjects Performance

Figure 4 shows the performance of FKE's students in the laboratory subjects. Note that student of the conventional EE must attend 12 laboratory subjects in their first and second year of studies, as shown in Figure 4(a) and 4(b). Whereas in the new curriculum of the BEKG, three laboratory subjects are merged and rebranding as one subject. Hence, there is a 50% reduction in the list of laboratory subjects of BEKG as shown in Figure 4(c). Despite the rebranding of laboratory subjects for BEKG, the overall performance of the laboratory subject shows a similar trend to the conventional EE.
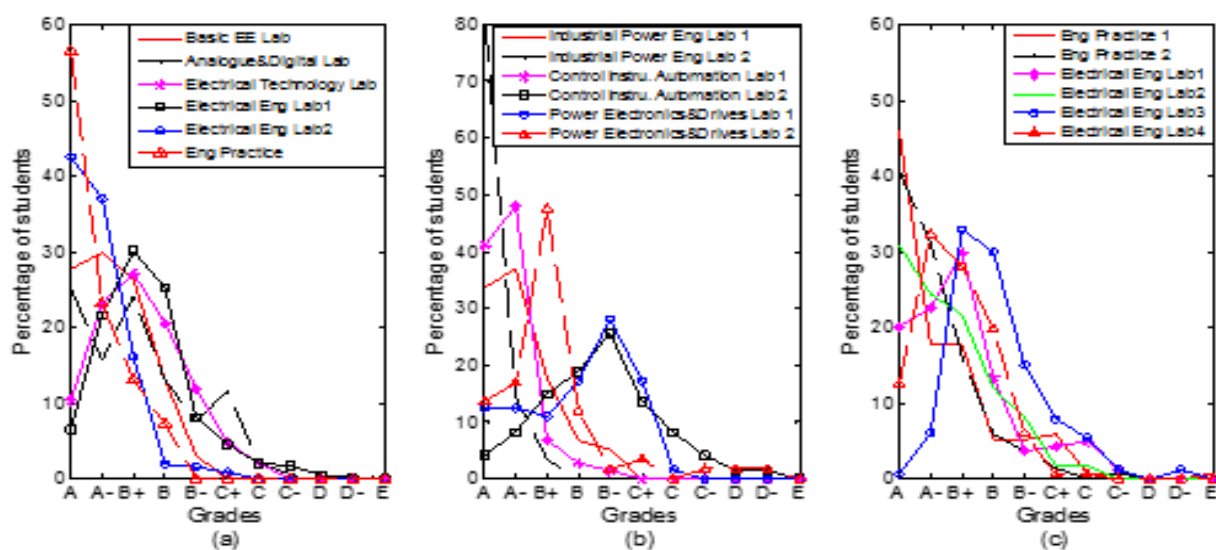
Figure 4: Laboratory subject for (a) Year 1 and 2 (b) Year 3 and 4 of the Conventional EE and (c) BEKG

4.   CONCLUSION

The student performance for the conventional EE and the BEKG program in FKE have been evaluated by comparing the performance of students in mathematics and basic science, laboratory as well as electrical subjects. This study indicates that the performance of the BEKG student is better than the conventional EE in terms of evaluation and assessment through selected subjects. The future work of the authors includes evaluating the curriculum structures of the multidisciplinary and elective subjects in the BEKG program based on these results.

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ACTIVE LEARNING: OUR FLIPPED EXPERIENCE

Zaiton, A.M.[1], Shaarizan, A.S.[2], Hazmilah, H.[3] and Kamarul, A.M.[4]

[1] Centre for Telecommunication Research & Innovation, Fakulti Kejuruteraan Elektronik & Kejuruteraan Komputer, Universiti Teknikal Malaysia Melaka,
[2] Centre for Instructional Resources and Technology, Universiti Teknikal Malaysia Melaka,
[3] Centre of Technopreneurship Development (C-TeD), Universiti Teknikal Malaysia Melaka,
[4] Faculty of Engineering Technology Mechanical & Manufacturing, Universiti Teknikal Malaysia Melaka,
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

zaiton@utem.edu.my

ABSTRACT

The impact of internet revolution 4.0 (IR4.0) has also given a big impact on the institution of higher learning (IHL). Teaching and learning approach has been revolutionized towards education 4.0, where face-to-face learning were combined with an online approached. This paper examines the active learning in Electric Circuit 2 course which apply flipped classroom methods. The students were divided into five classes; three classes were conducted using conventional methods while the other two applies flipped learning. The performance of the students is then being analyze and it shows that by flipping the classroom has given a significant impact on the outcomes.

Keywords: *active learning, flipped learning, outcomes.*

2   INTRODUCTION

In recent days, teaching and learning in higher education has moved towards a hybrid approach of learning that combines traditional face-to-face technique with technology-powered e-learning method. Researches have agreed on the effectiveness of active learning approach as it combines the best approach of both worlds agreeing that cost effective, time-saving and more customized methods of knowledge acquisition. Digital learning environments are not neutral but comprises assumptions and values regarding how teaching and learning should be carried out.

The impact of web development towards higher education has been thoroughly discussed in Gregory (2013), Salmon (2014), Buus (2015, 2018), Hansen (2018), and Salmon (2015), has been illustrates in Figure 1. According to the author, Education 1.0 is principally a one-way process, where the process is still educator-centred and students are engage in activities based around provided resources. As students' global mobility enhanced over time, the role of the lecturer became increasingly important. Learning Management Systems (LMS) was introduced in Education 1.5. Educators began to integrate the conventional approach with the Web, which contemplated the knowledge of teaching paradigm. The digital part of LMSs is called active learning. Education 2.0 commences when people can generate content and communicate virtually with each other through web applications, which then embedded in LMS to enhance conventional approaches. Various teaching and learning approach grows cordially with the

availability of web resources and contributed content enabled. Cross-boundaries educational characterizes Education 3.0, where the students themselves act as creators of the contents. The contents shared, and society benefits from the knowledge sharing.
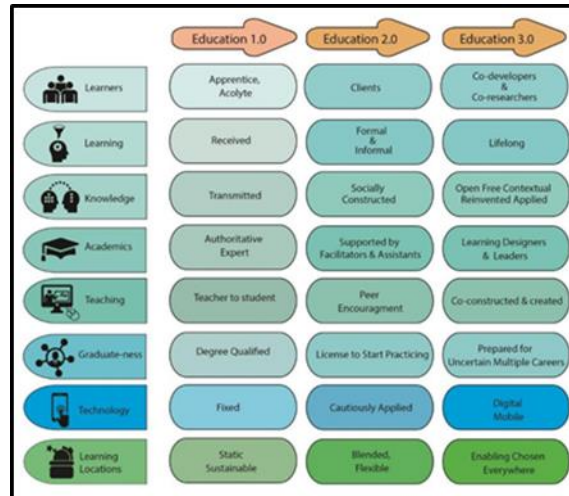

Figure 1: Higher Education 1.0 to 3.0 [1]

'Flipped Classroom' is a great example of Education 2.0. By this, information spread out of the class in an instant. Students regularly access and work on their own pace. Knowledge assimilation and peer work happens during allocated lecture time. Advancements of mobile technologies and better network infrastructures, flipping has pulled in a considerable measure of interest and experimentation.

As teaching is moving to an active learning approach where face-to-face sessions are kept for students to actively do things with peers. It must be note that the students today were brought up with smartphones and internet, and are fully immersed in "online learning". Approaches that elude "online learning" are backward because the rest of the world is moving on whilst you stand still and watch the world go by as discussed in Gillet_Swan (2017), Brooks (2016), Salmon (2015), Mutalip (2009), Flavin (2016), Flavin (2017) and Zaiton (2011).

3   METHODOLOGY

This case study was carried out on the Electric Circuit 2 course, to oversee the effectiveness of applying new teaching approach to engineering course. This course consists of theoretical and calculation elements.

3.1   Research Methods

In this case study, 180 students undertook this course and they were divided into five classes. Three classes were conducted using conventional approached (control classes), while the other 2 classes (experimental environment classes) were exposed to active learning. In the active classes, flipped learning was introduced to 45.6% students. Students were asked to watched online video lectures and given reading materials to gain necessary knowledge and were encourage to explore the concept of each lecture topics before the class. In class, students were guided to practise applying key concepts of the

topics through interactive activities (discussion and problems solving activities) to deepen the key concept. Presentation, quizzes and online discussions were done after each session to evaluate students understanding. The study examines the overall students' achievement who were taught in flipped classroom and conventional teaching approach.

4   RESULT AND DISCUSSION

4.1   Research Methods

The student preferences after experiencing the process were evaluated as one of the criteria identified based on the basic attributes regarding the course. There are four Likert scale questions asked in the survey, and the findings as illustrated in Figure 2.
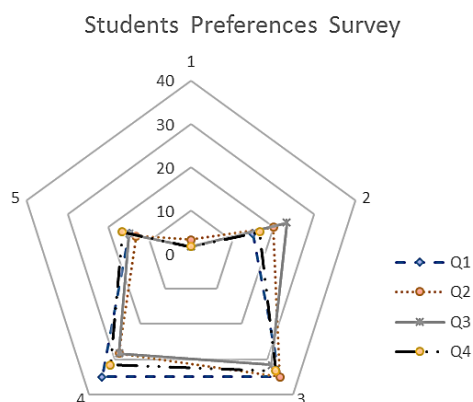
Figure 2: Students preferences survey analysis.

Questions 1 and 2 (Q1, Q2) in this questionnaire were regarding student's satisfaction on flipped approach and whether this approach suits their learning styles. Students who answered 3 and above were considered as agrees with the criteria. 85% satisfied on this approached and 76.66% agreed that this approach suits their learning styles. 75% confirmed that flipped is relevant to their learning styles in Question 3 (Q3). When the effectiveness of flipped approach in the course were examines, 81.67% suggested that it is the best methods to be implemented compared to conventional teaching and learning approach.

In the second part of the questionnaire, four criterions based on (1) students understanding on the topics, (2) improvement on communication with peers, (3) instruction from lecturer, and (4) time they spend for the subject. The outcomes as illustrates in Figure 3 to Figure 5, where majority of them agrees with the advantages of applying flipped learning on the course. The downfall of this approach is that most of them agreed that they spend more time on the subject, as in Figure 6. But they are happy that the video lecture on selected topic could be replay at anytime, anywhere possible.
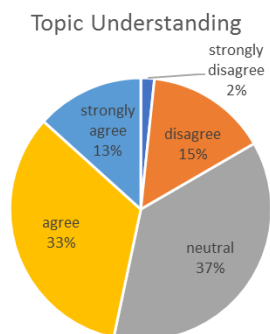
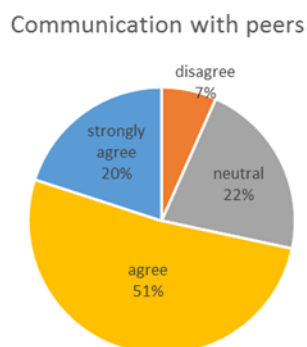**Figure 3: Students perception on topic understanding.**

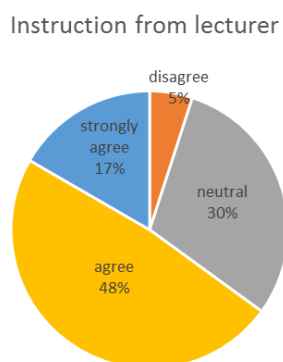**Figure 4: Students perception on communication with peers.**

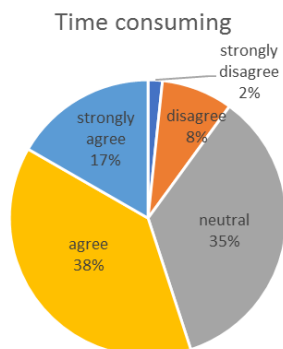**Figure 5: Students perception on lecturer instruction.**

Figure 6: Students perception on time consumption.

4.2   Student's Performance

In general, Figure 7 illustrates students' general achievement for this course. 87.8% have passed the course except for 22 students, and 10.6% were classified as an excellent achiever.
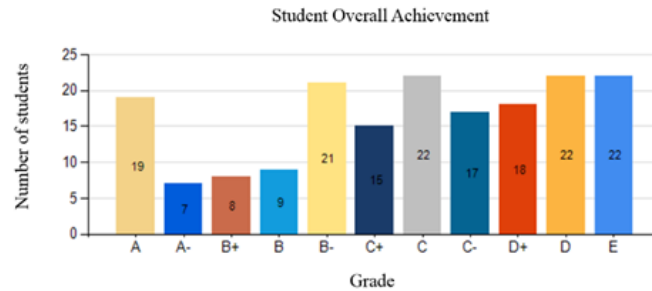

Figure 7: Overall students' achievement.

Achievements of students who were exposed to flipped and non-flipped classroom are as in Figure 8. 84.2% scored A were from flipped classroom. And only 18.2% of flipped students fail the course.
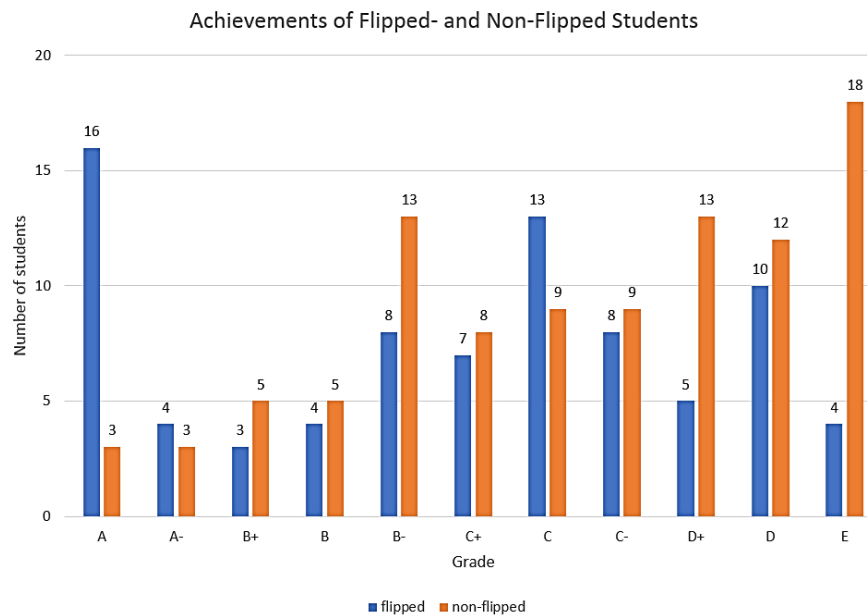

Figure 8: Students achievements based on flipped- and non-flipped classroom.

The results suggest that the implementation of innovative active learning strategies seem to have positive influences on students' achievements, while conventional approach does not give any positive impact on student performance.

The findings support the research hypothesis: "The educational achievement of the students who are taught with the active method is higher than that of the students who are taught with the conventional approach". These findings are well-matched with the conclusions of some other researches by Flavin (2017), Zaiton (2011), hirani Bidabadi (2016) and Damodharan (1999).

5   CHALLENGES

There are few challenges in applying flipped classroom although the student is well-versed with the technology. The first thing is how to engage the student with an engaged lecturer. Lecturer need to be able to actively encourage and "pull" students upward. They are responsible for their own learning but they often fall off track and need encouragement to continue.

Some students claimed that these methods fail to teach them. Student feels that the discussion information and analysis done in classroom are valuable to them.

6   RESULT AND DISCUSSION

In this study, new pedagogical techniques have been implemented in the specific course. The objectives of flipped the classroom is to move students towards active learning where students were involved in collaborative activity, problem-based learning and peer learning. Inside this specific circumstance, the lecturer roles were shifts towards coaching and facilitating the students by empowering them to take control of their own learning.

The survey and student result shows that there is significant impact on the student performance. This study proves the effectiveness of implementing active teaching and learning approach based on students' survey and students' overall attainments. Although the student performance is not solely depending on the lecturer teaching method but also depend on the student ability and attitude towards the subject matter. Thus, the outcomes confirmed the pedagogical research hypothesis: "The educational achievement of the students who are taught with the active method is higher than that of the students who are taught with the traditional method".

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VIRTUAL AGENT'S DESIGN AND ITS' VALENCE AND AROUSAL EFFECT ON EMOTIONS IN LEARNING: A RESEARCH PROPOSAL

Vicneas M. & Ahmad Zamzuri M. A.

Faculty of Art, Computing and Creative Industry, Universiti Pendidikan Sultan Idris, 35900 Tanjong Malim, Perak, Malaysia.

*Corresponding e-mail: vicneasm@gmail.com

Keywords: Virtual agent; uncanny valley; emotion in learning

ABSTRACT – *Virtual agents are animated life-like characters used in virtual learning environments to facilitate learning tasks. The effectiveness of virtual agent in term of promoting positive emotion is very much related to character realism influences. The level of realism of virtual agent may cause distress to the users, especially when the character mimics like human; which was based on the uncanny valley phenomenon highlighted by Mori in 2012.Therefore this research is aimed to analyse the effect of different realism level of the virtual agent's design on students' emotions.*

5. INTRODUCTION

Generally, virtual agents are animated life-like characters used in virtual learning environments to facilitate learning tasks (Bian & Yang, 2016). Virtual agents play motivational role in educational setting to increase motivation among the learners in order to produce meaningful learning (Mohanty, 2016). When they engage in learning tasks, a good social interaction will be created and maintained between virtual agent and learners (Berry, Butler & Rosis, 2005). Since social relationship between the virtual agent and learner is important, thus bigger prominence should be granted in design phase of the virtual agent appearance (Shiban et al., 2015). The effectiveness of virtual agent in term of promoting positive emotion is very much related to character realism influences (Mohd Najib, 2015). Based on previous researches in animation and games industries, it clearly indicates that the realism factors have impact on the success of the animation and games (Schwind, Wolf, Henze & Korn, 2015). Hence, question arises if the same effects will befall on the virtual agent, specifically for education purposes? Therefore, it is essential to conduct studies that address this phenomenon in instructional settings.

6. RESEARCH BACKGROUND

These days, animations are consolidated as a feature of computer based multimedia learning aid to facilitate human learning through technologies such as virtual agent (Tien & Kamisah, 2010). In designing aspects, the level of realism of the virtual agent is among the most vital attribute that should be addressed (Ahmad Zamzuri & Mohd Najib, 2016). It is to ensure that the virtual agent animation is capable of obtaining maximum impact in learning (Baylor, 2011).

According to Mori (2012), a character that is too realistic or almost resembles a human would eventually cause viewers to feel fearful and horrified when viewing these characters which is also

known as the Uncanny Valley phenomenon (Tinwell, 2016; Mohd Najib, 2015). If a virtual agent does not exhibit socially acceptable behavior, then people may reject it. Moreover, the level of realism of three-dimensional animated characters is higher in resembling the actual human compared to a two-dimensional animated characters (Mohd Najib, 2015). Therefore, this study will only focuses on various realism design of 2D characters. Most studies on the impact of the level of realism were focused on the film industry and very less in education field. Consequently, it is important to conduct studies that analyse the impact of realism levels of the virtual agent in teaching and learning media as well.

Many previous studies only focused on agent's appearance but limited on realism level of the character (Shiban et al., 2015). Besides, past studies only focused on students' emotions caused by character's appearance in isolated and not on the entire learning process. Hence, this study aims to address the gap by studying on the impact of different realism level of virtual agent.

Firstly, the character's appearance in isolated on students' emotions in the dimension of valence and arousal. Secondly, students' emotions on overall learning and thirdly, its relation. For that, four different realism level of virtual agent in Multimedia Learning Environment (MLE) had been developed as experimental items and tested to analyse its impact, specifically on emotion caused by the character's realism level and emotions in learning. Accordingly, the four 2D female virtual agent prototypes are realistic agent, semi-realistic agent, stylized agent and cartoon-like agent.

7. PROBLEM STATEMENT

Adequate realism level of virtual agent might have an impact in simulating positive emotions among the learners. Although, different realism level of virtual agent would create different emotions among learners, it is still unclear on how to design the appearance of a virtual agent to improve students' positive emotions. The relationship between learning and emotion is not something new but still very few numbers of researchers who have studied about it.

8. THEORETICAL FRAMEWORK

The Mayer's Cognitive Theory of Multimedia Learning (Mayer, 2009), Mori's Uncanny Valley phenomenon (Mori, 2012) and Russell's Circumplex Model of Affect (Russell, 1980) used as the basis to construct conceptual framework in this study.
A conceptual framework of this study has been constructed, as depicted in Figure 1.
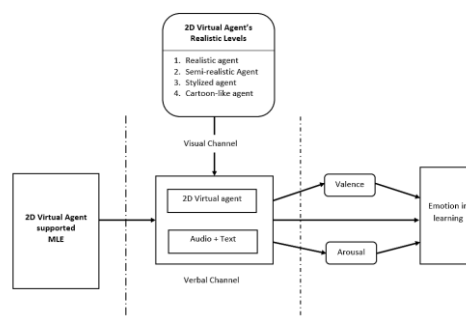

Figure 1 Proposed Conceptual Framework

9. RESEARCH OBJECTIVES

The self-assessment manikin (SAM) nonverbal pictographic questionnaire will be used to measure students' individual emotions in the dimensions of valence and arousal on the different realism level of the animated virtual agent design. Whereas, the achievement emotions questionnaire (AEQ) will be used to measure students' emotions in as a whole.

Accordingly, the specific objectives of the study are as follows:

a) To analyse the effect of different realism level of the virtual agent design on students' emotions in the dimension of valence.
b) To analyse the effect of different realism level of the virtual agent design on students' emotions in the dimension of arousal.
c) To analyse the effect of different realism level of the virtual agent on students' emotions in learning.
d) To analyse the relation between students' emotions in the dimension of valence caused by different realism level of virtual agent design and emotions in learning.
e) To analyse the relation between students' emotions in the dimension of arousal caused by different realism level of virtual agent design and emotions in learning.

10. CONCLUSION

Animated virtual agent acts as computer generated animated character that can serve as a social model to hold meaningful interaction with learners. A mismatch in virtual agents' visual elements could attribute to negative impact on students. It is because, level of realism on agent may cause distress to the users, especially when the character mimics like human based on uncanny valley phenomenon. Therefore, this study focuses on the realism impacts of virtual agent on students' emotions in learning.

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GRAMMOV: LEARNING GRAMMAR USING MOVIES

Tengku Intan Suzila T. S.[1,], Mohd Yusri M. N. [2], Omar S R[3*]

[1&2]Academy of Language Studies, Universiti Teknologi Mara Cawangan Pahang, 26400 Bandar Jengka, Pahang. Malaysia

[3] Centre for Environment and Sustainability, Universiti Teknikal Malaysia Melaka,Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*]Corresponding e-mail: sitirohana@utem.edu.my

ABSTRACT

7   *English grammar learning can be challenging for many ESL users for its non-overgeneralization features. As fun is deemed as a significant element in any learning process, excerpts from movies were used as e-content to assist in teaching English grammar. Recall technique in semi structured interviews were carried out on pre-identified average students after learning grammar using movies to unfold their learning acceptance. Findings suggest average learners show minimal benefit of such learning technique.*

Keywords: *ESL; grammar; movie*

1. INTRODUCTION

The learning of English grammar has been a challenge to English as second language (ESL) learners (Mohamad. 2009). Mohamad (2009) found students excel in learning grammar using internet activities as opposed to traditional method "chalk and talk" yet newer studies (Tengku Intan Suzila, et.al, 2018; Solano, et.al, 2017; and Gunuç, & Babacan, 2017) found mediamorphosis is not suitable for average learners. Mediamorphosis can be fun to many highly digitized natives yet the changes from one media to another in learning environment may be overwhelming for averagely digitalized students (Tengku Intan Suzila, et.al, 2018).

The element of fun is highly associated to learning acceleration yet it has to be an immersive and instructionally fun too (Allen, 2016). Thus, the present study adopts movie excerpts as a fun e-content to assist in ESL grammar learning.
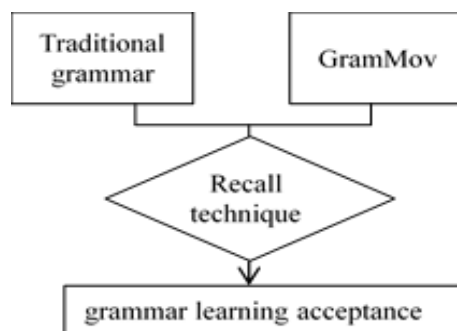

Figure 1: Research procedure

7.1 Research Question

Can the use of movie excerpt as e-content improve ESL grammar learning acceptance?

7.2 Research Objective

To unfold average ESL students' ESL grammar learning acceptance of movie excerpt as e-content.

7.3 Research procedure

Allen (2016) offers the background that initiated the present study. The present study adapts (Ikram, 2015) for it procedure. Recall technique in semi-structured interviews were carried out with a focus group of five conveniently selected students after 28 students were taught English basic part of speech and tenses using traditional grammar drilling and learning grammar using movies excerpt were made. Figure 1 illustrates the present research procedure.

2. METHODOLOGY

Qualitative approach is adopted for the present study to better understand students' grammar learning acceptance. Average students serve as the subject of the present study. The problem that led to the current study is, average ESL students seem to face great challenges in grasping English grammar using traditional method as suggested in (Mohamad, 2009). Therefore, intervention in the form of mainstream movie excerpts to add an element of fun is made.

2.1 Recall technique

Memory activities include recollection and familiarity which are differentiated by wants (to remember) and seen before (Srivastava & Vul, 2017). Thus, the recall technique used in this present study is based on familiarity – seen before. The encoding process is from movies and classroom activity whilst the retrieval processes happens in a semi-interview session. Srivastava and Vul (2017) states "differences in memory performance in recognition and recall are attributable to no deeper issue than an ecological preference to test memory using more items than lists (Srivastava and Vul 2017:8)." Yet, as it adds to the element of fun in learning (Allen, 2016), the present study proposes such experiment on average learners.

2.2 The present study

A focus group consisting of five students was interviewed to unfold their grammar learning acceptance using movie excerpts as e-content. Coding of the recall technique semi-structured interview is shown in Table 1. Yet, for the purpose of the present paper, only some of the descriptive analysis shall be discussed.

Table 1: Coding

Parts of speech		Tenses	
Properties	Weight	Properties	Weight
Noun/pronoun	4	Simple	1
Verb	3	Progressive	2
Adverb/adjective	2	Perfect	3
Preposition	1	Perfect progressive	4

3. RESULT

Some examples of scenes and the transcribed interviews are as the following:

Scene1:
Thor: "Where **is it**? This Crown?"
Surtur: "**This is** my crown, the source of my power."
Thor: "Oh, **that's** a crown. I thought **it was** a big eyebrow."
Surtur: "**It's** a crown."(Marvel Studios,2017)

Question 1: Can you recall how singular and plural nouns and verbs agreement is important in English?

1:1 It **is** a crown (giggled)
2:1 *tak ingat lah 's' letak kat mana* (I don't remember where to put 's')
3:1 *Macam* "This **is**" *tu ke puan*? (like 'this is,' madam?)
4:1 movie *tunjuk* 'crown **is**' *dan guna* '**this**' (in the movie, 'crown is' and 'this')
5:1 camne puan? (how, madam?)

Scene2:
Thor: "So, Earth **has** wizards now?"
Dr. Strange: "The preferred term is Master of the Mystic Arts.
Thor, I sense a great change in your future. Destiny **has** dire plans for you, my friend."
Thor: "I **have** dire plans for destiny." ."(Marvel Studios,2017)

Question two: Can you recall how 'has' and 'have' are used?

1:2 I **have** plans…*macam tu, kan?*
2:2 *satu* has.. *tu betul* (one –has, that is correct)
3:2 I *selalu* have, tapi satu I ni…
4:2 confuse *lah*
5:2 tak tau lah

Scene3:
Fan *(to Thor)*:**"**Sorry to hear that Jane **dumped** you."
Thor *(aside to Loki)*: "She **didn't dump** me, you know. I **dumped** her. It **was** a mutual **dumping**." ."(Marvel Studios,2017)

Question three: Can you recall how the word 'dump' is used to describe time?

1:3 tak ingat lah
2:3 past *tu..*
3:3 ada –**ed**..
4:3 *yang* mutual dumping *tu? …*
5:3 *tak paham puan* (don't understand, madam)

4. DISCUSSION

Average learners' feedback from recall technique semi-structured interview suggests that students show minimal acceptance of learning grammar using movie excerpts as e-content. This parallel to (Solano, et.al, 2017, Gunuç, & N. Babacan, 2017, and Tengku Intan Suzila, et.al no date). In 1:1 the student imitated the dialogue and giggled suggesting that he found it fun. In 2:1 clarification for understanding had to be made twice to ensure translated meaning was captured.

Asking for clarification shows uncertainty in giving answers is common as seen in 3:1 and 1:2. Overall, feedback suggests that each shown movie excerpts with written dialogue and written explanation demands further verbal explanation from the educators. Thus, a video recorded explanation is also insufficient. Tengku Intan Suzila, et.al, no date) also noted that mediamorphosis among average learners is of lower acceptance.

Properties that fall under tenses seem to have lower acceptance over parts of speech. Although general acceptance may be seen, correlation to performance has to be examined. Therefore, the educator needs to play a part in explaining the role of tenses in English. The movie excerpts assisted in understanding time line based on the movie plot.

The plots of the movies seem to be a distraction of the learning process as interest was led towards the plot. This is also seen in (Tengku Intan Suzila, et.a,l no date).

5. CONCLUSION

Using movie excerpts as part of e-content may be limitedly constructive towards average students. Although it adds the element of fun, it distracts the learning acceptance of these students. The role of the educator cannot be denied. Thus, it is significant that educators understand the needs of their target students as there is no blanket rule to teaching.

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E-TRANSFORM: HIGH SCHOOL EDUCATIONAL KIT FOR LEARNING MATHEMATICAL TRANSFORMATION

Zabidi, M.I.Z.M.[1*], Yung, L.T.[3], Rifin, R.[4], Kadiran, K.A.[4], Abidin, A.F.Z.[1], Harun, M.H.[1], Azahar, A.H.[1], Karis, M.S.[2], Ali, N.M.[2], Yusoff, Z.M.[4]

[1] Faculty of Electrical & Electronic Engineering Technology, Universiti Teknikal Malaysia Melaka, 76100 Durian Tunggal, Melaka, Malaysia.
[2] Faculty of Electrical Engineering, Universiti Teknikal Malaysia Melaka, 76100 Durian Tunggal, Melaka, Malaysia.
[3] School of Science & Technology, Wawasan Open University, 81300 Skudai, Johor, Malaysia.
[4] Faculty of Electrical Engineering, Universiti Teknologi MARA Cawangan Johor Kampus Pasir Gudang, 81750 Bandar Seri Alam, Johor, Malaysia.

Corresponding Author e-mail: izzat.zakwan@utem.edu.my

ABSTRACT

Mathematical Transformation is a part of Mathematics Secondary grade syllabus in Malaysia where the students being exposed to three topics: translation, reflection and rotation. This paper proposed an educational kit that can be used to study the topic of Transformation in Mathematics. The educational kit displays question at the LCD screen in which the student need to insert the correct shape at the appropriate slot at the given grid. Then, the educational kit gives feedback to the student. A survey is done to gauge the effectiveness of the educational kit. The results shows the potential of the educational kit.

Keywords: educational kit; mathematical transformation, translation, reflection, rotation

1. INTRODUCTION

'Transformation' is one of the main topics in the Mathematics subject. It consists of a few important sub-topics such as translation, reflection and rotation. Nowadays, most of the students in high school are unable to answer those questions which are related to this topic due to their weak imagination. For instance, to find out the image of a shape under rotation, students have to use the coordinates on the grid paper to perform their answers.

Currently there are two educational tools that related to this project. Math Warehouse is a website that enables students to learn transformation through animation [1]. IXL Learning is a website that allows high school students to learn transformation in different kind of levels via online [2]. It provides students a space to enter their answer based on the question given or by using cursor to drag the shape of the answer on the coordinate plane.

Noticing the problem mentioned earlier and the current solutions which all are website based, therefore this paper proposes a hardware electronic-powered educational kit that test student knowledge on 'Transformation' where the kit automates the process of providing questions, the student select relevant shape and insert the shape to a relevant coordinates of the grid, and the kit will give feedback to the students which reduce the dependency on the teacher.

2. METHODOLOGY

e-Transform is an electronic board that test student the high school students' knowledge in Mathematical Transformation. Students can easily insert the female pin header (attached below the shapes) that they want onto the long straight turn pin for the purpose of finding the image of an object according to the question given on the TFT LCD and check their answers by entering the instructed character on the 4x4 keypad. The melody "twinkle-twinkle little star" from the buzzer and green LED are used to indicate the correct answer, whereas the long "beep" sound and red LED are used to indicate the wrong answer. Figure 1 shows the project prototype from the top-view of the educational kit.
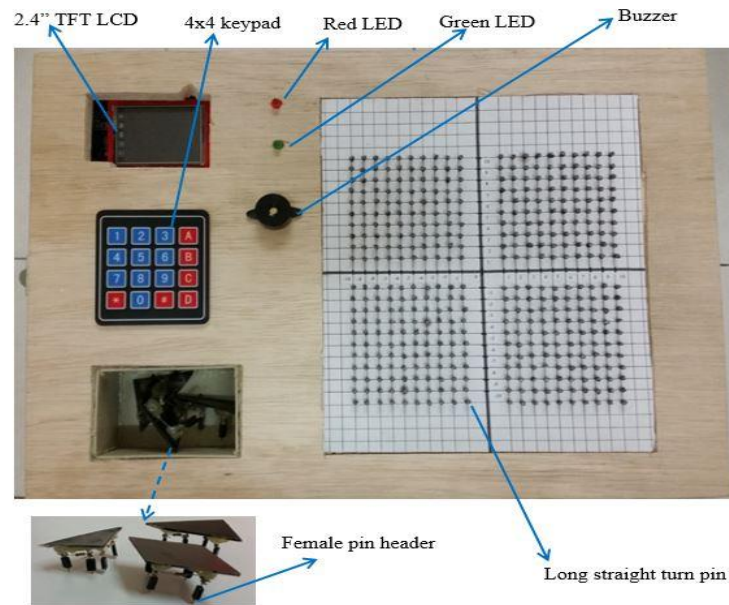

Figure 1: Project prototype

Firstly, students need to select the type of questions (reflection, translation or rotation) that they want and follow the instructions that displayed on the TFT LCD by entering the indicated value on the 3x4 keypad. Then, the students need to slot the shape or point that they want by using female pin headers on the Cartesian coordinate (composed of straight pin headers). Next, the students have to enter and check their answer. If the answer is correct, green LED will turn on and TFT LCD will display true statements. Else, the buzzer and red LED will turn on together and TFT LCD will display false statement which indicates the wrong answer. The whole process keeps repeating until the students switch off the educational kit.

3. RESULT AND DISCUSSION

In order to gauge the effectiveness of the educational kit, a brief satisfaction survey has been conducted among 40 students at Potensi Jaya Tuition Centre. The reason of choosing this tuition centre is because it's best location surrounded by 12 private and government schools, specifically among the Form 2 and Form 3 students because the students have learned the topic 'Transformation' according to the syllabus. The questions of the survey are shown in Table 1. Figure 2 and Figure 3 shows the satisfaction on the educational kit according to the question asked to the students and teacher, respectively.

Table 1: Survey questionnaire

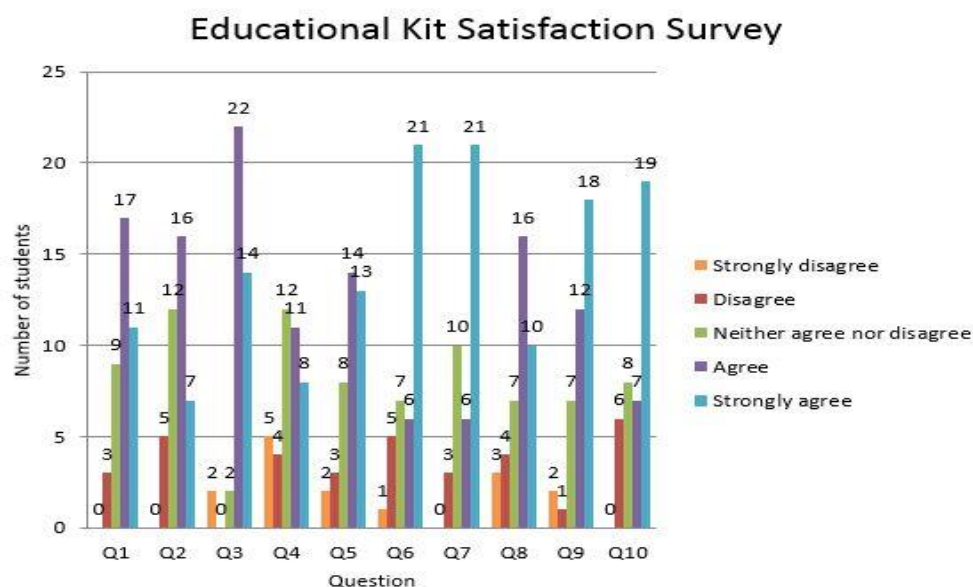| No	Survey Question
1.	This educational kit explained very well in kind of answers.
2.	The questions asked by this educational kit are easy to be understood.
3.	This educational kit can be a highly interactive activity.
4.	Students are able to operate this educational kit without the guidance of educator/ teacher.
5.	Students gained better understanding after answering the entire questions in this educational kit.
6.	All the sub-topics that performed by this educational kit is related to secondary school's syllabus.
7.	This educational kit definitely can catch students' attention.
8.	The contents of this educational kit are suitable for higher secondary school's students.
9.	This educational kit can stimulate students' imagination.
10.	Students prefer to learn this subject by using the educational kit rather than in theoretical way.

Figure 2: Students' satisfaction for each question

Figure 3 shows the survey conducted to the teachers that teach the subject. 80% of the teachers felt that this educational kit had well explained in term of the answers. Besides, 66.67% teachers also felt that the questions asked in this kit were easily understood. Meanwhile, 93.3% teacher rate that this kits could generate interactivity for the learning process. None of the teacher disagree when asked about whether students need guidance when using this kits and whether this kits could give better understanding to the students to learn transformation topic through this kit. Meaning, for the learning process majority teachers believe that students can understand more when expose to this kit. None of the teachers also disagree that this kit could stimulate student imagination and preferred to learn though this method as compared to traditional method.
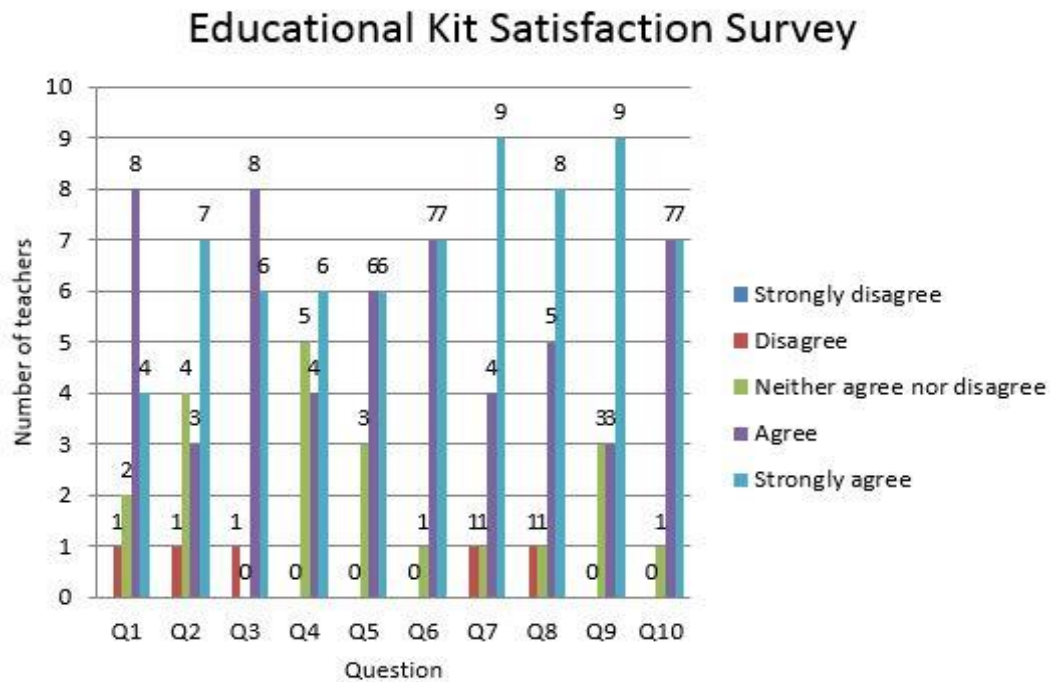

Figure 3: Teachers' satisfaction for each question

4. CONCLUSION

This paper presented the development of an electronic-based educational kit to test student knowledge on Mathematic Transformation called e-Transform. The finished prototype is then presented to a group of target audiences which then a survey is done to gauge the effectiveness. The feedback obtained shows the potential of the proposed prototype. The authors believed a further analysis needs to be done in order really examined the relevancy of the prototype to real used.

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INTERNET OF THINGS (IOT) AND QUICK RESPONSE (QR) CODE TO ENHANCE READING AMONG SLOW LEARNERS IN PRIMARY SCHOOL

Parvani, S. & Melor, M.M
Universiti Kebangsaan Malaysia
Bangi, 43600, Malaysia
Correspondence Author email:baha5423@gmail.com

ABSTRACT

The proliferation of technology has brought forth many innovative applications in the field of education. On par with the fourth industrial revolution (4IR), the use of Internet of Things (IoT) and Quick Response (QR) code in teaching pedagogy helps to redefine the mundane learning environment and experiences in the classroom. The inclusion of IoT and QR code in teaching reading skills among slow learners in Malaysia has not been explored yet. Therefore, this article aims to report a preliminary study conducted on the use of QR code in improving slow learner's reading skills. The pre and post test showed an increase in their reading abilities using QR code compared to using the traditional method. This shows that there is a bright prospect in using QR code to enhance reading among slow learners in Malaysia.

Keywords: Internet of Things , QR code , reading skills , slow learners

1. INTRODUCTION

The advancement of technology in the forth industrial revolution (4IR) in terms of Internet of Things (IoT) is slowly garnering global attention. Aldowah et.al (2017) advocated that IoT will bring positive changes in education as it is visioned to provide a better learning environment for students. Inadvertently, as Malaysia gears towards 21st century learning, educators and policy makers are working towards incorporating technology into education.

Although the nation is preparing itself to meet the standards of 21st century, it is undeniable that some students are still struggling to cope in the classroom. This notion is supported by Ahmad et.al (2013) who explained that a research conducted by National Union of the Teaching Profession (NUTP) in 143 primary schools, 4.87% of students are still struggling to read. Dzalani and Shamsuddin (2014) believed that students who have below average cognitive abilities are known as slow learners. In Malaysia, these slow learners are screened through a test called Literacy and Numeracy Screening Programme (LINUS).

However, despite the intervention programme, many students are still in the same level. This could be due to the inadequate knowledge on how cater to slow learners' needs as well as the limited

resources available in schools nationwide. In addition, in a mainstream classroom, these slow learners are often left out as the teacher has merely an average of 10-15 minutes to spend on focused teaching.

Thus, a platform to promote a more student centered learning is needed. One of the many ways is by utilising IoT via Quick Response (QR) code. The use of IoT and QR code is yet to be explored in the Malaysian education system. Therefore, this preliminary study aims to report the use of IoT and QR code integrated reading module for slow learners.

2.   LITERATURE REVIEW

2.1 Internet of Things (IoT)

The phrase Internet of Things is not a new concept in the technological world. The word Internet of Things is introduced by Kevin Ashton in the year 1999 and is coined from the word "internet" and "things" (Suresh et.al, 2014; Coetzee & Eksteen,2011). In addition, Coetzee and Eksteen (2011) advocated that, IoT is a commuication between human-human, human-things and things-things. Suresh et.al (2014) further elaborated that by the Year 2020, over 50 billion devices could be connected with the Internet. Hence, with the concept of IoT, most of the equipment used in our daily life can be controlled and supervised using the IoT where it heightens the connectivity for anyone at anytime and anyplace.

2.2 Quick Response (QR) code

The Quick Response (QR) code is a 2-dimentional bar code that can be read via mobile devices and scanners. The QR code was first founded in 1994 by a Japanese company called Denso (Law & So, 2010). QR code has the ability to store information vertically and horizontally (Saravani & Clayton, 2009) and has an immense capacity to hold 7089 numeric characters, 4296 alphanumeric characters, 2953 binary bytes, and 1817 kanji characters (Law & So, 2010).

Durak (2016) propounded that QR code has been used in a wide array of areas since 2011. There are two types of QR code namely; static and dynamic. Gopen (2012) elaborated that static QR code embeds information after the code is generated whereby the user is unable to modify the contents. On contrary, dynamic QR codes are rewritable as it allows the user to alter the contents as they wish.

2.3 Quick Response (QR) code in reading

Qr code in education is seen as mobile learning where students can learn in an non-restricted area (Low & So, 2010). The use of IoT and QR code in lesson optimizes the concept of Cognitive theory whereby students make logical and operational thought.
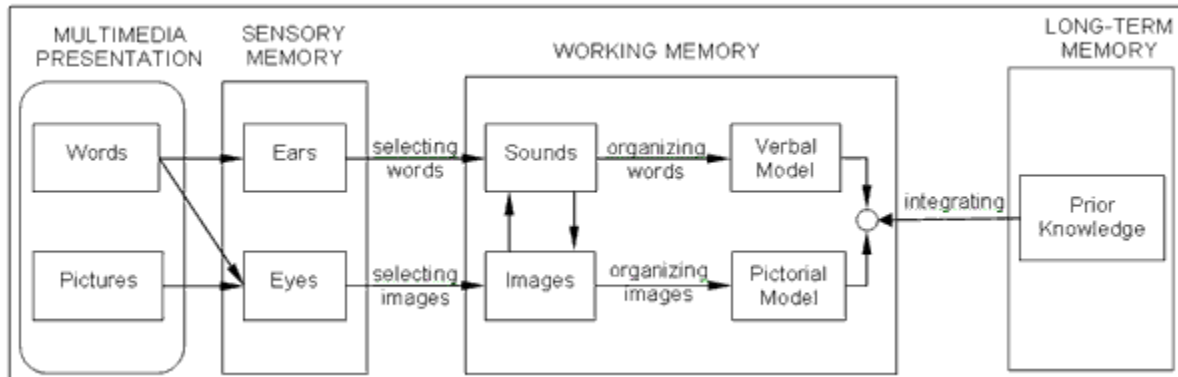

Figure 1 Visual representation of the Cognitive Theory (citied in Pomales-Gracia & Liu,2006)

Incorporating Cognitive Theory to develop the application and the module helps to cater to the different types of learners. Hence, through the integration of animation, words and sounds, enhances learners sensory and working memory. In addition, using QR code and IoT gives learners the autonomy to explore the topics on their own pace. This notion is supported by Kossey et.al (2015) who stated that QR code based lessons promote independent learning among learners.

3. METHODOLOGY

A quasi-experimental preliminary study was conducted in a rural vernacular primary school in Merlimau, Melaka. The study is conducted on four eight year old students during English class for a duration of two weeks. The topic selected was on 'Animals'. The instruments used were animal reading flashcards with QR code and mobile phones with installed application.

3.1 Procedures

A pre-test was conducted using a traditional method; reading from textbook. The researcher recorded the reading using the developed application.

Before the post-test was conducted, the students were given the flashcards with QR code and mobile phones for them to practice scanning the QR codes. Once the students were well-versed in using the application, they were given the actual set of animal flashcards.

Once the students scanned the flashcards, they will be directed to the main interface of the application. The main interface of the application is designed to be similar to the flashcards to avoid any confusion. To spark more interest among slow learners, the images used were in the

form of Graphic Format (GIF). features of this microphone and

Test	Paired difference			
	Mean	N	Std. Deviation	Std. Error mean
Pre test	13.8	5	4.324	1.933
Post test	8.4	5	3.049	1.363

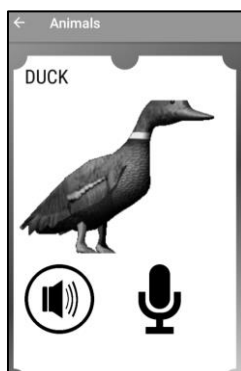Interchange Other extra interface are the speaker icon.

Figure 1 Main interface of the application.

The speaker icon enables students to listen to the pronunciation of the words. Students read the word until they get the "Good" remark. If the students read the word wrongly, the phrase " Try again" will appear. This provides students ample of practice until they were able to get the "Good" remark.

As for the researcher, as soon as the students log in into the application and use it, the result will be automatically available. The data can be retrieved instantly from the Firebase database.

4. RESULTS AND DISCUSSION

An analysis was carried out for the pre and post test. In this preliminary study, the average score for the pre-test is 13.8 (SD 4.32) meanwhile for the post-test the mean score is 8.4 (SD 3.05). the lesser the mean score, the better the reading skills shown by the students. This shows that students were able to read better as the frequency of " Try again" score was less.

Table 1 Pre and Post test results

The preliminary study showed that the use of QR code helped to improve students reading. Besides that, this method helped students to progress according to their own pace. Students were able to use the application at any time and any place. Hence, a non-threatening environment was established. Hashim et.al (2017) advocated that optimal learning can be created through technology. Thus, students were given the autonomy to self-learn. This notion was supported by Baruffi (2015) who stated that QR code aided lessons helped student's personal growth as well as encouraged them to work independently. This greatly helped the teacher in the class as the teacher could facilitate the mainstream students and the slow learners at the same time.

In addition, the teacher could provide assistance and facilitate their reading if the teacher found that the students were struggling based on the real time data obtained from the Firebase database. Student's reading audio data were automatically inputted into the database although students used the application during their free time. This shows that the teacher could retrieve the data whenever the uses the application to read. By utilizing the concept of IoT, the teacher could retrieve the data of any students at anytime and anywhere. Hence, it gives the teacher flexibility in analysing the data.

5. CONCLUSIONS

Succinctly, the use of IoT and QR code in education has the potency to bring positive results in helping our students to develop their potential. It would be apt for teachers and policy makers to explore the endless possibilities of using IoT and QR code in maximising the teaching and learning experience in the classroom.

As outlined in the Malaysian Education Blueprint (2013), the government is aiming to leverage ICT in education sectors in the nation. Therefore, teachers should grab this opportunity to upgrade their teaching pedagogy to produce a more dynamic and enthusiastic students.

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MENTOR-MENTEE PROGRAM FOR WEAK STUDENTS IN CALCULUS

Samsul Ariffin Abdul Karim[1, *], Noor Nashuha Azman [2]

[1, 2)] Fundamental and Applied Sciences Department, Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak Darul Ridzuan, Malaysia

[1)] Centre for Smart Grid Energy Research (CSMER),

Institute of Autonomous System, Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak Darul Ridzuan, Malaysia

Abstract: *Mentor-Mentee Program is proposed in order to cater the weak students in Calculus at Universiti Teknologi PETRONAS (UTP). This program has been running on three consecutive semesters i.e. March 2016 (as control), July 2016, March 2017 and July 2017, respectively. To measure the effectiveness of the program, the coursework (CW) and Final Exam (FE) of all mentees are recorded and were analysts by applying one-way ANOVA test. The main outcome of the study indicates that the Mentor-Mentee Program has improved the performance of all mentees in the final exam.*

Keywords: *Mentoring; Performance; ANOVA*

1. Introduction

There are many ways that the teachers and lecturers can assist the weak students. For instance, give students with many exercises and homework. Usually this is lecturer centered. Apart of teaching innovation as well towards teaching 4.0 agenda, many active learning (AL) activities has been integrated and incorporated in teaching and learning (T&L) via cooperative learning (CL) as well as online T&L such as e-learning, ULearn, MOOCS and Open Distance Learning (ODL). Besides that, mentoring also can be used as one of teaching innovation in lectures or tutorial [1, 2, 3, 4].

To assist the weak students (Foundation Studies) in Calculus at UTP, we choose difference approach compared than the existing T&L methodology. We implement Mentor-Mentee Program (MMP) or peer mentoring by choosing mentees with their CW is less than 25 out of 50. Mentors are choosing from UTP undergraduates which have scored at least B+ in Calculus. All the mentees are needed to undergo minimum 12 hours mentoring activities per semester. Throughout the program, we implement many AL activities such as Brainstorming, Reflection, Think Pair Share (TPS), Pair Testing, Question and Answer Pairs and Closure Review Pairs (CRP). The results are collected and recorded for every semester. We compare their performance before the mentees join the MMP (March 2016 semester) and after they has successfully participating the event (July 2016, March 2017 and July 2017). One-way ANOVA is used to measure the effectiveness of the MMP at UTP. To our knowledge, this is the first study in improving students' in Calculus by using Mentor-Mentee Program.

2. Methodology

For every semester, we select 40 mentees and 20 mentors with three dedicated lecturers respectively. Due some unforeseen circumstances, usually the turn up for mentees are only around 17-30 meanwhile for mentors around 10-20, respectively. Table 1 summarizes the number of mentees and mentors for four semesters. In order to apply the ANOVA test, we choose March 2016 semester as control variable i.e. we calculate all descriptive statistics for all mentees without joining MMP.

The methodology framework is divided into the following four stages:

(1) Choosing mentee (CW less than 25 out of 50) and mentors (at least grade B+ in Calculus)
(2) Running MMP event on Week 12 or 13 with 12 hours intensive T&L with cooperative learning.
(3) Collect and record the data
(4) Analysis the data by using statistical techniques and finalize the outcome of the study

The details for stages 1 until 2 can be found in Karim and Azman [2]. We only emphasize on the data collection in Stage 3 and results analysis in Stage 4 for this study.

Data Collection

From Table 1, we collect the results for each mentee for each semester. We use simple descriptive statistics by calculating the mean, variance and to determine whether the data is follows normal distribution or not. If it's followed, then we can use one-way ANOVA tests (or any other parametric statistical tests). Figure 1 summarizes the obtained data for CW, FE and Total (CW+FE) for each mentee –for July 2016 semester. For complete data sets, the reader can refer to Azman and Karim [2].

Table 1 Mentor and Mentees.

Semester	Mentees	Mentor
March 2016	30	15
July 2016	30	15
March 2017	21	15
July 2017	17	10

In the MMP, the lecturer will prepare set of exercises given in the form of Workbook to all mentees and mentors. The topics covered include Differentiation and Its Applications, Integration and Its Applications, Series and Solving System Linear of Equations. In total, they must complete 12 hours mentoring processes that involving many AL activities as well as peer teaching and learning. Furthermore, after each session, mentor will provide to the mentees instant feedback regarding on the discussed topics in each session such as where is the mistake and what need to be do, how to tackle those problems, how to get better understanding in difficult topics such as series and power series involving interval of convergence etc. This will ensure that, mentees will receive instant feedback in order to improve their performance in the final exam. Indeed, mentees can contact their respective mentors via social media such as What Apps, Telegram etc.

(a)

(b)

Fig. 1: Some pictures on MMP event at UTP.

3. Results and Discussion

We calculate all description statistics for all four semesters. Table 2 summarize the value. From Table 2, the mean for July 2016 is higher than the means for March 2017 and July 2017. From Azman and Karim, it can be shown that the grades for all batches (July 2016, March 2017 and July 2017) can be considered as the normal distribution's i.e. ANOVA or any other parametric statistical tests can be used.

One-way ANOVA at 95% confidence interval (CI) is used in this study. We set the null hypothesis (H_0) and alternative hypothesis (H_0) as follows:

$$H_0: \mu = \mu_1 = \mu_2 = \mu_3$$
$$H_A: \mu \neq \mu_1 \neq \mu_2 \neq \mu_3$$

Where μ is a mean for March 2016 semester (without MMP). This is control variable in one-way ANOVA statistical test i.e. the results before the weak students (mentees) are undergone an intensive MMP under the mentoring and guiding by the dedicated mentor and lecturers. Meanwhile μ_1, μ_2, μ_3 are mean for July 2016, March 2017 and July 2017 semesters, respectively.

Null hypothesis indicates that there is no improvement in the performance of all mentees for each semester. To reject the null hypothesis, we use two statistical values i.e. p-value obtained from the ANOVA is less than critical level $\alpha=0.05$ and the $F_{statistic}$ is greater than $F_{critical}$ obtained from F-Table with degrees of freedom.

Table 2 Descriptive Statistics for ANOVA Test

Groups	Mean	Variance	Standard Deviation
Mar-16	39.66	86.69	9.31
Jul-16	63.44	68.11	8.25
Mar-17	52.96	52.77	7.26
Jul-17	54.02	86.34	9.29

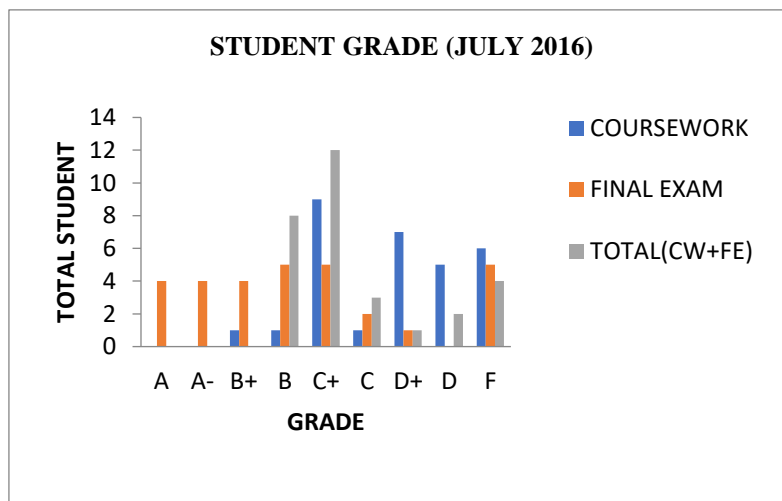**Fig. 2: Results for July 2016 Semester.**

By using one-way ANOVA in Microsoft Excel, the following results are obtained:

$$F_{statistic} = 22.15$$

$$p - value = 0.000000000594$$

$$F_{critical} = 2.75$$

Since $F_{statistic} > F_{critical}$ at 95% CI as well as $p - value < 0.05$, then the null hypothesis can be rejected i.e. the mean for July 2016, March 2017 and July 2017 is difference than the mean for March 2016 (without MMP). This shows that, the MMP has improved the performance of the mentees. Evidently it can be seen from Table 2. Mean for March 2016 is less than 40%. Meanwhile, mean for July 2016 is the highest compared with March 2017 and July 2017. Overall the MMP event provide some meaningful activities to all students.

Thus from descriptive statistics and ANOVA results, we could say that the performance of all mentees has been improved

significantly. For March 2018 semester, the MMP also has been implemented on 20-21 June 2018 at UTP. From the students' feedback, they all enjoy the MMP event and indeed it has improved them a lot. Furthermore, since the students just finished their final exam, thus there are no data that available for statistical analysis. For more details and complete data analysis on the MMP results, the interested readers can refer to Karim and Azman [2].

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A HEUTAGOGICAL APPROACH FACILITATE COLLABORATIVE LEARNING THROUGH DIGITAL VIDEO PROJECT IN SECONDARY SCHOOL

Lim S.H.[1*], Tay C.C.[2,] Hanipah H.[3], Pang Y. J.[4]

[1,4)] Institute of Technology Management & Entrepreneurship, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2)] Faculty of Electrical Engineering, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[3)] Centre for Languages and Human Development, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*]Corresponding e-mail: limsehhoe@gmail.com

Keywords: Project-based collaborative learning; heutagogy; digital video production

ABSTRACT – *The integrating technology upon heutagogy in project-based learning(PBL) to foster meaningful collaborative learning. This paper reports on the implementation digital video project of a Chinese Language class at an secondary school in Melaka. The project combined elements of heutagogy approach and project-based learning to produce a strong autonomy focus in collaboration. This study aims to encourage the digital video as a tool that allows students' learning to meet the needs and requirements of 21st century skills by making students collaboration in secondary school Chinese Language class. The study builds on the PBL model that places the focus of collaboration with students. The data were collected through a questionnaire for 63 respondents. The results show significant positive results in terms of collaborative learning through digital video production with Chinese Language as a medium of interacting communication and collaboration with peer. A new technology and face book were integrated into the project process in order to create a technologically rich learning environment. In particular, we describe the potential of the digital video project to provide students with opportunities to exercise their competency as autonomous students within a structured language learning context. These*

findings have been student-generated video digital to be beneficial in collaborative learning on PBL, which is important in preparing students do an ever-changing 21st century. The technique of digital video can be used effectively setting to learn writing and self-determined in the content of writing.

1. INTRODUCTION

Global competition is forcing the secondary school to excel in knowledge-creation that are significant and innovative. However secondary education is traditionally model upon a teacher-centered delivery of instruction to classes of students who are the receivers of information. The new generation to have begun to diverge their learning need, leading to a correspondingly rapid rebirth in learning. The potential for transforming the traditional learning environment into a context of heutagogical approach by digital video project. This curriculum will still stress student-centered but have a greater emphasis on PBL.(Malaysia Education Blueprint, 2013) It may have played a vital role in bringing about heutagogical learning environment that is a student-directed and collaborative learning guide by teacher as facilitator. Students were empowering as video content producers and learning context generators.

Most teacher belongs to the baby boomer or generation x cohorts, while secondary students belong to the millennial generation. Millennial students have divergent perspectives on their learning needs with their teachers. These learning differences may contribute to intergenerational encounter. In order to be successful education, it is important to provide self-determined approach of learning to the needs of the students. The term self-determined is a relatively name for heutagogy, commonly referred to as heutagogy is describe self-learning, independent of formal teaching which appears to suit the millennial students. Discovery and reflection will fill the gap of their formal learning as student do immensely valuable work for themselves. Secondary students have shorter attention span and prefer interactive and collaborative learning. The change in the attribute and needs of the students forces the educational system to acclimate to the students.

Thus "transmission pedagogy" has prepared high-achieving students for increasingly complex life and workplace in the future. In the new global economy, PBL has become a central issue for attempted to model the process of moving from pedagogy to andragogy and towards heutagogy using digital video project focusing upon student-generated learning contexts. PBL increased students' motivation by organizing their own learning in solving real-world problems.

Heutagogy as a pedagogical framework moves the focus from 'learning the content' to 'learning to learn'. In his major study, Natayan identifies heutagogical approach has also been successfully implemented and evaluated in multiple undergraduate courses.(Narayan & Herrington, 2014).Heutagogy built capabilities to develop new ideas and ability to work with a variety of technologies(Dole et al., 2016). Furthermore, a study to realize how effective collaborative groups formed in a course specified that PBL promoted small collaborative learning groups effective in the digital environment.(Kimura, 2016) Video can be part of immersive simulation environments; can be embedded in a more complex virtual learning environment with text, pictures, graphics, and so on.(Pirhonen & Rasi, 2017).

Some researchers have begun to explore the potential of digital storytelling projects, as a pedagogical tool to establish an open dialogue, create compassion, and sustaining student engagement within a

community of student. [5] Thus, digital video as a catalyst to enable change along the pedagogy to heutagogy continuum by focusing upon student-generated contexts. In such projects, students work either individually or in groups to design and construct a short, movie-like digital production, known as a digital video production. We begin by reviewing important concepts in collaboration in learning especially as these relate to new technologies.

This study was to investigate the impact of interdisciplinary secondary students with generated digital video in the Chinese Language. Moreover, the study was applied heutagogy to develop collaborative working skill and technology integration practices in PBL environment. Figure 1 showed the study assesses Wolff's design features for creating an optimal collaborative PBL environment.
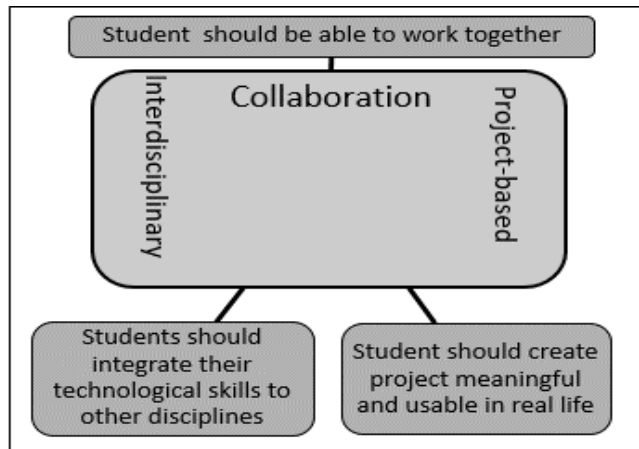

Figure 1 Adapted from Derya Baser at.el.(2017) Collaborative project-based learning: an integrative science and technological education project (Baser, Ozden, & Karaarslan, 2017)

Student self–determined practice of interdisciplinary in the digital environment through project-based collaborative learning. This digital world is characterized by real-time sharing and collaboration, enabled by today's powerful mobile smartphones. Collaborative learning is a major area of interest within the field of the students worked together in group to crop their videos. During this moment, students pursue and give help, and assign the planning and the editing of the story together. At the same time, they build team skills. Learner- driven knowledge creation, collaboration and digital literacy had effect on student learning outcomes when students self-assessed their own learning after the project. What we know about digital stories is largely based upon empirical studies that investigate how the students' descriptions of their work with digital stories. The digital storytelling activities are motivating and fun, they also need commitment and hard work in order to achieve the learning objectives.

Finally, we evaluate the ways in which the students learning was allowed to take control in the technological environment. Whereas PBL is a pedagogy strategy utilizing the same kind of media and technological environments that students are engaged with outside of the classroom.

2. METHODOLOGY

This study facilitated the investigation of a user self-generated video using a device, such as a smartphone, laptop. The objective of PBL was to support students self-determined learning and impact their collaborative learning. A study was conducted to identify the processes involved when applying the PBL approach according to the learning theme. There were 63 secondary students who participated in this research. The respondents were given 4 weeks to plan and organize the digital video project. Six learning stages were designed to guide students through the project process which showed in Figure 2.
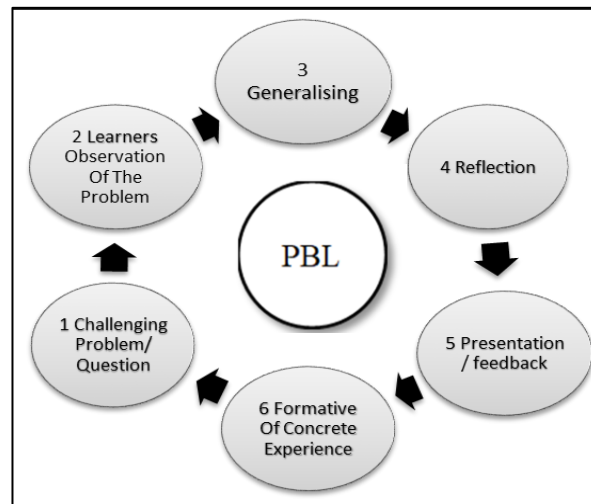

Figure 2 Six learning stages in project-based learnng

Students digital video activities mainly take place at home where small groups of 3-4 students meet and build up stories together. The students did not have real experiences with editing video or remixing music or creating a video story. Once the digital video is filmed, all the video was uploaded in face book and the students present their work to peers and the teacher. They also provided research material. This study was conducted to collect quantitative data. A researcher has developed a five-point Likert-scale questionnaire to identify students' viewpoint of the PBL that support students' collaborative learning of the competencies. The categories were identified from the students' collaborative learning, include complete task together; incorporate feedback, set goal and plan., create join product, and presentation group work. The question covered several features of collaboration learning as they were presented in the framework of PBL. The questionnaire used by Hixson et al.(Achievement, n.d.) was modified based on students' competencies in this study. The collected data were coded and exported to SPSS 23.0 for statistical analysis. The PBL survey instrument is the primary source of data collection.

3. RESULT AND DISCUSSION

The students created over 16 videos altogether. Most of them were between 3 and 5 minutes in length. Students had freedom to choose how they wanted to create video story in their learning. The data analysis of the questionnaire suggests that student-generated digital video on PBL in collaborative skill, we found that they made a significant impact in collaborative learning. We found that heutagogy on project-based learning model proposed in this research had significant positive impact on the students' collaborative learning. The study data in this investigate is drawn from five main source, such as complete ask together, incorporate feedback, set goal and plan, create join product, and presentation group work.

Figure 3 showed the percentage of each heutagogy on the collaborative learning questionnaire item. It can be seen the almost all the percentage are very high (more than 92%) except for item 3, 84%, it is a common element for them to work with classmate to set a goal and make the decision to create a plan for their teamwork.
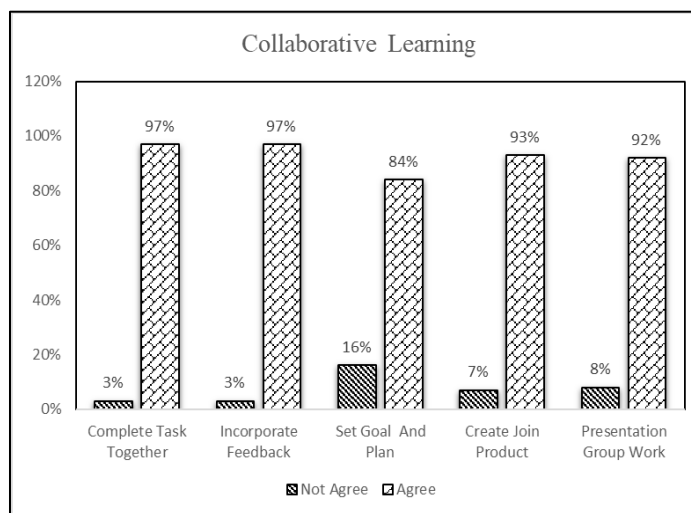

Figure 3 Collaborative skills on Project-based learning in secondary student

Based on report, we found 97% students agree they complete task together. They pay a lot attention to collaborative aspects of collaborative learning. When collaborating on group assignments to complete their own tasks, they effort to try to contribute, even some peers contributes less. They were satisfied peer individual contributions. The brighter peers did most of the work will help low-contributing students. 97% students reflect they incorporate feedback in group discussion. They accepting opposing viewpoints and giving elaborate their explanations. They were also providing and receiving help with each other. Students aimed to achieve individual academic learning but not neglected the importance of social interaction.
84% students mention when they started to work in group by set goal and plan may experience to the effectiveness of collaborative learning. They were coordinate their group activities affectively,

within planning a project of actions for group members to finish in time and to support each other's progress. 93% students stated that they know how to collaborate effectively by create join product. They were shared idea and feel safe to share with each other to express their thinking. They synthesizing relevant material and create a new and effective report or product. They were share their opinions, while others defensively argue for their idea. 92% students indicated they have experience collaborative in presentation group work, especially they worked in their favorites groups where they can know each other well.

They can create joint peer's product and agree presentation may have been caused by heutagogy facilitate collaboration in team work. This implies that such project-based learning would affected students' work in groups to make decision from feedback to complete their product or task together, Within the study, collaborative learning had a mean of 3.8 with a standard deviation of 0.66961. The result now provides evidence to conclude that heutagogical approach facilitates student project-based collaborative learning in generating digital video project is a successful learning approach. This findings of research is clear showing that the interpersonal and the team skills may help group interaction and collaborative learning. When the group goal was to accomplish group tasks and to get a high grade for the group product, less capable students were often motivated during collaborative learning.

Heutagogy is an important component in the 21st century education system, and plays a key role in PBL. This generating digital video experience had an impact on project-based content collaborative learning. It is a useful way to consider the effective use of environments and tools. With PBL, the inside or outside of the classroom becomes the place to share, discuss and explore learning materials. Group members may be urged to strengthen social interaction and mutual help in order for everyone to benefit from collaboration

A 21st century education system needs students who work collaboratively to design effective and innovative learning project, and digital technologies are the key to making that work in heutagogy. As a consequence, low-status students may feel confident to participate themselves in collaborative work, thereby benefiting from the collaboration. However, learners need to be able to negotiate how, when, where and to what upper (rather than minimal) level they want to take their learning (Halsall, Powell, & Snowden, 2016). The key to successful learning is adopting a spirit of openness by all parties involved in the learning process. For educators to be creative in their pedagogy, encouraging learners to utilize their learning spaces to negotiate how, what and when they learn. Digital technologies have the biggest impact on teaching and learning when they combine formal and informal learning structures and result in improvements in, and supplements to learning. Learning has also been reinvented and new paradigms created when these technologies are used in partnership with new providers. Learning in such environments is more relevant, engaging and motivating.

4. CONCLUSION

The Malaysian educational system is currently undergoing transformation, one of the emphasis of which is to create a generation who can communicate, collaborate, think creatively, innovatively and critically(Devkota, 2017). Then we describe the implementation of a collaborative student digital video project as part of a curriculum secondary school for Chinese Language. This project intended to encourage from the previous student-directed pedagogy to a more heutagogical approach where the emphasis moved to student production and collaboration.(Helen Caldwell, 2018) The students have learned from each other, feel proud for producing digital video , and their friendships get strengthened.(Vivitsou, Niemi, Wei, Kallunki, & Miao, n.d.) Digital video project could contribute and augment the producer culture in schools, as it would open up opportunities for students to generate new digital storytelling genres for language learning. If this finding of this study are confirmed in other studies, these will have practical implications for implementing collaborative learning as well as training students in heutagogy approach and collaborative learning practice. Connected with collaboration is the ability to determine their own learning needs and to reflect continuously on the learning process. Collaborative tasks in digital storytelling increase student engagement. This involves developing skills of open communication and teamwork, being flexible in PBL, and becoming confident in students' ability to take appropriate and effective action in the new learning situation. In this perspective, collaboration and working together in group work purposes to both ease task complexity and keep the space for students to think deeper. When future efforts in student training and education are aimed at enhancing prospective teacher and students' understanding of effective collaborative learning and the contribution to the obstacles, both teachers' and students' experiences during collaborative learning may improve significantly. This study contributes to the understanding how PBL should be implemented in the classrooms to encourage students to pursue STEAM majors at the high level. Heutagogy approach stimulates the development of the students' soft skills, by exposing them to a challenging environment.

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THE ACCEPTANCE OF SOCRATIVE AS SELF-ASSESSMENT APPROACH IN ENHANCING MOTIVATION AND ACHIEVEMENT IN LEARNING AMONG POLYTECHNIC STUDENTS

[1]Kaliyamah, R., [1]Zulina, Z. & [2]Vicneas, M.
[1]Electrical Engineering Department, Sultan Azlan Shah Polytechnic,
35950 Behrang, Perak, Malaysia.
[2]Information and Communications Technology Department,
Sultan Azlan Shah Polytechnic, 35950 Behrang, Perak, Malaysia.
Correspondence Author email: logesri02@gmail.com

ABSTRACT

The purpose of this research is to explore the acceptance of Socrative in promoting motivation and achievement in education settings among polytechnic students. Therefore, a research conducted to indicate how extent online self-assessment influence the students. A quantitative method has been used in this research. The elements of the questionnaire consist of four factors include usefulness, ease of use, ease of learning and motivation in learning. Statistical Package for Social Sciences (SPSS) version 25 used to analyse the data. The finding indicated the acceptance of students in term of usefulness is high (mean=3.46, standard deviation=0.6); ease of use is high (mean=3.58, standard deviation=0.564); ease of learning is high (mean=3.61, standard deviation=0.542) and motivation and achievement is high (mean=3.58, standard deviation=0.519). As conclusion, the research showed positive relationship between the acceptance level of Socrative and its impact on motivation and achievement. Thus, the use of Socrative as online-self assessment is suitable to implement in current teaching and learning environment towards 4.0 education.

Keywords: Socrative, motivation, achievement

1. INTRODUCTION

Basically, assessment is a part of teaching and learning process which is in the form of question or exercise on a test, quiz, or other form of evaluation (Black & Wiliam, 2006). Assessment capable in improving the quality of education in line with its capability in enhancing life-long learning skills (Nasri, Roslan, Sekuan, Bakar & Puteh, 2010). Towards 21st century, the implementation of online assessment is very important as it is capable to bring significant changes in Higher Education setting (Pachler, Daly, Mor & Mellar, 2010). In view of that, Socrative is one of online assessment that has elements of good design that make it a great learning experience in teaching and learning process. Socrative can be accessed by students through internet connection, mobile phones and tablet devices. Consequently, tons of paper can be saved by replacing paper-based assessments with online assessments (Piaw Chua, 2012). Socrative has unique challenges in providing effective assessment in interactive and fun way. This due to the greater potential of online assessment in providing immediate feedback and score efficiently. Besides that, Socrative

capable in generating and sharing variety of questions, digital materials and picture without the need of technical knowledge on the construction of materials. In addition, students' active involvement in learning can result changes in their attitude, critical thinking skills and the retention of information (Cavanagh, 2011). In the era of technology, students preferred to use computer based assessment compare to paper-based assessment as they felt more motivated and actively involved in answering online assessment at their own pace (Lim et al., 2006). Moreover, motivation is one of the important factor in ensuring one's achievement in learning (Bandura, 1989). Also, an individual's success varied based on their motivation and interest towards it (Komarraju, Karau & Schmeck, 2009). In view of that, students' achievement is extremely promising by implementing online assessment through Socrative (Hoskins & Van Hooff, 2005). Socrative as formative assessment tools able to offer engagement towards learning in online environment. The feedback received from an assessment capable to enhance motivation and improve achievement in learning (Vonderwell & Boboc, 2013). Therefore, Socrative can be used utilized wisely in teaching and learning process in order to provide an engaging experience for students.

2. PROBLEM STATEMENT

Polytechnic is an educational institution that based on technical and vocational education. Polytechnic concerned about having skilled and knowledgeable graduates in accordance with the needs of industry. For that reason, it is important to know students' performance upon adopting an effective teaching and learning approach that should increase the students' interest and understanding (Chinn, Sheard, Carbone, & Laakso, 2010). The current assessment method tend to be less attractive to students and they have lack of motivation to participate actively in the evaluation process. The issues of lack motivation are probably happened due the lack of exposure and experience (Clarke, Thomas, & Adams, 2005). Thus, it is difficult to keep them engaged as they could not transfer knowledge gained from lectures. This is happen because of the incapability of the students to relate basic course contents. In order to enhance students' achievement, innovative assessment approaches should be applied to teaching and learning practices. Accordingly, initial exposure of an assessment should be attractive and fun for students to stimulate their interest and motivation. This is because appropriate and interesting assessment contents can engage learners to improve their achievement (Pivec, Dziabenko, Schinner, 2003). Thus, Socrative as online self-assessment is a good approach in motivating the students, besides giving a good experience as well as to increase their achievement.

3. OBJECTIVES

The objectives of this study were:

a. To analyse the level of usefulness in using Socrative as self-assessment approach.
b. To analyse the level of ease of use in using Socrative as self-assessment approach.
c. To analyse the level of ease of learning in using Socrative as self-assessment approach.
d. To analyse the level of motivation in learning in using Socrative as self-assessment approach.
e. To analyse the relationship between the acceptance level of Socrative and its impact on students' motivation and their achievement.

4. RESEARCH QUESTIONS

Through this study, researchers sought to find answers to the following:

a. How is the level of usefulness in using Socrative as self-assessment approach?
b. How is the level of ease of use in using Socrative as self-assessment approach?
c. How is the level of ease of learning in using Socrative as self-assessment approach?
d. How is the level of motivation in learning in using Socrative as self-assessment approach?
e. How is the relationship between the acceptance level of Socrative and its impact on students' motivation and their achievement?

5. METHODOLOGY

Methodology is an important aspect in ensuring the objectives can be achieved as planned. This research is a quantitative survey. Quantitative method focuses on aspects of data collection and analysis of data in the form of numbers.

5.1 Participants

The research was conducted at Electrical Engineering Department of Sultan Azlan Shah Polytechnic. The samples were 40 students from fourth semester at December 2017 session that undertaking Interactive Multimedia Application course.

5.2 Procedure

Online quizzes created with 10 questions per quiz using Socrative. The respondents of the research were requested to answer all the quiz sessions. The mark for the quizzes were 40% (10% each) from their total marks of Interactive Multimedia Application Course. After the class session of

related topic, students were supposed to answer the Socrative Quiz individually using mobile phones, tablets and PCs. Students logging in are requested to enter the room name (KALIQUIZ) that provided by their lecturer. They were then asked to enter matric number to identify themselves. After completion of the Socrative Quiz in class, the students were asked to give their judgment about the online quizzes.

5.3   Instrument

A questionnaire consisting of 20 items was designed using Google docs. The online questionnaire was conducted at the end of the semester. The questionnaire divided into five important parts; Part A: Biographical information; Part B: Usefulness; Part C: Ease of use; Part D: Ease of learning and Part E: Motivation in learning. There were four-point Likert scale items were used that ranged from 1 (strongly disagree) to 4 (strongly agree). All quantitative data obtained through the questionnaire were analysed using Statistical Package for Social Sciences (SPSS) version 25. Interpretation about the students' acceptance levels is determined by mean score which categorized into low, moderate and high as shown in Table 1.

Table 1: The interpretation of score mean

Mean Score	Level
0 – 1.33	Low
1.34 – 2.66	Moderate
2.67 – 4.00	High

Adopted from Nunally (1978)

6. RESULT

The results of the research obtained through analysis on students' achievement and students' survey based on data collected through questionnaire.

6.1   Students' achievement

The students' achievements in Socrative quizzes were compared to paper-based quizzes that carried out to semester four students that undertaken Interactive Multimedia Application course at June 2017 session in order to identify whether assessment using Socrative has improved student performance. Figure 1 illustrate the comparison of students' average marks between Socrative and non-Socrative quizzes for two semesters respectively.
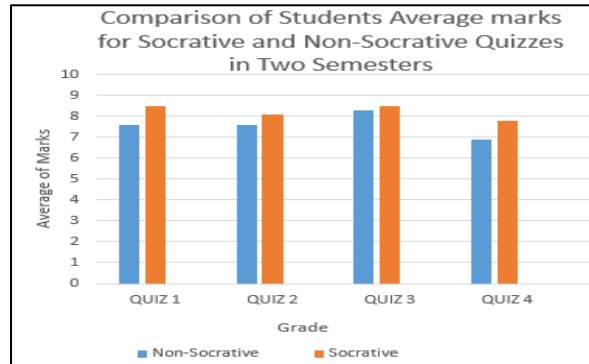
Figure 1: The comparison on students' average marks

The results of figure 1 demonstrates there is improvement in the students' achievement when quizzes implemented using Socrative. The result reveals that there is 9% improvement in Quiz 1, 5% improvement in Quiz 2, 2% improvement in Quiz 3 and 9% improvement in Quiz 4. In overall, students' achievement improved using Socrative quizzes as they engaged and involve in online settings.

6.2   Students' survey

According to the observation on the data gathered from the questionnaire, students seems very enthusiastic in using Socrative as their self-assessment method. Table 1 illustrated positive results for each factor with high percentages. The factor of motivation in learning obtained highest percentage in which Strongly Agree and Agree carried 99 percentages. The students feel very motivated in using Socrative as their quiz platform.

Table 2: The Score For Each Factor

Description	Percentage (%)	
	Strongly Agree & Agree	**Disagree & Very Disagree**
Usefulness	95	5
Ease of use	96	4
Ease of learning	98	2
Motivation in learning	99	1

Furthermore, the factor of ease of learning achieved 98 percentages which significantly increases their learning process. The factors of ease of use obtained 96%. This indicated that the structure of Socrative easy to understand and easy to answer as well. Consequently, students felt comfortable

with this approach in educational setting. The score for the factor of usefulness is 95%. In overall, the developed Socrative quizzes get a good response from students.

7. DISCUSSION

Each part of the questionnaire discussed in order to answer the research questions from the analysis of the collected data.

a. Part B: Usefulness

In this part, five items used to assess the usefulness of Socrative as self-assessment approach. It has been found that the average mean score is 3.46 with standard deviation of 0.6. Table 3 shows that the highest mean is for item B3- "The facilities of Socrative makes me feel not bored" with mean of 3.65 and standard deviation 0.483. The lowest mean is for item B2- "Socrative is very helpful for my learning and give satisfaction to me" with mean of 3.35 and standard deviation 0.700. Based on the findings, the students realised the use of Socrative as online self-assessment and satisfied with facilities provided in Socrative environment.

Table 3. Part B-Usefulness

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
B1	The Interaction through Socrative is clear and easy to understand.	3.40	0.545	High
B2	Socrative is very helpful for my learning and give satisfaction to me.	3.35	0.700	High
B3	The facilities of Socrative makes me feel not bored.	3.65	0.483	High
B4	The assessment questions in Socrative introduced a bit of competition.	3.43	0.675	High
B5	The feedback from Socrative helped my understanding of course material	3.45	0.597	High
	Average	**3.46**	**0.6**	

7.2 Part C: Ease of Use

According to the result of Part C in Table 4, students absolutely agreed that Socrative is an online assessment that very easy to use. This is found from the highest mean score obtained for item C1-"The content of Socrative is easy to use" with mean of 3.70 and standard deviation 0.464.

Table 4. Part C-Ease of Use

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
C1	The content of Socrative is easy to use.	3.70	0.464	High
C2	I can easily access Socrative without time constraints	3.55	0.677	High
C3	I can easily access Socrative without any restrictions.	3.45	0.639	High
C4	I can obtain results quickly through Socrative	3.55	0.552	High
C5	I can share my understanding by answering assessment questions in a variety formats through Socrative.	3.63	0.490	High
	Average	**3.58**	**0.564**	

4.3 Part D: Ease of Learning

Based on Table 5, all items are at high level with average mean score of 3.61. The result of Table 5 shows that students prefer to use Socrative frequently in learning. The respondents showed a positive interest in using Socrative through the highest score for the item D4-" I like to answer assessment questions using Socrative". This shows that students interest in using Socrative can stimulate the process of understanding in learning process.

Table 5. Part D-Ease of Learning

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
D1	Learning is more easily understood by using Socrative.	3.48	0.506	High
D2	Socrative can improve my learning performance.	3.58	0.501	High

D3	I think the Socrative is an effective interactive learning	3.70	0.648	High
D4	I like to answer assessment questions using Socrative.	3.73	0.554	High
D5	The assessment using Socrative attracted me to continue learning.	3.58	0.501	High
	Average	**3.61**	**0.542**	

4.4   Part E: Motivation in Learning

Based on the result of Table 6, students participated actively during teaching and learning using Socrative as one of Web 2.0 technology. The readiness of students in using the Socrative lead to the increment of their motivation and achievement in learning process. The findings prove the effectiveness of using Socrative as self-assessment for students.

Table 6. Part E-Motivation in Learning

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
E1	I am very interested in using Socrative.	3.50	0.506	High
E2	Socrative capable to improve my motivation in learning process.	3.43	0.636	High
E3	I felt that I actively collaborated in my learning experience	3.78	0.423	High
E4	I felt I have the freedom to participate in my own learning experience	3.68	0.526	High
E5	Socrative capable to improve my achievement in learning process.	3.53	0.506	High
	Average	**3.58**	**0.519**	

8. CONCLUSION

Socrative is online self-assessment approach that capable to create engaging, fun and interactive environment in order to promote motivation and improve achievement among students. The data obtained from the research showed positive acceptance level of Socrative among polytechnic students as it is simple, effective and user-friendly. Therefore, it is worth to implement the approach in teaching and learning environment towards 4.0 education.

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EDUCATION 4.0: TRENDS AND FUTURE PERSPECTIVES IN STEM TEACHING AND LEARNING THROUGH ROBOTICS COMPETITION

Pang Y. J.[1,*], Hanipah H.[2], Tay C. C.[3], Lim S.H.[4],

[1,4)] Institute of Technology Management & Entrepreneurship, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2)] Centre for Languages and Human Development, Universiti Teknikal Malaysia

Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[3)] Faculty of Electrical Engineering, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*]Corresponding e-mail: yeejiea@gmail.com

Keywords: Education 4.0; STEM, robotics competition

ABSTRACT – *Education 4.0 is the vision for the future of education, responds to the needs of "industry 4.0" or the fourth industrial revolution, where man and machine align to enable new possibilities. This paper describes the survey results from an annual robotics competition for students in secondary schools that aims at increasing their interest towards science, technology, engineering, and mathematics (STEM). To bring the experience of Project-based Learning into robotics education by using a competition, a new framework namely Robotics Competition-based Learning (R-CBL) is proposed. The new framework, which is referred as R-CBL, provides educators with an alternative solution to overcome many of student's deficiencies associated with traditional learning practices; such as lack of motivation, lack of self-esteem, insufficient practical and real-life experience, and inadequate team work practices. S-STEM Survey is used to measure the students' attitudes toward STEM in National Robotics Competition (NRC) year 2017. To acquire the data, students are surveyed before and after the competition to study their interest towards STEM. Results indicate that students who participated in the robotic competition had a more positive attitude toward STEM subjects and related careers. Implications of results on students' attitude are discussed.*

1. INTRODUCTION

The future of the education is a new vision the or learning, starting right now. The impact of Industry 4.0 is Around 10-50% of jobs are 'vulnerable' to digitalization, but for many jobs it might be that only certain tasks will be automated – especially repetitive job routines in production, the service sector and office work. Robotics is a great agent to promote integrated STEM education [1]–[4]. In recent years, educators have been progressively making effort toward improving STEM education from primary to tertiary levels of education, but obstacles

from different ways exist to challenge the implementation of robotics in education. Due to the global crisis of shortage of student interest in STEM education, increased attention has been given to the appeal and attraction of Robotics. In 21st century learning environment, robotics can easily be used to introduce a variety of scientific process skills which are needed to pursue a variety of STEM career paths [5]–[7]. Through these roles, robotics has served to interest students in science and engineering, to introduce them to real-world interdisciplinary applications, and to stimulate their intellectual development [8]. Educational robotics have demonstrated the learning theories of constructivism, constructionism and active learning, by increasing student engagement through hands-on application in skills such as computer programming and engineering design [9]. Educational robotics for STEM is such an interdisciplinary environment which involves an understanding of related but different domains and involves participants from industry, academia and organizers of educational activities [10], [11]. Robotics competitions are widely recognized as effective motivational and organizational frameworks for robotics research and project-based learning [1], [12]. Robotics competition provide a fertile environment for robotics researchers to develop and test robots that can solve realworld problems. Competition-based Learning proposed in this study can provide an inherent framework for evaluating the benefits of using robotics in education. Past approaches by including robotics competitions in the classroom have confirmed the value of robotics in existing curriculum as intellectual development such as excitement in STEM education [1], [13], [14], building self-efficacy [15], and introduction to real-world interdisciplinary applications [16].

2. METHODOLOGY

This study aimed to assess how robotic competitions improve students' science, technology, engineering, and math interest. To prove the unique benefit of interdisciplinary robotic competition, we need measurable data that quantifies the student's experiences.

The state level NRC is held in 16 states to select the best 2 teams for each category before they participate in the national level. In the national level, total of 501 secondary school students participate in NRC 2017, however, there are only 215 students in NRC participated in this survey voluntary. The experimental group included a total of 193 males and 22 females with an average age of 15.6 years. The control group contained 35 males and 25 females. Participants self-reported their gender, age, grade, and race. After 2-8 weeks gap varied by the different states, the voluntary students again filled out the survey on the day of national level NRC, and gave it to their teachers after the competition. The questionnaire and its administration were approved by the organizers which are Ministry of Education Malaysia (MOE) and Sasbadi Holdings Berhad. For the control group, we found teachers to distribute the survey during the same period as the participants in National Robotics Competition to take the survey.

3.   RESULT AND DISCUSSION

A preliminary analysis evaluation the homogeneity of-slopes assumption indicated that the relationship between the covariate and the dependent variable did not differ significantly as a function of the independent variable, $F(1, 95) = 1.25$, $MSE = 40.92$, $p = .27$, partial $\eta2 = .01$. Therefore, the homogeneity of slopes test indicated that the assumption had been met and that the results of an ANCOVA would be meaningful. A comparison of the pre- and post- means indicated that students who participated in the NRC had a more positive attitude toward the adoption of STEM attitudes than students who did not participate in NRC. Students in the NRC group had statistically significantly higher attitude means, ($p < 0.05$), than students in the comparison group measured by the S-STEM survey.

4.   CONCLUSION

Education 4.0 is aimed to establish a blueprint for the future of learning, which is a lifelong learning, from childhood schooling, to continuous learning in the workplace, to learning to play a better role in society. Technology has become integrated into virtually every aspect of work. This paper presented a new learning model, namely, the R-CBL model that combines PBL and competitions. In conclusion, design competitions can effectively be integrated into coursework with well-planned learning outcomes. The S-STEM surveys used in this study are robust instruments that secondary school STEM education program leaders can use to understand students' psychological states and the impact programs may have on student attitudes toward STEM disciplines and 21st century skills and interest in STEM careers. This framework is still somewhat new, and researchers are encouraged to continue testing and refining the limitation and to overcome the obstacles in the future study. As summary, the unique features of this framework used in include: (i)Achieves Project Based Learning through a competition. (ii) Provides opportunities to talented students to work hands on with a robot. (ii) Leverages the competition to motivate students to pursue STEM careers in the future.

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E-WATER LEVEL: EDUCATIONAL KIT FOR LEARNING CONTROL SYSTEM BY USING WATER LEVEL APPLICATION

Kamaru Adzha K.[2*], Amar Faiz Z.A.[1], Muhammad Firdaus I.[2], Muhammad Farhan M.[2], Rozi R.[2], Zakiah M. Y.[2], M. I. Z. M. Zabidi[1], Ezzatul Farhain A.[1], Adam S.[1]

[1] Faculty of Electrical & Electronics Engineering Technology, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2] Faculty of Electrical Engineering, Universiti Teknologi MARA (UiTM), Cawangan Johor, Kampus Pasir Gudang, Johor, Malaysia

[*] Corresponding e-mail: kkadiran@gmail.com*

ABSTRACT

Control System subject is part of the syllabus in the diploma or degree in Electrical Engineering course where students is exposed to topics such as time response analysis. This paper proposed E-Water Level educational kit that can be used to understand transient response analysis by applying theory, calculate the delay time (Td), rise time (Tr), damping ratio and setting time(Ts). The system consists of Arduino Microcontroller, water tank, water pump, relay, ultrasonic sensor for water level sensor and LCD display to display the plotted graph. The results could help students to solve the questions base on the value given on the LCD hence provide more practical learning experience to students.

***Keywords:** Educational kit; Control System, water level*

1. INTRODUCTION

The teaching of control engineering has many pedagogical methodologies over the years with the inclusion of educational platforms in order to motivate, to clarify the concepts, to decrease the abstraction level of the control theory and also to prepare the students for industrial world [1].

Daniel C. Jeronymo et. al [3] has discussed the potential of applying a final practical laboratory task into the Feedback systems course as a new approach to learning and teaching for educational purposes whereby they make case studies in modelling, calibration, sensor and actuator electronic circuits, simulation, PID tuning and real-time control code under a step by step collection schedule. As result of this laboratory activity, significant progress is observed in the quality, motivation and learning.

In year 2016, an educational kit to learn control system by using hot air blower application has been developed by Amar Faiz. This project has been designed base on the idea of the Control System. The controller system will control the temperature out from the hair dryer.

2. METHODOLOGY

This project use Arduino mega 2560 as a microcontroller. Arduino is a complete development platform with its own standards, integrated development environment and programming interface. E-Water Level use water tank as a plant that process happen. The water pump will produce the pump out and pump in through the pipe and the ultrasonic sensor will detect the water level. The water pump will pump out the water with 6V flow rate. When the water is achieved the set point the relay for the water flow in will turn off and the relay for water flow out will turn on. The process will repeat until 120 second. After 120 second the process will end.

This project use two relay as a switch on or off controller. Relay1 will turn off when the water level achieved the set point and Relay2 will turn and the water will pump out. Relay1 will turn on when the level of water drop under the set point and Relay2 will turn off and the water will pump in. This project use ultrasonic sensor as a water level sensor, which can detect the water level from 2cm to 30cm which were compatible to the project. This project also use TFT LCD shield to display the result. The graph will be plot and display on TFT LCD and student can solve the question based on the value that given in the TFT LCD. Figure 1 show the project prototype.
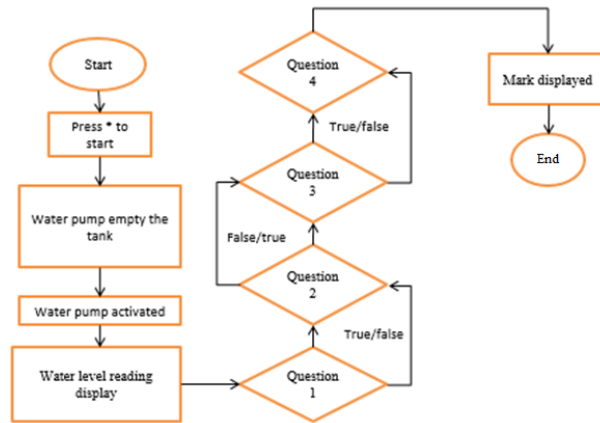

Figure 1 Project prototype.

Figure 2 General flow of the educational kit.

Figure 2 shows the flowchart of E-Water Level operation. First, user must push button asterisk "*" in the keypad to start the process. After pushing it, the process will start empty the tank. After the tank empty, blue LED will turn on and water will pump in into the tank. When the water pump in into the tank, the transient response result is captured and the graph is plotted through TFT LCD. After 120 second the process will end and red LED will turn on. At the end of the process LCD will display the question to user with information given from the TFT LCD.

3. RESULT AND DISCUSSION

Figure 3 (a) shows the graph on TFT LCD with no plotted data while figure 3 (b) shows transient response graph with plotted data captured by using the educational kit.
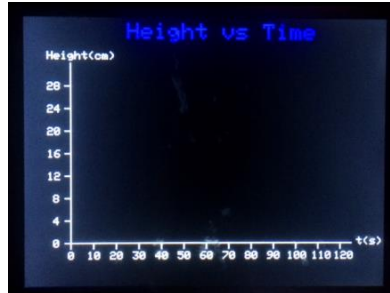
(a)
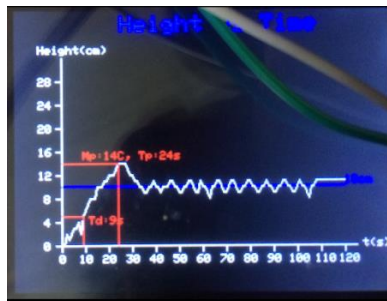
Figure 3 (a) TFT LCD show no graph before start the process. (b) TFT LCD show the plotted graph after complete water pump process.

Figure 4 20x4 LCD shows the questions asked to find damping and Td value.

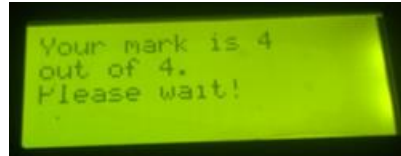**Figure 5 4 20x4 LCD shows the questions asked to find natural frequency and %0S value.**

Figure 6 4 20x4 LCD shows the final result of the questions.

Figure 4 and 5 shows the questions asked to the students after the system finish plotting transient response curve. The students were asked to obtain delay time (Td), rise time (Tr), damping ratio and setting time (Ts). Student need to key in the value using the key pad to answer the questions. Once completing the task, mark were shown in 20x4 LCD at the end of the flow. One mark is given to each questions correctly answered.

4. SUMMARY

This paper present the development of an electronic-based educational kit for learning control system by using water level application. This e-water level kit will generate a few question related to transient response and user will test their understanding about control system. By having this application student will get more understanding and relate real application of transient response with theory learned from control system subject. Yet the author believe further analysis need to be done to measure the effectiveness of the prototype.

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HUMANIZING MOOC: TAPPING INTO DEVELOPERS' MOTIVATION

Omar S R [2*,] Tengku Intan Suzila T.S[3].& Mohd Yusri M. N. [3]

[2]Centre for Environment and Sustainability, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[3]Academy of Language Studies, Universiti Teknologi Mara Cawangan Pahang,
26400 Bandar Jengka, Pahang. Malaysia

[*]Corresponding e-mail: sitirohana@utem.edu.my

ABSTRACT

Massive Open Online Courses (MOOC) enrolment enable many students to learn generic courses. This common courses can be shared by universities with similar curriculum demands and shared credits. The presently studied MOOC course is Ethnic Relations. The objectives are to unfold factors that are demanded in the course development and how the students' expectation are fulfilled can suggest the developers' motivation. A survey questionnaire analysis suggests that in order to achieve such requirement, a MOOC course has to appeal to the potential students in a vast manner.

Keywords: *MOOC, Medium Acceptance, motivation*

1. INTRODUCTION

Yuan and Powell (2013) concluded that MOOC was a free learning platform. With over sixty MOOC platforms around the world (Li,KC et.al,2014) and over five hundred fifty universities sharing platforms (Shah,D, 2016), the expansion of MOOC to Malaysian education system is thus undeniably important. Lin (2017) labelled MOOC as a 'disruptive educational phenomenon' but maintained its global relevancy. Most MOOC contents are for higher degree students (Hara,et.al, 2011 & Melicherikova, 2016) , thus Lin (2017) pointed out that MOOC contents which do not correlate with students' level of learning will be disappointing. Talking ahead, text-overlay, conversation, on location, animation, picture-in-picture, presentation slides with voice-over, demonstration, Udacity-style tablet capture, interview, recorded seminar, webcam capture and green screen are the video style found in MOOC (Hansch,et al, 2015) . Thus, the present paper looks into how the students' expectations are fulfilled can suggest the motivation in MOOC developers.

b. Motivation in developing MOOC

Hakami, White, and Chakaveh, (2017:327) analysed 42 past studies related to "MOOCs Learners' Motivations", "MOOCs Completion or MOOCs Retention", and "MOOCs Learner Engagement" and found many addressed on motivational factors to use MOOC yet limited on acceptance and factors influencing their use of MOOC. Their interest are alike others who focuses on users and the use factor rather than developers such as Alario-Hoyos, Estévez-Ayres, Pérez-Sanagustín, Delgado Kloos, and Fernández-Panadero who studied 6335 MOOC learners from160 countries.

In building a MOOC course, a team approach to producing a MOOC has to be adopted (Alario-Hoyos, et al, 2015; Belanger & Thornton, 2013 & Corke, et al, 2016) . This ensures that sufficiency and efficiency are achieved. The present paper also discusses the issue of collaborative and burn-outs in MOOC course development from students' acceptance and satisfaction in Ethnic Relation MOOC.

2. CONCEPTUAL FRAMEWORK

The present study adopts some of the details suggested in (Lin, 2017) as the working framework. This study supports the six-phase of the larger study and has reached its sixth phase before leaping to the next research phase. Figure 1 shows the working framework.
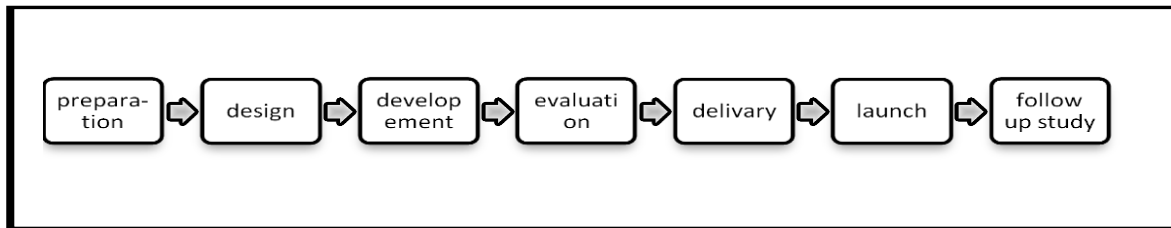
3. METHODOLOGY

Ninety-three students who enrolled for the Ethnic Relation MOOC course served as the respondents to a survey questionnaire.   These are conveniently selected samples. SPSS software was then used to analyse the data.

The research questions that lead to the present study are:

   a) **What are students' the mean of acceptance of the Ethnic Relation MOOC properties?**

   b) **What are the mean of students' satisfaction of each Ethnic Relation MOOC chapter?**

The objectives of the study are to unfold:

   a) **To unfold the students' acceptance of the Ethnic Relation MOOC properties**

   b) **To unfold the students' satisfaction of each Ethnic Relation MOOC chapter**

Based on these findings some issues related to the developers are discussed. This indirect observation is a kick-start to future study.

3.1 Properties investigated & findings

Figure 2 below shows the properties tackled in the present paper. Only three areas shall be discussed here which includes the introduction, objective and teaching and learning. Within the Ethnic Relation MOOC course, the introduction area defines the introductory section, the objective area defines learning objectives and expected outcomes, and the teaching and learning areas defines the ability of the course to allow students to relate to the past learning of the subject.
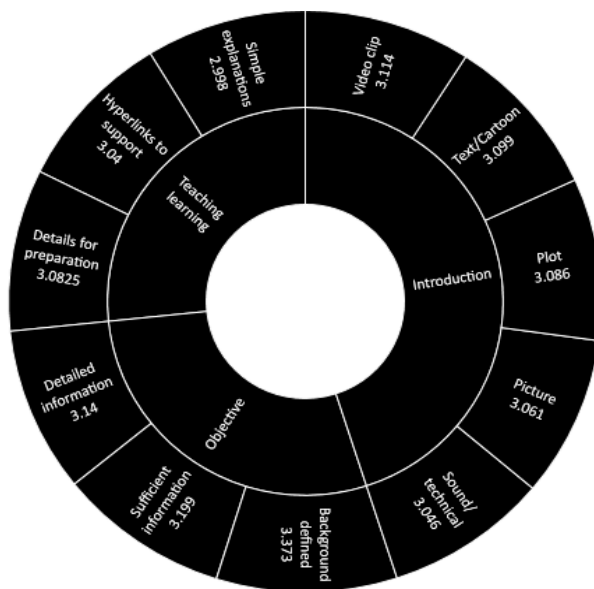

Figure 2 Mean of acceptance

Figure 3, 4 and 5 show another segment of evaluation which is the MOOC developers'-cum-educators although it is based on users' satisfaction. The chapters represent the chapters covered in the Ethnic Relations course. The same three areas serve as the focus of the study. The finding is discussed based on significant difference of mean of students' satisfaction of information retrieved from figure 2. The mean of the chapters in figure 3,4 and 5 represent the mean for the properties within each area.
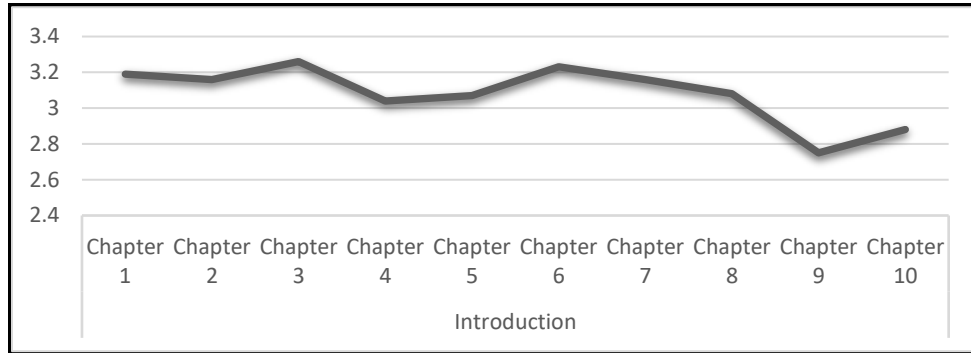
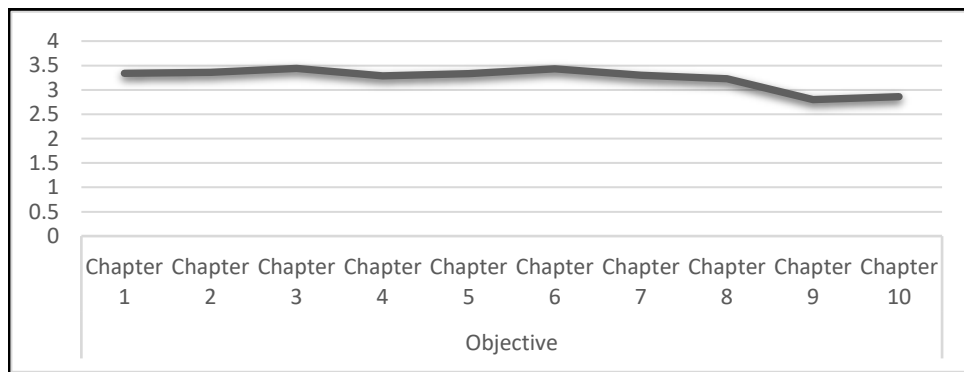**Figure 3 Students' satisfaction in introduction chapters**

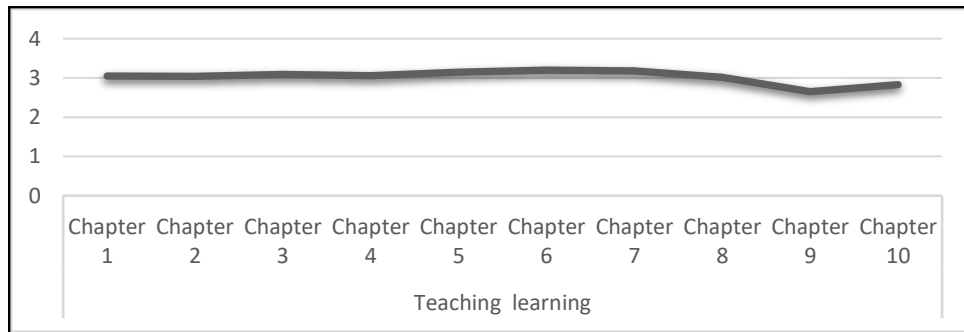**Figure 4 Students' satisfaction in objective chapters**

Figure 5 Students' satisfaction in teaching learning chapters

4. DISCUSSION

In the area of introduction, visual and audio are deemed significant to attract students' interest in learning (Hansch, et, al,2015). This can be possibly further expanded to age and new or advance learners. As Ethnic Relation course can be sensitive to a multi-racial country like Malaysia, a light and generic approach which appeals to the mass is vital. Therefore, a neutral plot depiction of video clips, pictures, learning plot, sounds, text and cartoons may guarantee a good Ethnic Relation MOOC course. The objective of the course is also well defined thus ensuring positive acceptance as seen in figure 2.

As the area of teaching and learning is an area to support past learning to the present one, a mere 2.998 mean is recorded which signifies explanations although simple has to be extensive and sufficient. As Lin (2017) mentioned, students' learning level is also a vital consideration in MOOC. Availability of adequate lesson, detailed information and support leads to students' satisfaction.

A deteriorating mean of students' satisfaction throughout the chapters can be seen in figure 3. This finding agrees with [8, 9 and 10]. A team approach to producing a MOOC (Alario-Hoyos, et al, 2015; Belanger & Thornton, 2013 & Corke, et al, 2016) plays a vital role in maintaining motivation. This suggests the downhill motivation of the developers, and insufficiency in completing the task produce a dissatisfying output. In ensuring a success in MOOC course development, a lean yet sustainable approach has to be adopted (Lin, 2017).

This is an essential area for future much comprehensive study. It may include recognition, determination and perseverance aside from motivation of MOOC developers.

5. CONCLUSION

A MOOC course has to appeal to the potential students in a vast manner. Lin (2017) suggested the implementation process of producing MOOCs has to be shared as guide to other future MOOC developers.

6. ACKNOWLEDGMENT

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A Conceptual Framework Study of Learning Mathematic Word Problem Solving using Virtual Reality Environment for Children with Autism

Zareena R.[1]*, Faaizah S. [1,2]

[1]Faculty of Information Communication and Technology, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2] Centre for Academics Excellence and Scholarship,

Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Correspondence e-mail: zareena703@yahoo.com

ABSTRACT

Helping students with autism spectrum disorder (ASD) achieve competence in mathematical problem solving has proven challenging because it related to various aspects of academic and cognitive factors. In order for students with ASD to succeed in the mathematics curriculum, there is a need to focus on mathematical word problem solving ability and the interventions that may help to improve this ability and will have the potential to perform academically. Hence, this study intend to reveal the conceptual framework mathematics word problem abilities among autistic children and learning intervention solution.

1. INTRODUCTION

Autism spectrum disorder (ASD) is a syndrome which resulted in children suffering from disabilities in self-development, problems of communication, behavior and even process information differently from normal children. According to the statistics from National Autism

Society of Malaysia (NASOM), showed an increasing number of children registered with autism in Malaysia. Due to the fact, there is a demand for assistive technologies that will help to improve the daily function of the children.

Meanwhile, the acquisitions of solving mathematical word problem (MWP) has been long recognized as an essential components of mathematics competency by National Council of Teachers of Mathematics (NCTM). MWP is important as it encompasses skills and functions which are important part of everyday life. However, MWP is a challenging task for children with ASD as it requires not only mathematics skills but also reading comprehension, memory organization and real-world reasoning (Rockwell, Griffin, & Jones, 2011) . Relatively little is known about MWP competencies in children with ASD and the importance of mathematics intervention for this children.

The application of technology, curriculum planning which considers the needs and learning problem of children with ASD, and common sense approaches which acknowledge and leverage the user's strengths are critical tools for successful educational outcomes (Hughes, 2015). The use of virtual reality (VR) as an educational tool for students with ASD is a line of research that has been have been developed over the last decade (Good, Parsons, Yuill, & Brosnan, 1999; Strickland, 1997). VR researchers concurred that VR technology is suited to the educational needs of individuals with ASD (Ke & Lee, 2016). The technology have shown

the improvement of cognitive abilities of children with special needs via a more supported by self-directed exploration of the virtual environment thus enable constructionist learning approach by the student-centered learning opportunities (Kalyvioti & Mikropoulos, 2012).

Hence, this paper intends to propose a virtual reality learning model for learning MWP skills of children with autism. Specifically, this study sought to find out a twofold aim: (a) what are the mathematics problem solving abilities among autistic children, and (b) how virtual reality environment can be integrate with mathematics problem solving learning process.

1.   BACKGROUND AND RATIONALE

Most of the autism studies have been carried out to improve their communication and social skills(Parsons, 2015;Wong et al., 2014). It is seen that there is a lack of studies on academic areas for these students, especially in mathematics and science. Early identification of problems with the MWP enables early treatment given to the student. Therefore the learning problems can be assist with appropriate teaching methods which will lead to positive consequences for their future lives and vocation.

The following section will brief the conceptual framework in which the study is conducted. The framework study comprised of (i) the study of MWP abilities among autistic children and (ii) the intervention solution of using VR learning environment for MWP solving skills acquisition. The conceptual framework of study is presented as shown in figure 1 below. The finding of this study will propose a VR learning model for learning mathematics problem solving of children with autism.
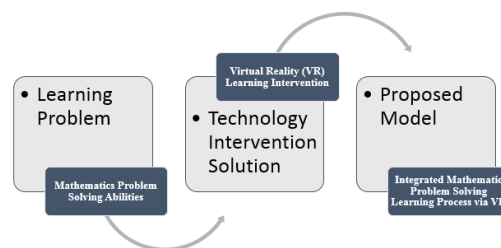

Figure 1. Conceptual Framework

1.1 MATHEMATICS WORD PROBLEM (MWP) ABILITIES

Standards for School Mathematics emphasizes a strong understanding of mathematics concepts, high degree of procedures knowledge, and the ability to apply mathematics knowledge to solve real-world problems (National Council of Teachers of Mathematics (NCTM), 2000), therefore students with and without disabilities are expected to develop the ability of the mathematics skill as required by the standards. Helping children with ASD in achieving their competence in MWP solving has proven challenging because it relates to various aspects of academic and cognitive factors (Wei, Christiano, Yu, Wagner, & Spiker, 2014).

MWP is a mathematical exercise where the information of the problem is presented as text instead of the mathematical notation. MWP requires students to use both semantic and counting

skills for problem solving (Rockwell et al., 2011).However, researchers have shown that students with autism have difficulty making use of semantic information (Frith & Snowling,

1983) due to their language impairment. Moreover, MWP often include the contextual knowledge or information that likely to encounter in their everyday lives. Due to their limited experience with community (Bae et al., 2015; Wei et al., 2014) and also their restricted and repetitive patterns of behavior, interest or activities (*Diagnostic and Statiscal Manual of Mental Disorders(DSM-V)*, 2016), the learning process will be a challenging task for the children.

In terms of academic, children with ASD may be associated with mathematical ability, but their Intelligence Quotient (IQ) may not predict their mathematics competency (Estes et al.,2011; Mayes & L.Calhoun, 2008). Autistic children with IQ >80 or HFA may show weakness in MWP solving. This assumption has supported by an empirical study (Iuculano et al., 2014) which has found above average performance on basic calculation skills but average performance on mathematical reasoning in a group of children with ASD with no intellectual impairment. Along similar lines, Jones et al., (2009) examined a subtest of mathematical reasoning and found low-average performance in math word problems for HFA children,

Mathematical reasoning is the critical skill in learning mathematics skills because to learn skills that are easily remembered, can be applied when needed and can be adjusted to solve new problems, they must learn by understanding. Hence, when solving MWP, students will apply their knowledge to realistic problem situations where mathematical reasoning became an important instrument for making concrete judgments.

C. 2.2 VIRTUAL REALITY LEARNING ENVIRONMENT

Virtual reality (VR) is an emerging learning platform attracting the attention of both educational researchers and practitioners. Virtual reality (VR) functions as a computer-generated 3D representation of a real-life learning environment (X. Wang, Laffey, Xing, Ma, & Sticher, 2016). Within VR environments, the variety of hands on experiences will enable the learner to apply mathematics concepts that they have learned in the classroom. VR has been used to teach students with ASD and successfully improving specific problem behavior for autism in term of social behavior, attention and safety but yet there is still slow development in targeting cognitive impairments among this children (M. Wang & Reid, 2013).

The main benefits of using VR are define as threefold (1) VR allows a user to experience real-life situations (X. Wang et al., 2016), (2) VR can promote the sense of social presence(Stichter, Laffey, Galyen, & Herzog, 2014) in the cyberspace, (3) Embodiment in VR will award a user the self of presence that can promote higher cognitive engagement with other avatars (Dalgarno & Lee, 2010). The characteristics of active, authentic, and contextualized learning processes derived from the interactive experiences in VR can help user to comprehend conceptual ideas easier (Cecil, Sweet-Darter, & Cecil-Xavier, 2017). It is seen the method is aligned with the

aspects of constructivism (Chen, 1995; Daghestani et al., 2012), suggesting that VR technologies can be integrate in learning MWP learning process in order to build ASD children's understanding in the context of mathematics knowledge in real life problems. The VR experience is expected to produce a development of problem scheme to assist the children in solving MWP.

2.3 PROBLEM SCHEMA

Kochen et al.,(1983) introduced schema-induction theory which explains how people induce a general schema from experiences with specific objects or events. The important of schema theory is that the problem schema can be formed through the induction as a result of experiencing various instances of general solution principle or rule.The broader the schema developed, the greater probability the children will recognize connections between novel and familiar problems; thus they will know when to apply the solution methods they have mastered(Fuchs et al., 2008).

2. METHODOLOGY

3.1 THEORETICAL STUDY

In the process of developing the research aims, an initial study will be conducted. The analyses of the study support the formulation of problems and the main aim of this research. An in depth understanding of learning problem in mathematics word problem solving acquisitions for autistic children will be conducted in this phase. The study will look into the integration of virtual reality application technology in mathematic word problem solving learning process as part of treatment which will enable problem schema development among the children.

Expert Consultation

Expert consultations will be conducted in order to provide empirical evidence from autism educator and instructor. The main purpose of this activity is to identify the components and phases involved in mathematic word problem solving learning process.

Model Design

A conceptual model will be designed as a medium to validate and evaluate the effectiveness of proposed design for problem schema development for autism children utilizing virtual reality application as a basis. This prototype will be used as a learning tool in mathematics problem solving skills acquisitions among the children.

Experimental Study

Experimental study will be performed on a real project to measure the practicality aspect, and therefore this can assist for validating the proposed design guideline model. The problem solving worksheets and multiple probe across participants design will be used as a method to gain the testing result from the children. The Evaluation will take place at the National Autism Society of Malaysia.

3. SUMMARY

This proposed project will help the researcher to further extend her research area in the usability of media interactive in special needs education. This investigation will be a momentous endeavor and will be very theoretical for learners with autism and other related disabilities. This scaffold will eventually help educators, facilitators and curriculum to create appropriate instrument and instructional programs for the benefit of this underprivileged community in overcoming problems in learning disability. Completion of this project will contribute to the diversity of technologies usability in education area and continue to enhance the researcher's research field in computer technology.

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ENGINEERING APPLICATIONS IN RAINWATER HARVESTING TO INCULCATE SCIENCE AND TECHNOLOGY IN EDUCATION

Rafidah H.[1,2*], Abdul Talib D.[1,2], Nazlin Ruziah M. S.[3], Zakiah A. H.[1,2], Norasra A R.[1,2], Zamrah P

Habibah A.[3], Yazid A.[3], Ghazali H.[3]

[1] Faculty of Mechanical Engineering, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2] Centre for Advanced Research on Energy, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[3] Sekolah Menengah Kebangsaan Iskandar Shah,
77000 Jasin, Melaka

*Corresponding e-mail: rafidahhasan@utem.edu.my

Keywords: rainwater; energy harvesting; education

ABSTRACT – *Abundance resource of rainwater at hilly surrounding can highly benefit the community. This research aims to inculcate science and technology in secondary education by converting energy from hilly nature rainwater resource to engineering applications. Initial innovation idea from school was improved with engineering knowledge and practice. Integration of university's professional guide and school's dedicated members has resulted to a promising small scale energy harvesting unit that can fulfill secondary education syllabus. The outcome from this research can assist inculcating basics of science and technology in secondary school pupils. Besides, the innovation can lead to potential scientific research in energy.*

1. INTRODUCTION

Studies in rainwater harvesting in Malaysia were usually looking at the potential of the resource as an alternative water resource to be consumed by the community for daily usage, at both large and small scales [1, 2]. A study in Taiwan suggested that both water consumption and energy conservation should be considered together in hilly communities [3]. A research in Malaysia has integrated the rainwater harvesting system with solar and wind harvesters to be used for renewable energy generation [4]. These advancements in technology need to be really understood and appreciated by the community since early ages. Therefore, abundance resource of rainwater at hilly school surroundings can be utilized in the realization of renewable energy system which can educate the school pupils using a practical hands-on, minds-on approach [5]. However, it is difficult for only school members to carry out this task, hence, cooperation from institute of higher learning as research-

based education centre is a must to ensure the sustainability of the developed technology. In this paper, early efforts on the development of engineering applications for rainwater harvesting system to benefit secondary education are discussed. The project is located at Sekolah Menengah Kebangsaan Iskandar Shah (SMKIS),
Jasin, Melaka, with cooperation from Universiti Teknikal Malaysia Melaka (UTeM).

2. MOTIVATION AND ACTION

The abundance of rainwater during heavy fall at SMKIS as shown in Figure 1 (a) and (b) can lead to harmful effects to both environment and education facilities, if no action is taken in nearest future.

Figure 1 (a) Drainage at steep hill during heavy rainfall; (b) Drainage system with excess rainwater.

It was an idea from the school to apply innovation and technology in the management of rainwater through the platform of networking under 'Sekolah Kluster Kecemerlangan – Universiti Awam (SKK-UA)' initiative [6]. Early solution from school is as shown in Figure 2.
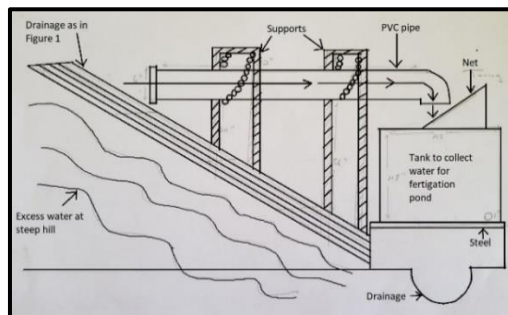

Figure 2 Initial idea to manage rainwater (side view).

To further improve the idea, engineering applications that can generate sustainable energy from rainwater harvesting were proposed. Amongst the reason to embed more engineering applications was to add value in the research so that it can be used in teaching and learning by hands-on and minds-on approach.

3. OUTCOME AND DISCUSSION

Figure 3 shows the improved proposal for rainwater management at SMKIS after including suggestions from UTeM's professional personnel.
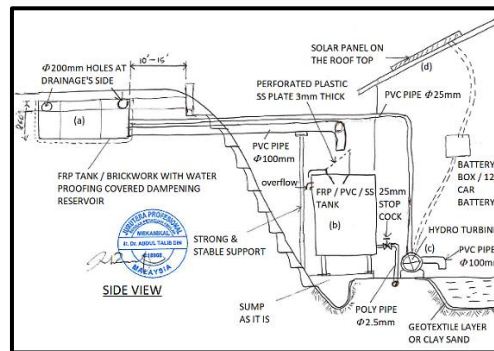

Figure 3 Proposal for rainwater management at SMKIS.

An important consideration was to slow down the water flow along the drainage at steep hill during heavy rainfall which caused erosion. This can be done by harvesting the rainwater, which can then be stored and used for energy generation. The generated energy can be used to power a small LED display nearby. Solar harvesting was also integrated in the proposal to sustain energy generation during sunny weather.

Amongst distinguished engineering applications in the proposed system as labelled in Figure 3 are:
   a) **Dampening reservoir**: To decrease water flow.
   b) **Water storage**: For sustainable water saving.
   c) **Water turbine**: For energy generation.
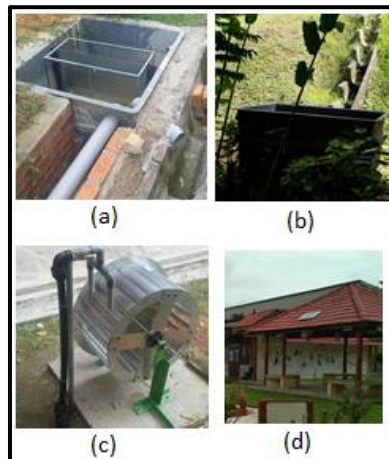   d) **Solar power**: For energy generation.

Figure 4 The developed engineering applications; (a) dampening reservoir; (b) water storage tank; (c) water turbine; (d) solar panel on roof top.

Figure 4 shows main engineering applications in rainwater harvesting research at SMKIS. On top of that, the water storage was intended to be used for fertigation pond as shown in Figure 5, which was concurrently developed by the Science teachers to add value of the project. All the physical works in the project were done together by five experts from UTeM, five teachers from SMKIS, and a group of five SMKIS pupils who were groomed to be school representatives in renewable energy project.

Figure 5 Fertigation pond at SMKIS.

Table 1 Subjects matched to rainwater harvesting unit.

SUB-PROJECT	SUBJECTS
Reservoir	Physics, Mathematics
Water	Physics, Mathematics
Water	Physics, Mathematics
Solar panel	Physics, Mathematics
LED	Design and Technology,
Fertigation	Biology, Chemistry,

Table 1 lists secondary subjects which can be benefited from this research project. The energy harvesting unit can assist hands-on, minds-on approach for school pupils. On top of that, other subjects such as language can also be involved.

4. SUMMARY

This research project of rainwater harvesting system at SMKIS has led to the development of small scale renewable energy harvesting unit. The outcome shows that 100% of the engineering applications can be matched to science subjects, thus it is very helpful in inculcating science and technology in school pupils. Further research to evaluate the effectiveness of hand-on, minds-on approach using this research outcome is yet to be done in nearest future. At least 20% from nine hundred school pupils and 10% from eighty school teachers are to be involved in the assessment of the effectiveness for this project.

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ASSESSING ASSISTIVE LEARNING TECHNOLOGIES WITH EXPERIMENTAL DESIGN

Gede P.[1; a], Muhammad S.[2], Helmi Adly M.N.[3], Aliza C. E.[1], and Siti Nur Azreen R.[1]

[1]   Universiti Teknikal Malaysia Melaka

[2]Universitas AMIKOM-Yogyakarta

[3]Malaysian Institute of Industrial Technology, Universiti Kuala Lumpur

ABSTRACT

Assistive learning technologies are computer-based tools that are aimed at assisting people with disabilities in improving their learning with minimum intervention of parents, caregivers, or helpers. Trials using experimental research design have largely been employed in order to assess their e cacy and feasibility. An experimental design is characterized by treatment or experimental units to be used, the way treatments are assigned to the units, and the responses that are measured. The treatment or experimental units require adequate number of and representative participants or sample. However, because of the limited numbers of participants or sample units, such kinds of studies have been noted as delicate but challenging experiences.

Keywords: assistive learning technology; disabilities; experimental design

1. INTRODUCTION

Assistive technologies (AT) are generally defined as "items, pieces of equipments, or product systems, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabil-ities of individuals with disabilities" [2]. Assistive learn-ing technologies consist of, but not limited to, computer-based products that aim to assist disable people in improv-ing their learning with minimum caregivers' intervention. Further studies in the similar domain reported that more than eight in ten published studies on AT were conducted to investigate the e cacy of the use of AT in impacting participants' cognitive skills and, approximately, 50 per-cent of them employed experimental research design [1].

The trials for AT e cacy using experimental design were unique, delicate and challenging experiences [3] [9]

[7]since the participants of the trials are people with dis-abilities, such as those are with Autism Spectrum Disorder (ASD) or with partially strokes. Furthermore, researchers have experienced with several problems related with gain-ing access, parent or caregiver concern or permission, le-gal issues, and reporting the findings [4] [6]. In the next following parts of the paper, experiences or attempts are reported based on two selected trials of assistive learn-ing technologies, which are a arithmetics tutor, called as MathTutor, and a serious game diagnosis, called as Vi-Per Games, for children with ASD.

Math Tutor Trial

This study is to investigate the e cacy of a computer as-sisted instruction or tutor in helping students with autism to learn elementary concepts of arithmetics. For this pur-pose, two independent sample pretest and post-test design of experiment was attempted and was targeted for children

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with ASD in the country of Malaysia. The design can be depicted by the Table 1 as follows.

Table 1. Experimental Design 1

O_1	P	O_2
O_3	X	O_4

However, since problems related with gaining legal ac-cess, concerns or permission from caregivers or parents, only a small number of participants can be obtained, par-ticularly from states of Melaka and Perak. During the experiment, an informal observation was carried out on both control and experiment groups. Observers toke notes on participants' attempts in using the tutor. Furthermore, notes were recorded from the observations pertaining to their behavior, progress, and if they had required guidance or assistance.

Vi-Per Games Trial

The study is aimed at investigating whether a set of se-rious games, called Vi-Per Games, can be used to diag-nose severity of visual perception amongst children with ASD. In order to overcome problems related with history bias, which was the main inherent deficiency in the de-sign, Tuckman [8] the one group pre-test and post-test was applied three times. The term history bias refers to the preconception triggered by events occurring in the envi-ronment concurrently when the experimental variable is being tested. The modified design, which was adapted by Pramudya [5], is called as separate-sample pre-test and post-test design. It is depicted in Table 2.

The results from the experiment indicate that there were no significant di erences between participants' mea-sures in pre-test and the post-test. It shows that, in each of the three samples, the participants' pre and post-test mea-sures were the same. As the collection of game scores was performed in three di erent independent samples and on di erent timelines, the history bias in this study was avoided. In other words, it is unlikely that some other events would have occurred simultaneously to a ect the use of the serious game environment in the three samples. This supports the conclusion that the scores resulting from the use of the serious games are accurate. This suggests that the serious game approach by using Vi-Per Games as a promising alternative method may benefit caregivers or others in order to diagnose severity of visual perception amongst autistic children.

Table 2. Experimental Design 3

O_1	X	O_2	
	O_3	X	O_4
		O_5	X	O_6

2. CONCLUSION

This is to review researcher experiences on employing de-sign of experiment in two independent studies. The stud-ies were aimed at investigating the e cacy of two assis-tive learning technologies, named MathTutor and Vi-Per Games, in helping children with ASD to learn elemen-tary arithmetics concepts and assisting caregivers to diag-nose severity of visual perception amongst children with

ASD. Representative samples were designed in order to meet the external validity of the design or in attempts to generalize findings. However, because of the limited con-cern from the parents or caregivers as well as limited ac-cess gained, only small numbers of children with ASD participated. Therefore, the researchers had to shift the paradigm, scope, and data analysis of the studies.

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PRELIMINARY SURVEY: IBOOKS FOR ENGINEERING SUBJECTS IN UTEM

Azma P.[1], Nurul Fajar A. M.[2]

[1]Centre for Advanced Research on Energy,
Universiti Teknikal Malaysia Melaka,Hang Tuah
Jaya 76100, Melaka Malaysia
[2]Faculty of Electrical and Computer Engineering,

Universiti Teknikal Malaysia Melaka, Hang Tuah

Jaya 76100, Melaka Malaysia

ABSTRACT

In this Industrial Revolution 4.0, the digital technology has played its important role in shaping the the education. Digital technology for teaching and learning materials improves progressively, and the implementation is now taking place especially for engineering subjects in the universities in Malaysia. In this paper, we discuss the perception of students on the digital interactive books— iBooks (for the Apple iPad and iPhone)—we created for undergraduate engineering students in Universiti Teknikal Malaysia Melaka (UTeM). The findings demonstrate that students can learn the engineering subject better with the iBooks and they want to spend more time with iBooks to learn independently. The latter finding is important for the implementation of flipped learning pedagogy in the university.

1. INTRODUCTION

Today's students are completely engaged with technologies. They interact with the world through smartphones, computers and tablets. If in the previous decades the teacher is the source of knowledge, now the sources of information and knowledge are available at the finger tips. As such, the learning styles and the needs of the student in this 21st century must be accommodated.

Keane et al. [2] reported that the use of iPad and Netbook influenced and enthused teachers and students, allowing more student-centred pedagogies to be developed, improving communication and literacy of students. However, dedicated teachers are important and they must be prepared to shift into the technological-based pedagogy.

The conventional didactic lectures especially in the university (where the students are adult learners) is now questionable in terms of its effectivity to transfer knowledge, and thus various pedagogies are gaining popularity, for example problem-based learning and flipped learning [1, 2]. In particular for the latter, use of digital technology is crucial to ensure the self-learning (at home) happens and to keep the students engage with the subject. Interactive content is therefore necessary.

One of the digital technologies which provides interactive media is iBooks from Apple. iBooks is an interactive book which can accommodate not just pictures, but also videos, HTML animations and 3D images integrated in 'one book'. Students can highlight the texts, create notes, and can directly share the thoughts with peers. iBooks also has accessibility features which allows the book to also be accessed by the blind impaired student. The iBooks can be just a substitution of a

normal pdf e-Book if it is not properly designed, especially if the interactivity elements are not fully utilised. iBooks must designed to redefine the student's learning.

A study conducted on the student's performance in Biology subject indicates that: (i) students using iBooks had significantly higher post test scores when compared to their peers using printed books, (ii) students using iBooks showed gains in achievement over the course of the year, while those using printed books shows significant decrease in achievement, and (iii) students using printed books experienced a decrease in motivation score, while the score of students using iBooks remained the same [3]. There is still a lack of research about the impact of iBooks on learning, particularly for engineering subjects. This paper is aimed at contributing to the preliminary study on the impact of iBooks for undergraduate students in our university.
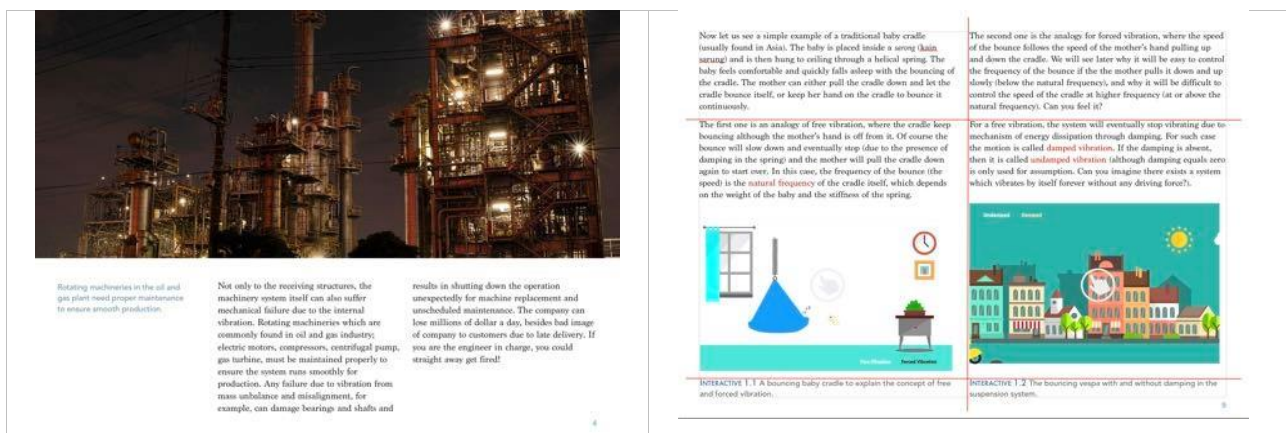
2. METHODOLOGY

a. Development of iBooks

We created two iBooks for undergraduate engineering subjects, namely Mechanical Vibration (3rd year students) and Multimedia Signal Processing (4th year students). We consider two main factors in developing the iBooks, i.e. design and interactivity.

Design

The aspect of design is rarely taken into consideration by lecturers and teachers when developing the teaching slides or lecture notes; documents used as the main learning materials by students. Design here is not only about the content, but merely on the visual appearance of the document which affects the visual communication with the reader. As pointed out by Norman [4], "*Attractive things make people feel good, which in turn makes them think more creatively...positive emotions are critical to learning, curiosity, and creative thought*"

We adopted some basic principles in our iBooks, namely contrast, alignment, proximity and generosity [5]. The default templates in iBooks Author actually apply these principles implicitly. Figure 1 summarises the application these design elements in our iBooks.
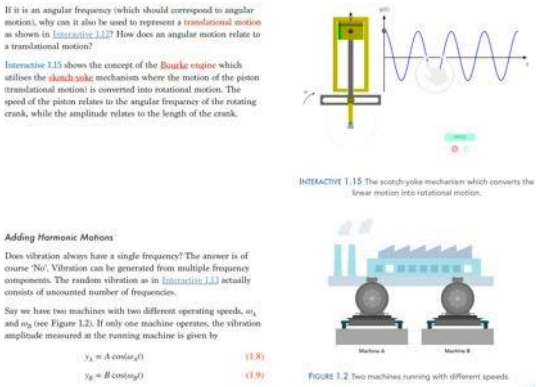
(a). Contrast: The dark colour on a white page reveals the beauty of the image. Instead of colour, concept of contrast can also be applied on shape, size and position.	(b). Alignment: The eye will see things conveniently if they are well-aligned. This will create a positive feeling.
(c). Repetition: Consistency in repeating the items, such as colour, font, shape and space.	(d). Generosity: Large image with only one paragraph of texts. The focus is on the image.

Figure 1: Examples of pages our the iBooks applying the principles of design.

Interactivity

In engineering subjects, many physical phenomena involved. Interactive elements to visualise the phenomena are thus required for student to better grasp an engineering concept. Thanks to iBooks where the element of interactivity can be integrated such as videos, keynote and HTML files.

In Mechanical Vibration subject where dynamic movement is involved, interactive elements are thus important. Figure 2(a) shows the example of interactivity in iBooks of a Bourke's engine to explain the skotch-yoke mechanism which visualises the process of converting the translational motion to rotational motion. The speed of the piston can also be changed by tapping a button. Figure 2(b) shows example of digital sampling in image processing. The image of Monalisa for correctly sampled or undersampled is shown by swiping the image right and left.
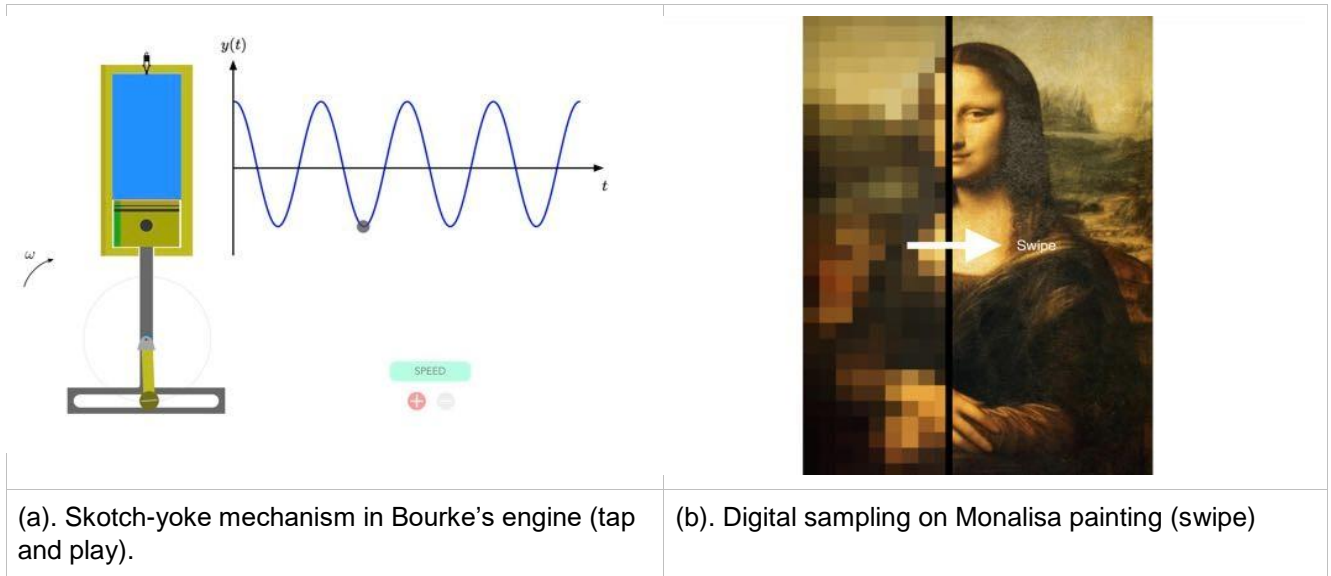
(a). Skotch-yoke mechanism in Bourke's engine (tap and play).	(b). Digital sampling on Monalisa painting (swipe)

Figure 2. Examples of interactivity in our iBooks.

b. Survey

The survey was taken after the semester was offer. This involves 15 third year students taking subject Mechanical Vibrations (BMCM3743) in Faculty of Mechanical Engineering and 48 fourth year students taking Multimedia Signal Processing (BMCT8393) in Faculty of Electrical and Computer Engineering. For the former, the students used iPhones to read the iBooks, while for the latter, the students used iPad in the classroom. The following are the questions in the survey:

a. What is the common learning materials for you to learn at home?
b. With Text Book, Power Point Slides or Modules, do you think that you can learn yourself easily?
c. According to you, what is the main problem with the current learning materials?
d. For Flipped Learning, what is the tendency that you will study at home before coming to the class?
e. Do you find my iBooks interactive and engaging? How would you rate?
f. What is the most engaging feature of my iBooks?
g. Did my iBooks change your feeling about Engineering subject?
h. Do you feel that using iBooks you can learn Engineering subject better?
i. Do you feel that you want to spend more time studying at home with the iBooks?

3. RESULTS AND DISCUSSION

Figure 3 shows the response from the survey about the conventional teaching materials, namely text book, power point slides or modules. These materials are not necessarily printed. Some materials are available to students in soft copy form (pdf files, ppt files). Most of the students from the two classes study outside the class using the teaching module. The teaching module consists of example questions and solutions, which indicates that students most likely prefer to do the exercises on solving problems at home to understand the theory taught in the class.

What is the learning materials for you to learn outside the class?
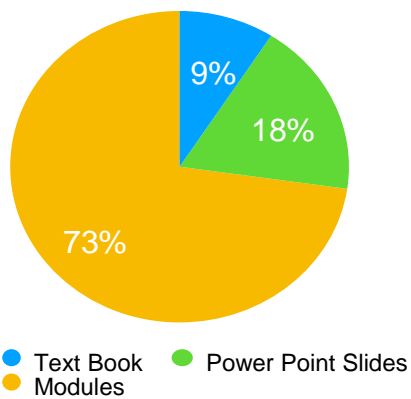
With Text Book, Power Point Slides or Modules, do you think that you can learn yourself easily?

Pie Chart 1	Pie Chart 2
9%	30%
18%	12%
73%	58%

Text Book   Power Point Slides   Modules

Yes   No   Not Sure
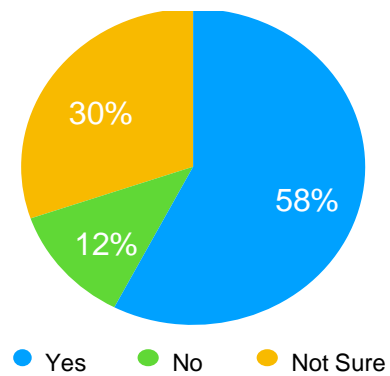
According to you, what is the main problem with the learning material you have now?
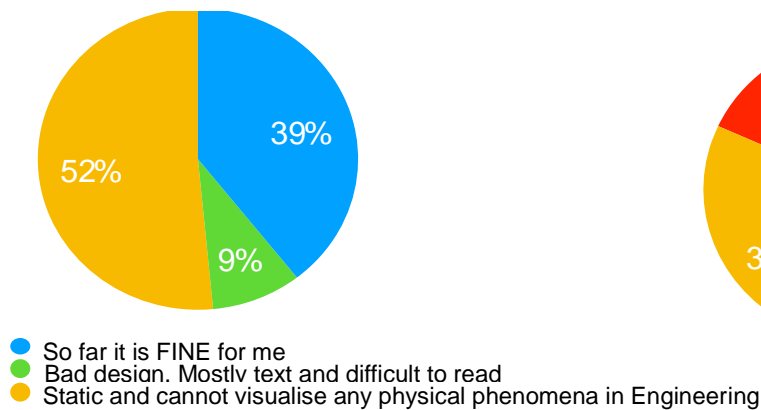
For Flipped Learning, what is the tendency that you will study at home before coming to the class?

Pie Chart 3	Pie Chart 4
39%	3% 15%
9%	15%
52%	33% 33%

So far it is FINE for me
Bad design. Mostly text and difficult to read
Static and cannot visualise any physical phenomena in Engineering
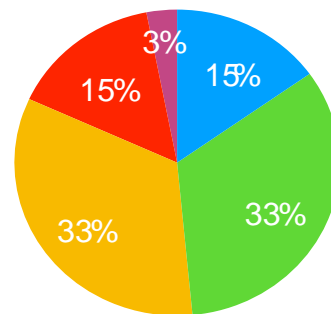
5 rating •4 rating •3 rating •2 rating
1 rating •

Figure 3. Response relating to common learning materials other than iBooks

Do you find my iBooks interactive
and engaging? How would you rate?

36%
48%
15%
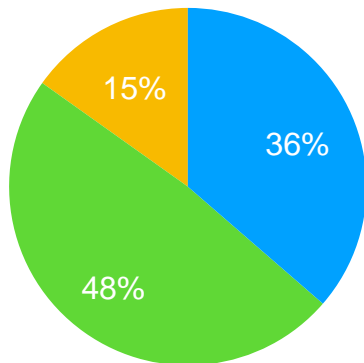
5 rating •4 rating •3 rating •2 rating
1 rating •

What is the most engaging
feature of my iBooks?

15%
18%
67%
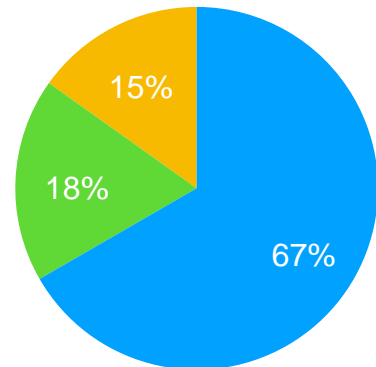
•Animations (tap and play) •Videos
•Stunning images

Did my iBooks change your
feeling about Engineering subject?

3%
97%
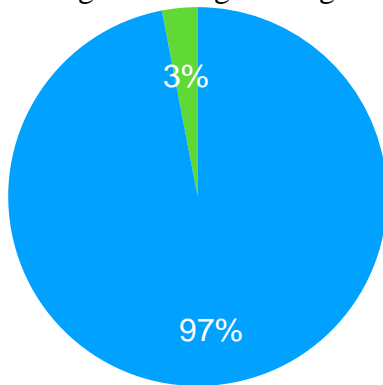
•Yes. I can grasp the concept better.
•Not really. I only enjoyed using the iPhone/iPad. Not the content of the iBooks.
•No. It was the same as the normal textbook.

Do you feel that using
iBooks you can learn
Engineering subject better?

15%
6%
79%
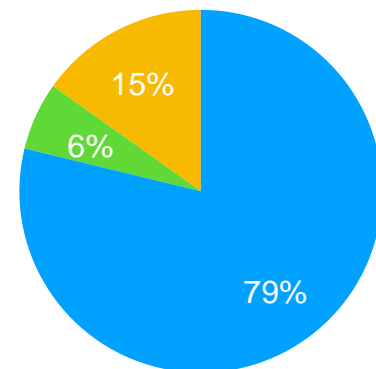
•Yes, definitely •Not really •Not sure

Do you feel that you spent more time studying outside the class with the iBooks?
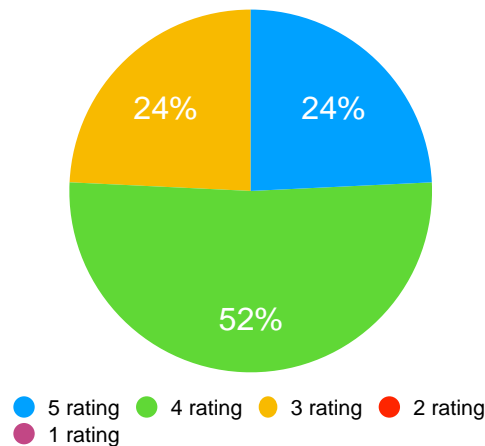
Figure 4. Response relating to iBooks

Almost half of the respondents say they are not sure or cannot learn by themselves outside the class using these materials. The most reason is that the material is a static material which cannot visualise any physical phenomena in Engineering. This could lead to deficiency of student's motivation in self-study [4].

The indication is further strengthen in the last chart where more than half of the students shows low tendency (ratings 1-3 out of 5) that they will conduct self-learning using the conventional materials. The self-learning (learning the material at home) is one of the key successes of flipped classroom or flipped learning.

The response concerning the iBooks are shown in Figure 4. Almost all students (84%) find that the iBooks are engaging, where the animation feature (with tap and play) is the most engaging part. Animated graphics can improve the cognitive aspect of learning and thus it has to be properly designed [6,7]. Students learned better of complex computer algorithm using animation [8]. The same was also found in teaching, where animated learning materials were more useful to undergraduate computer games students than traditional learning materials for learning mathematical concepts [9].

All students also find that they can grasp the engineering concept better with iBooks. And most importantly, 74% of students think they spent more time with the iBooks. Because the process of remembering and understanding (the lowest part of bloom taxonomy) has been catered outside the class, the higher part of the bloom (applying, analysing, evaluating and creating) can be focused in

the class (flipped learning) [10]. It was suggested that the format and structure of learning materials in the flipped classroom contributed significantly to the student's satisfaction with their flipped learning experiences [11]. For this purpose, the iBooks can be a suitable choice among any interactive media.

4. CONCLUSION

Survey on the perception of iBooks has been done. The main findings reveal that students can learn better with iBooks to grasp the concepts in engineering and they want to spend more time to study outside the class, which is important for the implementation of flipped learning. Again, the impact of iBooks depend on how the author design the content, i.e. by optimising its interactive features. Otherwise the iBooks is just a substitution of digital e-Book. The long term study of its impact on student's learning can be further conducted by analysing the student academic performance with and without the iBooks.

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ANALYSIS OF UNDERSTANDING COMPUTATIONAL METHODS STUDENTS' AT UNIVERSITI TEKNOLOGI PETRONAS

Samsul Ariffin Abdul Karim[1, *], Noor Nashuha Azman [2]

[1, 2)] Fundamental and Applied Sciences Department and Centre for Smart Grid Energy Research (CSMER), Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak Darul Ridzuan, Malaysia

1) Institute of Autonomous System, Universiti Teknologi PETRONAS, 32610 Bandar Seri Iskandar, Perak Darul Ridzuan, Malaysia

Abstract: *Computational Methods subject is offered to students in Year 2 Semester 1 at Universiti Teknologi PETRONAS (UTP). Throughout this subject, the students are tested on their skills in various numerical techniques to solve many scientific problems by using MATLAB programming. Since this our early study, we only have one data set comprising 365 respondents for September 2017 semester. We give questionnaires to all students, but only 223 students are participated. We use basics description statistics and data analysis to present the finding of this study. Based comparison with OBE for the final exam results of the subject; we found that students are less familiar with Chapter 7 than the other chapters. Some action plans are suggested at the end of the study.*

Keywords: *Computational Methods; Data Analysis; Descriptive Statistics; Data Science.*

1. Introduction

The progress of computer methods for the solution of scientific and engineering disciplines was one of the boundless in the Industrial 4.0 era. This can be achieved through some innovative Teaching and Learning (T&L) techniques in mathematical modelling and numerical methods with mathematical software such as MATLAB, Phyton, Octave and Mathematica. The students will be taught theoretically and at the same time they must be able to solve the numerical problem by writing their own coding in that software. Each topic/chapters will have its own assessment, in order to measure the understanding of the students and perhaps, to prepare an action plan to improve students' performance. Some recent studies in Mathematics education include Ismail et. al. [30] and [31] Khalid et. al. [31][31]. They all try to analysts and study some common problems in students' learning in subject Mathematics.

The Computational Method subject is offered to students Chemical Engineering, Petroleum Engineering, Electrical Engineering and Computer Engineering. In this subject, there are seven subtopics: Error Analysis, Roots of Equations, Linear Algebraic Equations, Interpolation, Numerical Differentiation and Integration, Numerical Methods for Ordinary Differential Equations, and Partial Differential Equation. Additionally, students are also given knowledge about the use of MATLAB software to solve numerical problems. Some problem based learning (PBL) is given to the students involving some MATLAB programing.

2. Methodology

The Framework is divided into two stages:

(1) Use google form to collect the data at the end of September 2017 Semester.

(2) Use data science tools to extract the information (big data analytics).

Data Collection

The data is collected from set of questionnaires given at the end of Semester September 2017. Only 223 students have been participating in the surveys. Table 1 summarize the total of respondents with respect to the respective program.

Course	Number of Students
Chemical Engineering	98
Electrical Engineering	23
Petroleum Engineering	102

Table 1: Number of Students for Every Courses

The students are required to answer set of question by choosing the appropriate scale based on a Likert's scale such as 5 (Excellent Understanding), 4 (Good Understanding), 3 (Medium), 2 (Poor Understanding), and 1 (Very Poor Understanding). Questionnaires are divided into 3 sections consist of Section A, Section B and Section C and in total there are 45 questions. To extract the data, we use some **data science** tools since basically the data are big. All the data are collected from Google Form. We use basic description statistics (in term of percentage) and data analysis (using Microsoft Excel) to present the finding of the present study. OBE software is used to compare the results and to provide some insight as well as conclusion to the study.

3. Results and Discussion

Basically, we divided each chapters to several sub-chapters. For instance in Chapter 1 there are 6 sub-chapters. All students must answer all 6 questions for Chapter 1 and so on. Then we calculate the percentage as well as the average of each rank based on Likert's scale and presenting the results into Pie Chart.

Fig. 1: Pie Chart for Chapter 1

Chapter 1: Error Anylysis

Chapter 2: Roots Of Equations

Fig. 2: Pie Chart for Chapter 2

Chapter 3: Linear Algebra Equations

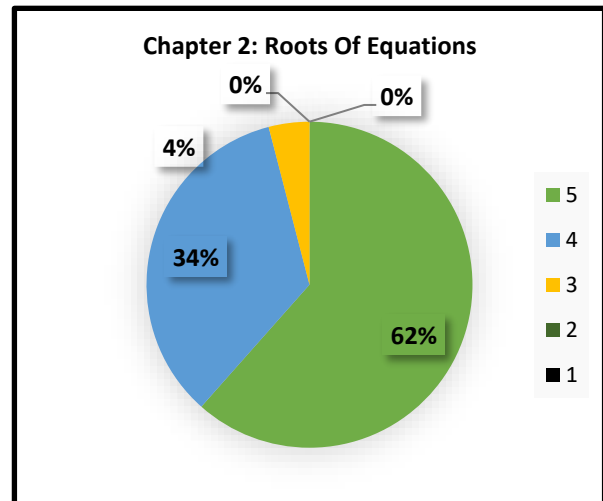Fig. 3: Pie Chart for Chapter 3

Chapter 4: Interpolation
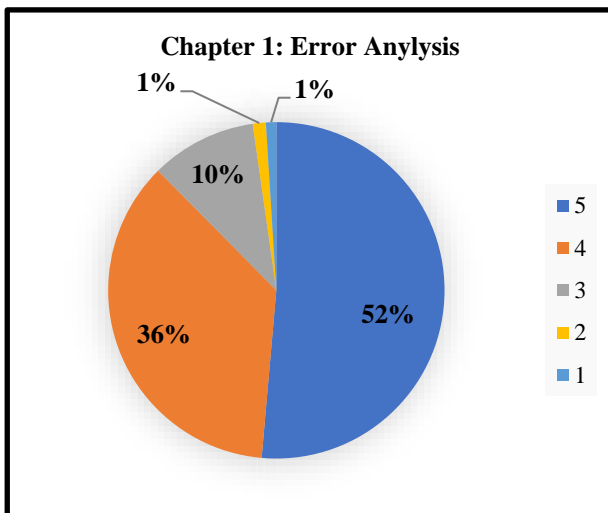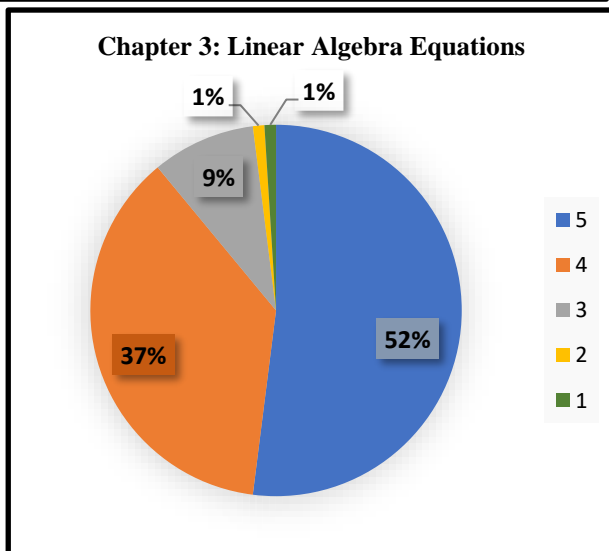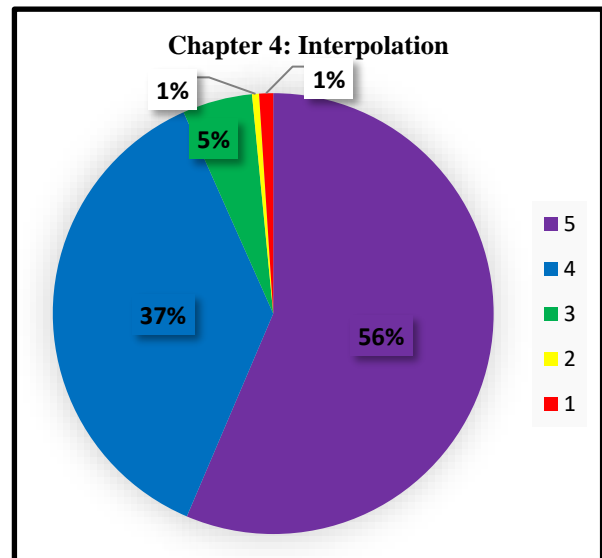
Fig. 4: Pie Chart for Chapter 4
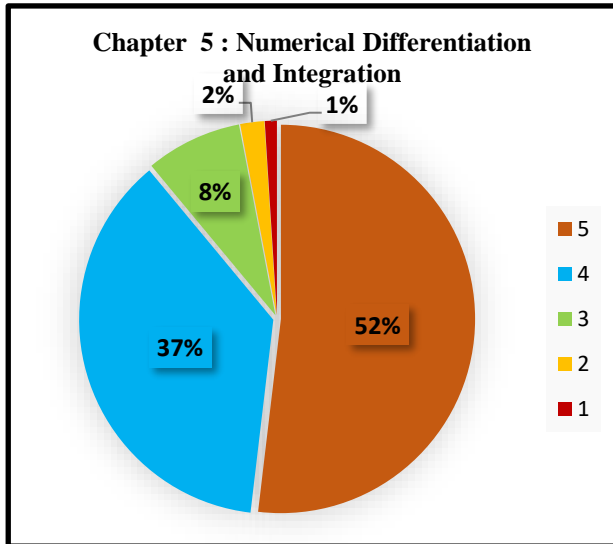
Fig. 5: Pie Chart for Chapter 5
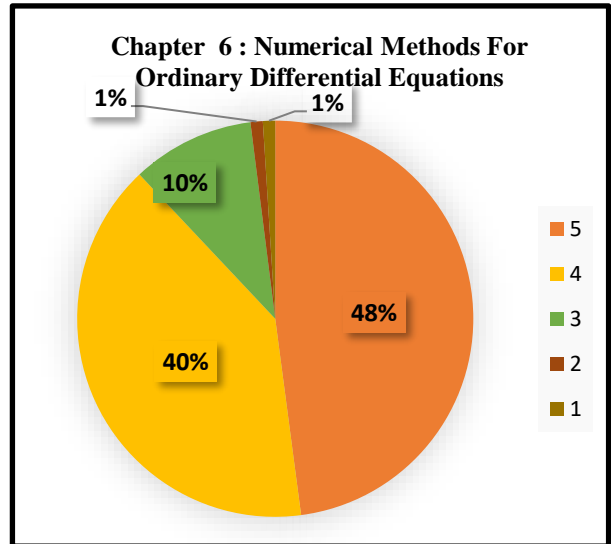
Fig. 6: Pie Chart for Chapter 6
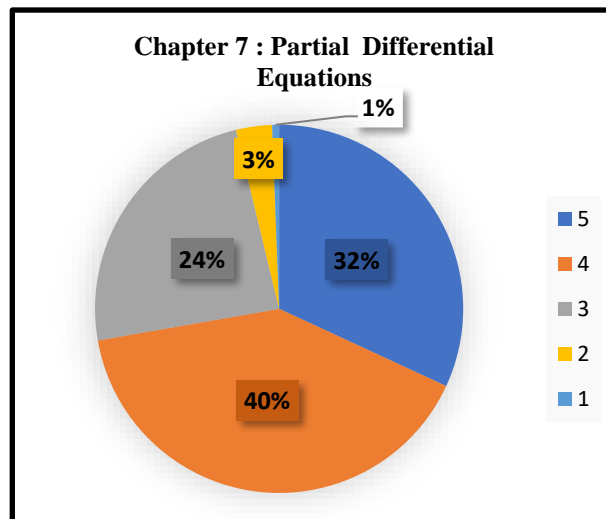
Fig. 7: Pie Chart for Chapter7
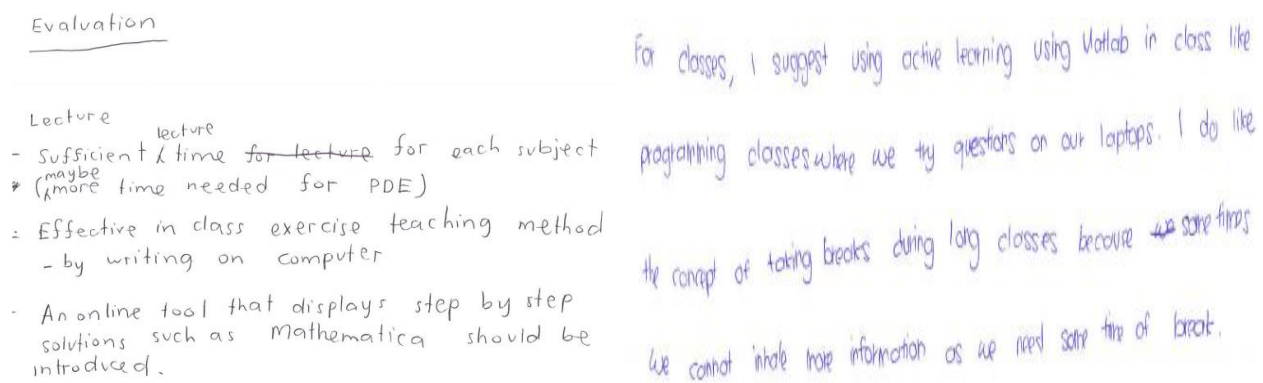
Fig. 8: Excerpts from Student's reflection during lectures

Based on the survey that have been conducted at the end of September 2017 semester as well as some reflection from the students, we have notified that the students did express their concern on Chapter 7 as well as MATLAB programming. Furthermore, based on OBE software at UTP, we also found that, the results for PDE (Question No 5 in the Final Exam) also shows that around 32% students have problem in the topics. Thus some action plan is proposed such as provide step by step explanation to the subject and get instant feedback from the students by giving them online exercises during lectures. Active learning activities also can be used that should be incorporated with latest T&L technology. This will improve students' understanding especially for May 2018 and September 2018. The other chapter, students seem have less problem.

4. Conclusion

From this early study as well as UTP OBE software, we obtain some idea and insight on students' understanding about the subject matter. We also did apply some basic data science tools in order to extract information from the collected data i.e. thousands. This data also can be considered as a big data. Thus some basic concept and method in big data analytics can be used to analyst's further. This will enable us to prepare some predictive continuous quality improvement to the Computational Methods course. This is our main research in the future. Furthermore, our main intention in the forthcoming semester is to integrate the T&L with some active learning activities as well as online assessments (quiz, assignment, exercises) via outcome based education (OBE).

5. Acknowledgement

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MEDIATING EFFECTS OF AVATAR REALISM LEVEL IN MOTIVATION IN GAME-BASED LEARNING – A RESEARCH PROPOSAL

Kogilathah,S., Ahmad Zamzuri, M.A. & Wee Hoe, T.

Faculty of Art, Computing and Creative Industry, Universiti Pendidikan Sultan Idris
35900 Tanjong malim, Perak Darul Ridzuan, Malaysia.
Correspondence Author email: p20142001491@siswa.upsi.edu.my

ABSTRACT
Referring to digital entertainment games, digital game-based learning (DGBL) expanded in several ways such as in using avatar to assist the students to learn on their own. Nevertheless, question arises as what type of avatar would be preferred by the learners in DGBL. Therefore, this study aims to identify how different level of realism of a game avatar would influence different elements of emotions (valence and arousal) and aspects of motivation among Malaysian tertiary level students in DGBL setting. For this research purpose, a DGBL with avatar entitled Colour Travel with five different realism levels has been developed and will be tested towards 300 students enrolled into Diploma in Computer Graphic Design at Cosmopoint College among 10 different campuses. It is a quasi-experimental study which investigates the effects of five different realism level of avatar in DGBL on the emotion and motivation of students. The research design approach will be five groups emotion test and motivation test, where all the five groups are experimental group. Emotion test and motivation test will be conducted by using suitable instrument which are a pictorial mood reporting based questionnaire adapted from SAM (Self-Assessment Manikin) and a questionnaire adapted from MSLQ (Motivated Strategies for Learning Questionnaire) respectively. Emotion and motivation will be tested at the first before playing the DGBL prototype and second test after playing the DGBL prototype. Descriptive analysis (mean and standard deviation) and inferential analysis (ANOVA, linear regression and multiple linear regressions) will be used to answer the research questions.

Keywords: Avatar, Realism, DGBL, Emotion, Motivation

1. INTRODUCTION

Usage of avatars as an educator in the virtual learning environment such as game is increasing as it is interactive, engaging, communicative and motivating whereby, these are important design requirements in a virtual learning environment (Ratan & Hasler, 2011). Another study stated that characters which are designed in the right aesthetic way, any level of realism or notion can be appealing (Hanson, 2005). Nevertheless, there were dearth studies conducted on how the realism level of an avatar in DGBL would influence the emotions and motivation of a learner since researchers stated that feeling experienced by learner during a learning progression offers evidence in the learning process which also motivates the learner (Novak & Johnson, 2012; Sincero, 2012). As such, this research is aimed to investigates how different level of realism of a game avatar would influence different elements of emotions (valence and arousal) and aspect of motivation among tertiary level students.

2. BACKGROUND STUDY

Educational digital games have become a huge research opportunity nowadays which has opened up plenty of research area for researchers to expand their ideas. It has also enabled players to immerse themselves into virtual world and acquire knowledge while having fun. Over the past decade, implementation of DGBL has provoked important aspects in exploring in what manner games might be powerful tools in the classroom (Groff, Howells & Cranmer, 2010). There are also growing bodies of DGBL research in Malaysia to enhance both tertiary and also the secondary level students' knowledge acquisition. Nevertheless, in a virtual learning environment such as game-based learning, learners tend to complain online learning feels emotionless and detached since presence of coach or pal is missing in supporting learner via the instruction process. One way to overcome this problem is by using virtual characters or avatars to personalize the experience (Ratan & Hasler, 2011). However, implementation of DGBL particularly assisted by an avatar seems lacking in teaching and learning in Malaysia.

"Avatars is an online manifestation of self in a virtual world, and are designed to enhance interaction in a virtual space", (Peterson, 2005). Meanwhile, in a study conducted by Inal and Cagiltay (2006) stated that, when virtual space is implemented to represent classroom in game-based learning, educators prefer an avatar to represent them to increase student's motivation. By the same token, human-like avatars that have many characteristics are ideal to serve as tutors, coaches, or guides in game-based learning environments to provide knowledge-based facilities to the learners (Johnson, Rickel & Lester 2000). Avatar or virtual character has gone through several developments to suit the players need in a digital game environment. High technology advancement pave path to animators and game designers to design extremely realistic virtual characters (Tinwell, 2015). Doerr (2007), Hoggins (2010) and Ravaja et.al (2008) stated that, "increased in realism would allow the viewer to engage and enjoy the game that they play". Notably, according to MacDorman, Green, Ho and Koch (2009), users incline to be scared when a simulated character looks too human like. Masahari Mori (1970) has explained this phenomenon through a graph named the Uncanny Valley. The "valley" refers to that allegedly unavoidably creepy region in the middle. Mori (1970) claimed that the valley occurred for static and dynamic humanlike figures and inventor should not invent robots that might fall in the valley as such creation would be rejected by people. Meanwhile Hanson, et.al (2005) stated in their studies that there is almost utterly unexplored territory of intermediate designs between realistic and cartoonish character. Hence, Hanson et al, (2005) conducted a research to identify the acceptance level versus the realism level of virtual character among participants.
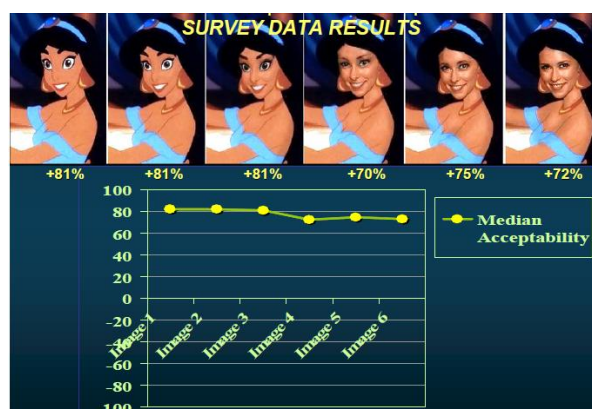

Figure 1.1: Percentage of respondent acceptance level base on the realistic level of 2D animated character and real human character (Hanson, 2005)

On the other hand, Schindler et al. (2017) has reviewed human brain responses to six professionally stylized faces that expresses happy, neutral and angry emotions varying from abstract to realistic by using an electroencephalogram or EEG measuring device. The data from the EEG reading found that 3D characters with happy emotions showed higher readings on the level of acceptance and comfort experienced by the respondents. However, the most realistic 3D characters in reading are almost identical to smiling and neutral face expression. It is also found that human emotion was less disturbed by a character that resembled a real human who portrayed a happy emotion like smiling.
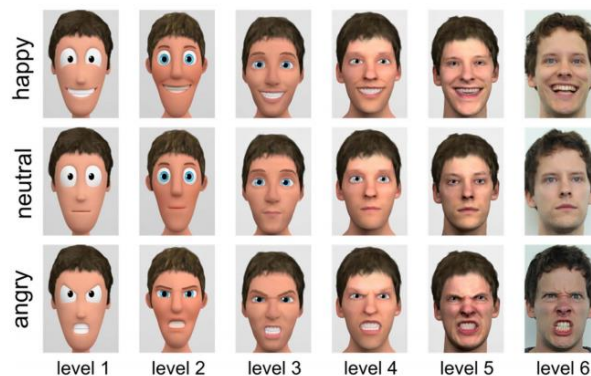
Figure 1.2: Expressions of emotion and neutral state in six different levels of realism (Schindler et al., 2017).

However, these studies did not explore different scopes of emotion involved among participants during the experiment. There are two scopes in emotion which fluctuates from calm and arousing (arousal) to positive to negative (valence) and concurrently (Russell, 2003). Studies have been conducted to identify whether emotions influence a player in a game. Hence, in a study conducted by Bailey, Wise and Bolls (2014) stated that, a game that is psychologically arousing will trigger the players to return back to play and stay extended. By the same token, students' emotions influence their motivation and performance (Muñoz, Lunney, Kevitt, Noguez, & Neri, 2013). Meanwhile studies also found that learning strategies, learning outcome and motivation enhanced by positive emotions (Pekrun, 2006; Pekrun, Goetz, Tiltz, & Perry, 2002). Alternatively, arousal too can improve learning and memory (Falk & Gillespie, 2009). As a matter of fact, psychology studies identified that valence and arousal in numerous levels contrarily impact the intellectual resources volume assigned in processing information (Lang, 2006). Nevertheless, there were fewer studies conducted in considering interaction effects between valence and arousal on different theories of motivation. "Motivation is a driving force behind both participation and progression in gaming environments", (Konetes, 2010). Motivation can be divided into two separate theories which are intrinsic (internal) motivation and extrinsic (external) motivation. As to date, numerous studies have been conducted either separately or combined to identify intrinsic and extrinsic motivational factor in DGBL. As pointed out earlier, usage of avatar in DGBL proven to motivate students (Inal & Cagiltay, 2006; Falloon, 2010). In line with this, studies have been conducted in features and metamorphosis of an anthropomorphic avatar that would motivate and engage learners in a virtual environment (Nowak & Rauh, 2006). The term motivation and engagement has been a norm in DGBL world. In consequence, engaged students experience aroused pleasure that is synonymous with intrinsic motivation (Kang & Tan, 2014). Whereas, Lacovides, et.al (2011) stated that, in order to consider the recent game-related developments, the current motivation and engagement theories need

to be revisited. Besides that, understanding the links between why people play games, what keeps them engaged in this process, and what they learn as a result could have a significant impact on how people value and use games for learning (Lacovides et al., 2011). Considering all these views together, this research aims to investigate how different level of realism of a game avatar would influence different elements of emotions (valence and arousal) and aspects of motivation among tertiary level students in DGBL settings.

3. THEORETICAL FRAMEWORK

This study is being grounded on Russell's Circumplex Model of Affect (1980) and Uncanny Valley phenomenon. "Circumplex Model of Affect is a theory proposing that emotions are distributed in a two-dimensional circular space, containing arousal and valence dimensions", (Russell, 1980). The vertical axis is represented by arousal where else horizontal axis represented by valence (Figure 1.3), and neutral valence and medium level arousal is represented at the centre of the circle (Rubin & Talerico, 2009). According to the model, the states of emotion can be indicated at any level of arousal and valence or even at a neutral level of one or both factors together. Every feeling can be depicted as a direct blend of these two measurements, or as variable degrees of both arousal and valence (Posner, Russell and Peterson, 2005). Delight, for instance, is a passionate condition that is the outcome related with positive valence or joy together with modest initiation with arousal (Posner, Russell and Peterson, 2005). Emotional states other than delight correspondingly emerge from a similar two neurophysiological frameworks however contrast in the degree or degree of enactment. Precise emotions in this way emerge out of examples of enactment inside these two neurophysiological frameworks, together with psychological elucidations and marking of these centre physiological encounters (Posner, Russell and Peterson, 2005). Circumplex models have been utilized most ordinarily to test stimuli of emotion words, emotional facial expressions, and emotional states (Rubin & Talerico, 2009).
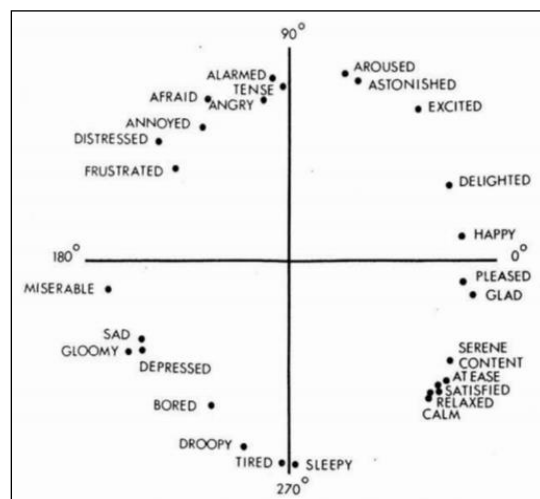
Figure 1.3: Russell's Circumplex Model of Affect (Russell, 1980)

Meanwhile, effects that arise from incorporating different realism level of avatar is explained via the Uncanny Valley phenomenon which will be the second theory this research has been grounded. Uncanny valley is a phenomenon that describes the relationship between different levels of realism of a character and towards the comfort and human emotions (Mori, 1970; MacDorman, 2006). Masahiro Mori's Uncanny Valley graph illustrates the phenomenon.
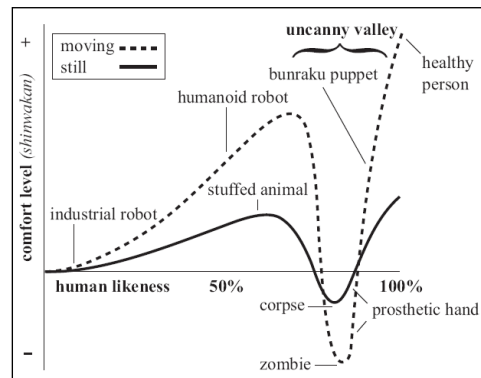
Figure 1.4: The Uncanny Valley Graph by Masahari Mori (MacDorman, Green, Ho, & Koch, 2009).

Figure 1.4 depicts the connection between comfort level and human likeness whereby it clearly states a character that look too realistic will scare the audience even with a smallest defect (MacDorman, Green, Ho, & Koch, 2009). This situation excavated when the character moves (MacDorman, Green, Ho, & Koch, 2009). Nevertheless, the human emotion graph increased to positive level when the character is a real human (Mori, 1970; MacDorman, 2006). In sum, by adapting to these theories, principles and the literature overview, a conceptual framework has been proposed as depicted in Figure 1.5.
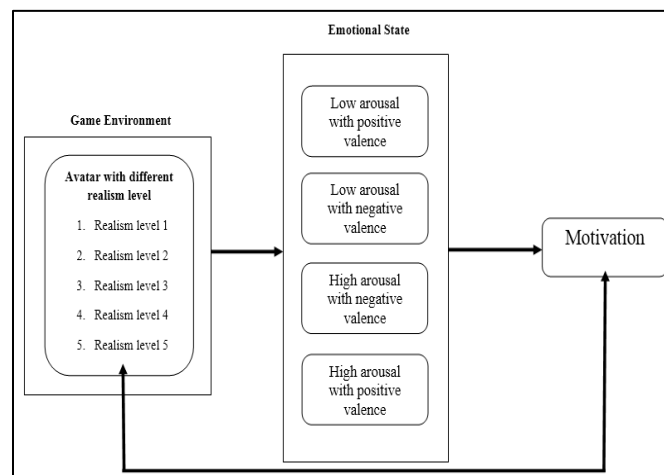
Figure 1.5: A conceptual framework for colour travel digital game.

4. PROBLEM STATEMENT

One of the challenges in designing a DGBL is getting the students engaged with the content and stay in the game. In order to get the students engaged, a motivational factor needs to be implemented in the DGBL environment. In this case, implementation of an avatar in DGBL environment would motivate and engage the students as avatar would represent a coach or a buddy in the virtual world. However, question arises as what level of realism would be appropriate in order to make the students motivated and engaged. This situation evolves as many theories and studies have stated that different realism level would create different emotions among students. As stated earlier, there are two scopes

in emotion which are valence and arousal. A DGBL which is physiologically arousing will encourage the learner to sustain in the game and play longer. As such, emotions influence the students' performance and motivation to sustain in the game (Muñoz et al., 2013). Learner's intrinsic and extrinsic motives in participating and becoming engaged with an educational game content usually portrayed in their motivation (Konetes, 2010). The intrinsic motivational factors created in an educational game is used to measure the advance stages of achievement in the game. On the other hand, extrinsic motivational factors vary in terms of attract and demand since the learner becomes motivated by the desire to achieve a reward for their participation or to avoid the consequence for non-participation (Konetes, 2010). Therefore, sustaining the elements perhaps require having relation between realism, emotion and motivation. Nevertheless, there is dearth of research conducted in investigating how different level of realism of a game avatar would influence different elements of emotions (valence and arousal) and aspects of motivation among Malaysian tertiary level students in DGBL. Game-based learning as such is less conducted among tertiary level students compared to schools and pre-schools students especially with virtual environments which are highly interactive (Terzidou, et.al, 2012). Thus, this research is conducted to fill this gap.

4.1   Research Objectives

The objectives of this research are:

Development:
1. DGBL prototype development entitled Study on Colours five with different avatar realism level.
2. Usability (UX) and User Satisfaction study of the DGBL prototype developed.

Research:
1. To analyse if there will be any significant difference in emotion level of students who undergo different realism level of avatar in DGBL.
2. To analyse if there will be any significant difference in motivation level of students who undergo different realism level of avatar in DGBL.
3. To analyse if emotion appeared to be a significant mediator in determining the motivation of students who undergo different realism level of avatar in DGBL.

4.2   Research Questions

1. Will there be any significant difference in arousal and positive valence students who undergo different realism level of avatar in DGBL?
2. Will there be any significant difference in arousal and negative valence of students who undergo different realism level of avatar in DGBL?
3. Will there be any significant difference in motivation level of students who undergo different realism level of avatar in DGBL?
4. Is arousal and positive valence a significant mediator in determining the motivation of students who undergo different realism level of avatar in DGBL?
5. Is arousal and negative valence a significant mediator in determining the motivation of students who undergo different realism level of avatar in DGBL?

4.3   Hypotheses

Hypotheses derived based on pass studies related literature and theoretical framework grounded are as follows:

Ha1.   There will be a significant difference in arousal and positive valence of students who undergo different realism level of avatar in DGBL.

Ha2.   There will be a significant difference in arousal and negative valence of students who undergo different realism level of avatar in DGBL.

Ha3.   The will be a significant difference in motivation level of students who undergo different realism level of avatar in DGBL.

Ha4.   Arousal and positive valence are a significant mediator in determining the motivation of students who undergo different realism level of avatar in DGBL.

Ha5.   Arousal and negative valence are a significant mediator in determining the motivation of students who undergo different realism level of avatar in DGBL.

5. METHODOLOGY

For this research purpose, a DGBL with avatar entitled Colour Travel with five different realism levels has been developed. This DGBL is being tested towards students enrolled into Diploma in Computer Graphic Design at Cosmopoint College at 10 different campuses. All of 10 campuses of Cosmopoint College are offering Diploma in Computer Graphic Design program. It is a quasi-experimental study which examines the effects of five different realism level of avatar in DGBL on the emotion and motivation of students. 300 samples will be used for this research purpose. These 300 students will be identified randomly and will be divided into five groups with 60 students each. The groups will be contained with balanced proportions of gender. The research design approach is five groups emotion test and motivation test, where all the five groups are experimental group. The research conducted involves three types of variables which are independent variable (IV) the realism level, mediating variable (MV) the students' emotion and dependent variable (DV) the students' motivation. Emotion test and motivation test will be conducted by using suitable instrument which are a pictorial mood reporting based questionnaire adapted from SAM (Self-Assessment Manikin) and a questionnaire adapted from MSLQ (Motivated Strategies for Learning Questionnaire) respectively. Emotion and motivation will be tested at the first before playing the DGBL prototype and second test after playing the DGBL prototype. Descriptive analysis (mean and standard deviation) and inferential analysis (ANOVA, linear regression and multiple linear regressions) will be used to answer the research questions.

6. CONCLUSION

Over the years there has been numerous amount of study of DGBL technologies and concepts conducted to improve teaching and learning, for both training and education purposes. DGBL is being a trend in the world of academia as it is known for motivating and engaging students to acquire knowledge. Hence, in order to fulfil learners' expectation to have a virtual teacher, avatar been introduced to represent an educator. However, there have been many studies conducted in order to represent an avatar that would accommodate the need of all kind of learners. As such, studies also have been conducted in order to identify the level of realism prefered by user of an anthropomophic character in a virtual interaction. By the same token, there were dearth research conducted in order to

identify the emotional aspect of user when they are interacting with avatar that was developed with different level of realism and the motivation theory involved while learning using avatar with different realism level. Underlining to that, this research is vital in identifying how different level of realism of a game avatar would influence different elements of emotions (valence and arousal) and aspects of motivation among Malaysian tertiary level students in DGBL settings.

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EXPLORING LECTURERS' PERCEPTIONS OF EFFECTIVE CLASSROOM MANAGEMENT: PRELIMINARY INSIGHTS FROM TECHNICAL UNIVERSITY

Nur Amalina, A. R[3], Sedek M.[1] , R. Ahmad[2], H. Musa[3]

[1] Center for Academics Excellence and Scholarship, Universiti Teknikal Melaka, Universiti Teknikal Melaka, 76100 Durian Tunggal, Melaka

[2] Information Security and Networking Research Group (InForSnet), Center for Advanced Computing Technology, Faculty of Information Technology and Communication, Universiti Teknikal Melaka, 76100 Durian Tunggal, Melaka

[3] Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka

[*]Corresponding e-mail: muliati@utem.edu.my

ABSTRACT

One of the vital aspects of a university is its quality of teaching. Quality teaching in higher education is matters for students' learning outcomes. Initially, the academia factors play as the most important roles in making the mission of improving teaching and learning quality a success. In this regard, the intellectual community in universities must equip themselves with the necessary knowledge and skills to enhance teaching success. Managing classroom and its climate are essential for effective learning thus inevitable and critical competencies required for lecturers. In general, this study examines the prevalence of teaching competencies among the lecturers of Universiti Teknikal Malaysia Melaka (UTeM), notably in classroom management and climate. Specifically, this paper aims to develop and validate a framework of teaching and learning competencies among lecturers of UTeM specifically in classroom management and climate. The whole constructed framework for teaching and learning comprises of the following components: Pedagogical Content Knowledge, Instructional Quality, Classroom Management, Climate, Mindset and Values, Technology Competencies, and Technical Competencies. This paper however, reports only two components i.e. Classroom Management and Climate. In terms of methodology, a confirmatory factor analysis was utilized to assess the adequacy of the two components in the proposed framework. This study may be instrumental to guide the university's top management particularly the academic managers of the university to plan and conduct the intervention programmes to further enhance the quality of teaching and learning of the university.

Keywords: Teaching and learning, classroom management, classroom climate, teaching competence

1. INTRODUCTION

In the face of ever increasing pressures on the quality and credibility of higher education, the academicians are required to continuously develop their teaching competencies. Thus, many considerable researches attempt to investigate the teaching competencies that are much required in a higher education teaching contexts nowadays. Tigelaar *et.al* (2004) defines teaching competencies as an integrated set of personal characteristics, knowledge, skills and attitudes that are needed for effective performance in various teaching contexts. Therefore, a framework of teaching competencies that suitable for the current landscape of higher education should be developed as a starting point for evaluation purposes and for lecturers to set their professional learning goals.

Numerous attempts have been made to define teaching competencies and to identify its components as well as the characteristics of effective university teaching by using a variety of theoretical perspectives, from qualitative and quantitative approaches, and from various discipline. Common components for teaching competencies in most frameworks are: competencies in content knowledge, instructional qualities, and classroom management.

Wubbels, Den Brok, Veldman and Tartwijk (2006) highlights that among the teaching competence required nowadays are the creation of positive teacher-student relations, managing and monitoring student behaviour, and teaching for student attention and engagement. Nowadays lecturers do not only impart information and knowldge but must also competent in managing the physical as well as the psychosocial aspects of the classrooms. This is due to the fact that the overall learning environments, atmosphere, ambience, tone, and ethos have a significant influence on students' satisfaction and performance. According to Smith and Simpson (1995), effective lecturers for higher education must not only possess scholastic skills but also planning, management, communication, evaluation as well as interpersonal skills. The management skills are highly required to manage the learning environment that could result to optimum learning. Communication skills are indeed desirable to promote students engagement, enhance motivation, build confidence and collaboration among students, which in turn enhance the successful attainment of the goals of the course.

In general, this study examines the prevalence of teaching competencies among lecturers in UTeM particularly in classroom management and climate. In this study, a framework of teaching competencies is proposed with the following components: Pedagogical Content Knowledge, Instructional Quality, Classroom Management, Climate, Mindset and Values, Technology Competencies, and Technical Competencies. The components of Mindset and Values and Technical Competencies were added as new components for teaching competencies. However, for the purpose of this paper, only the elements of teaching competencies in classroom management and climate are discussed. This paper also focuses merely on the development and validation of its framework.

2. METHOD

This study employed a quantitative method of data collection. A total of 158 UTeM lecturers participated in this study, 80 males and 78 females. The instrument used in the study was a questionnaire which consisted of 109 items. Approximately 10 items were for the subjects' demography and 99 items were for the perception of lecturers on teaching competencies in UTeM. A five point Likert scale (Scale 0 denoting 'Irrelevant', scale 1 denoting 'Strongly Disagree', scale 2 denoting 'Disagree', scale 3 denoting 'Agree', and scale 4 denoting 'Strongly Agree' were used in describing the perception of lecturers on teaching competencies were using.

As mentioned earlier, a framework of teaching competencies is proposed with the following components: Pedagogical Content Knowledge, Instructional Quality, Classroom Management, Climate, Mindset and Values, Technology Competencies, and Technical Competencies. The components of Mindset and Values and Technical Competencies were added as new components for teaching competencies.

The items for this instrument were validated by a group of experts identified from UTeM, as well as, other Malaysian public university. Then, the instrument was piloted to 30 samples.

Subsequently, the collected data was analysed using SPSS to determine its validity. The final version of the questionnaires consists of 109 items from 154 items.

Sampling was conducted using a stratified random sampling. A total of 300 surveys were distributed to academicians but only 158 were returned. Data collected was then analysed using AMOS programme to confirm the selected items for each component thus to validate the framework. Thus, this paper reports the result of confirmatory factor analysis which explicitly validates the framework of classroom management and climate as components of teaching competencies for UTeM academicians.

3. RESULTS AND DISCUSSION

Confirmatory Factor Analysis

The Confirmatory Factor Analysis (CFA) is the first step conducted prior the SEM analysis (Hair et al., 2010). Here, the CFA was meant to define the individual constructs and was employed for three major purposes, namely to test for (i) model fit, (ii) convergent validity and (iii) construct reliability (Loehlin, 2013; Rencher & Christensen, 2012).

For the model fit test, two criteria were being considered; the fit indices and the individual factor loadings of each item in a construct. As shown in Table 1 is the set of criteria for fit indices and their recommended value.

Table 1: Fit indices and recommended value for CFA

Fit Indices	Recommended value
CMIN/DF	≤ 5.0
Relative x^2	≤ 5.0
CFI	$\geq .90$
IFI	$\geq .90$
RMSEA	$\leq .80$
Factor loadings	Between .5 to 1.0
	Positive

According to Rencher and Christensen (2012) and Loehlin (2013), in the model fit test, the standardised factor loadings must be between .5 and 1.0 and should be positive. The indicators that do not meet these criteria shall be deleted. The concentration should be given more to an indicator or item that associated with high Modification Index (MI). Other considerations that need to be considered are referring to the previous literatures on the importance and significance of the items in the questionnaire. If the item(s) is/are to be considered as important, it should be retained in the model (Byrne, 2013).

The next test is the convergent validity test. This test is meant to identify the validity of each item that presumes to measure a construct (Kline, 2011). The convergent validity could be tested using the Average Variance Extracted (AVE). The AVE value which is $\geq .5$ indicates a high convergent validity (Hair et al., 2010).

The final test in the CFA is the construct reliability test (CR). The construct reliability test is a measurement of the internal consistency of the observed indicator or variables. If the construct reliability is $\geq .7$, the item is considered reliable.

It is worth to note that once the three tests were conducted in the CFA, the number of items for each constructs was expected to be reduced and there might be or might be not a model that will be found to be unfit. So, if there was only one model identified unfit, the construct was considered as unreliable and ought to be omitted from the model. However, if there were more than one unfit model, the models should be combined and renamed as a new construct (Loehlin, 2013).

The Analysis of Moment Structure (AMOS) was used to validate the framework of classroom management and climate as components of teaching competencies for UTeM academicians. Table 2 reports number of items in each domain, number of items omitted and the percentage of items omitted in each component.

Table 2. Number of items in each domain, number of items omitted and the percentage of items omitted in each component

Component	N items	N items omitted	% of items omitted
Classroom management	10	5	50%
Classroom Climate	10	5	50%

Before CFA, there were 10 items (E1, E2, E3, E4, E5, E6, E7, E8, E9, and E10) in measuring the classroom management. The initial model indicated a poor fit (CFI=.715; IFI= .720; RMSEA=.180). Since the model was considered as unfit, the process of improving the model was conducted by concentrating on the standardised factor loadings and referring to the Modification Index (MI).
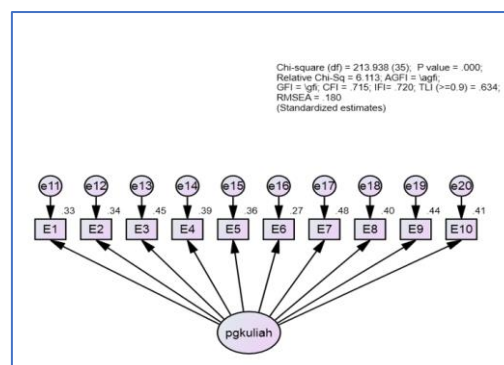
Diagram 1: Classroom Management before CFA

After CFA, all factor loadings were observed and five items (E1, E3, E5, E6, and E9) were identified to be less than .5, were deleted. This could be due to the characteristics of the items themselves. The items could be too detailed, inappropriate and redundant with other items within the same construct. Then, the test was conducted again and it showed a good fit

(CFI=1.000; IFI= 1.011; RMSEA=.000). As a result, the construct met the model fit. The remaining five items (E2, E4, E7, E8, and E10) were found to be the most appropriate items measuring the classroom management as one of the main components for teaching competencies.

Chi-square (df) = 3.118 (5); P value = .682;
Relative Chi-Sq = .624; AGFI = \agfi;
GFI = \gfi; CFI = 1.000; IFI= 1.011; TLI (>=0.9) = 1.023;
RMSEA = .000
(Standardized estimates)
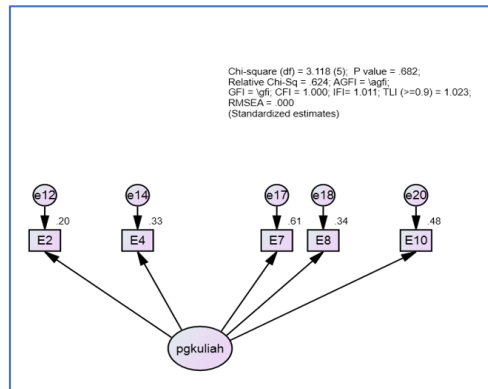
Diagram 2: Classroom Management after CFA

Before CFA, there were 10 items (D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10) in measuring the classroom climate. The initial model indicated a poor fit (CFI=.708; IFI= .716; RMSEA=.135). Since the model was considered as unfit, the process of improving the model was conducted by concentrating on the standardised factor loadings and referring to the ModificationIndex(MI).

Chi-square (df) = 134.868 (35); P value = .000;
Relative Chi-Sq = 3.853; AGFI = \agfi;
GFI = \gfi; CFI = .708; IFI= .716; TLI (>=0.9) = .625;
RMSEA = .135
(Standardized estimates)
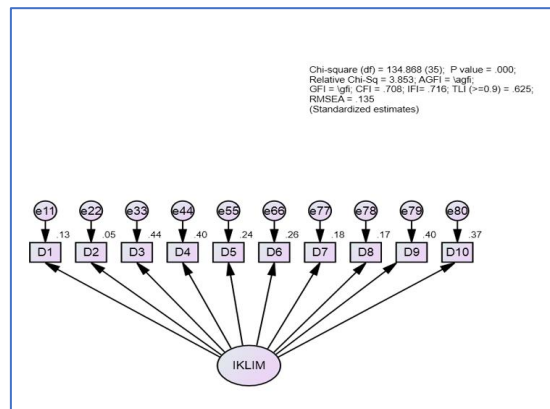
Diagram 3: Classroom Climate before CFA

After CFA, all factor loadings were observed and five items (D1, D2, D7, D8, and D10) were identified to be less than .5, were deleted. This could be because all five items are too detailed, not appropriate, and redundant with other items within the same construct , Then, the test was conducted again and it showed a good fit (CFI=1.000; IFI= 1.010; RMSEA=.000). As a result, the construct met the model fit. The remaining five items (D3, D4, D4, D5, D6, and D9) were found to be the most appropriate items measuring the classroom climate as one of the main components for teaching competencies.

Chi-square (df) = 3.448 (5); P value = .631;
Relative Chi-Sq = .690; AGFI = \agfi;
GFI = \gfi; CFI = 1.000; IFI= 1.010; TLI (>=0.9) = 1.020;
RMSEA = .000
(Standardized estimates)
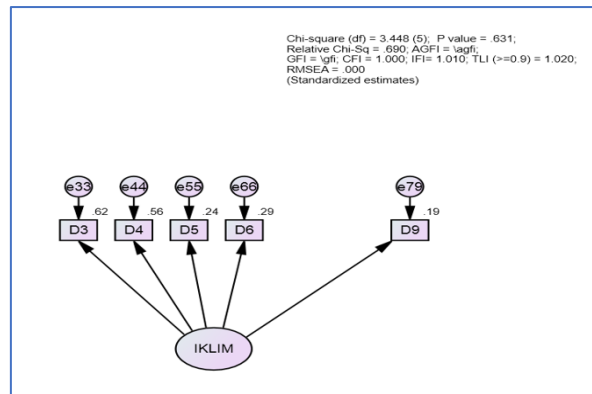
Diagram 4: Classroom Climate after CFA

Table 3: Most important items that were omitted and items that were

The Analysis of Moment Structure (AMOS) was used to validate the framework of classroom management and climate as components of teaching competencies for UTeM academicians. Table 3 explains in details the omitted as well as the accepted items for both classroom management and climate.

Component	Omitted Items	Accepted items
Classroom management	Classroom must be well arranged [E1]	Provide conducive learning environment [E2]
	Classroom tidiness and cleanliness matter a lot [E3]	Manage students' diverse background [E4]
	Classroom rules, procedures, and routines are adhered to [E5]	Enforce university's dress code on students [E7]
	Teaching/AVAs are shared among academicians [E6]	Guide students' social behaviour [E8]
	Respect for students' cultural diversity [E9]	Emphasize on the completion of assignment during class [E10]
Classroom climate	Considerate towards students' emotions [D1]	Promote conducive environment [D3]
	Knowing each other is not important in promoting positive classroom climate [D2]	Encourage students' participation in the class [D4]
	Minimal participation in class discussion [D7]	Promote harmonious relationship [D5]
	Criticize constructively upon students' misconducts [D8]	Start class on time [D6]
	Practise emotion control techniques [D10]	Crowd control with appropriate body language [D9]

4. CONCLUSION

To sum up, this study aims to validate the framework of classroom management and climate as components of teaching competencies for UTeM academicians. In general the results indicate that most of the items are considered as appropriate in measuring the teaching competencies in terms of classroom management and climate. As can be seen in Table 2, 10 out of 20 items (50%) were omitted. This is because the omitted items were believed to share the same common features in terms of definitions and measure up to the same criteria.

In general the results of the confirmatory factor analysis indicate that the items for teaching competencies from the perspectives of classroom management and climate should be broadly defined. The items that were omitted in classroom management, such as "the emphasis on classroom tidiness, cleanliness, routines, procedures and the sharing of teaching aids" are too detailed, too prescriptive and perhaps very technical. The non-technical factors such as the abilities to manage students' diverse background and to guide students' social behaviour and disciplines are deemed necessary for lecturers of higher education.

The results also showed that criteria of being considerate, ability to control emotion are less appropriate for classroom climate. This might be explained by the fact that inward-looking approach in teaching is less appropriate nowadays. This is in line with current teaching approaches for higher learning which focused more on cooperative learning which promotes social interdependence, engagement and active participation during class. In order to keep the students fully engaged in the classroom, lecturers must be able to create and maintain positive teacher-student and peers relationship.

Finally, this study suggests that exemplary university lecturers from the perspectives of classroom management and climate must be able to maintain a positive classroom environment specifically to stimulate students' interest, engagement, and motivation in learning, to have positive rapport with students, show high expectations of them, and to continuously foster the value of social interdependence among the students.

As the findings of this study indicated, a new framework of teaching competencies highlights the fact that classroom must be managed to foster the development of cooperative teacher-student learning activities. Classrooms that are managed in a controlled and disciplined manner seemed to be less appropriate for higher education contexts. Lecturers must also be creative enough to create a respectful, collaborative learning environment to enhance students' positive social behaviour and to stimulate students' proactive participation in the classrooms. University lecturers may find this framework as instrumental to improve their teaching approaches as to suit students' perspectives, goals and strategies. The academic and human resource development managers in universities may find this framework as beneficial in planning, developing and managing the appropriate intervention programmes for the academic staffs to become high performing university lecturers for the betterment of the universities.

5. ACKNOWLEDGEMENT

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LEARNING MULTIMEDIA JOURNALISM: BECOMING A MULTITASKING JOURNALIST AS A MODEL OF JOURNALISM IN THE 21ST CENTURY

Fauziah H.[1*]

1) Communication Program, Faculty of Leadership and Management, Universiti Sains Islam Malaysia, 71800 Nilai, Negeri Sembilan.

*Corresponding e-mail: fauziah.hassan@usim.edu.my

ABSTRACT – *The midst of journalism is when becoming a key trend in the digital age since the digital technology has changed the way news were produced and made the journalists rethink on how the news should be delivered to audiences. However, in the new era, the disruption of technology has actually give new experience in embracing the audience [1]. Thus, through the subject of Multimedia Journalism, it offers on how to roll the news in multi-platforms with rapid dissemination. On top of that, this article explains on how students were trained to be multi-task in reporting news, observations, including interviews, producing videos and info graphic for preparing them to enter the profession as a journalist.*

Keywords: *multimedia journalism, news gathering, journalistic reporting, investigative reporting, multi-task journalist*

1. INTRODUCTION

"I see my friends looking for something on the newspaper rack to buy some kind of newspapers to get information on a hot issue. On the other hand, my friends are reading something through smartphones. Some are reading messages on Twitter and some are reading messages on Facebook. To add, some choose YouTube as an informal channel to gain information as they want the visual satisfaction. From this view, I could say that everyone is trying to find the authenticity of the news that had shocked the world. I said in mind that this is the reality of today's world where news can be delivered quickly across multiple platforms".

Zerba [2] stated that the evolution of journalism has changed the tradition of reporting to the reporting for digital platforms of social cites such as *Twitter* and *Facebook* for quick and accurate delivery to readers. The Internet has made the assimilation and distribution of news become instantaneous in which everyone can share videos, text and pictures across many platforms to the globe. In the modern era, the life of journalists now is definitely changing [3]. Today, the technological convergence of mobile phones and multimedia has changed the way news content is produced [4]. Thus, in line with the digital era, Journalism students need the skills to improve their news reports/stories as modern journalists have to deliver information to the audience 24 hours 7 days a week. The question is whether the masses are ready to accept the instantaneousity by utilizing new technology to communicate and deliver information?

The course offers wide opportunities to future journalists to have a chance to increase their skills in writing whether for print, radio, TV, Website or any other online platforms. The course concentrates on the most important aspects of journalistic reporting, writing and editing using standards common to the profession while maintaining a constant focus on the unique characteristic and needs of online journalism. The course involves undertaking a number of new and traditional

skills to help students flourish online and also works to refocus students existing journalistic knowledge to fit the need of the online medium.

2. METHODOLOGY

The students will gather both practical and professional modules. They will be evaluated through individual and group project presentations. There are a range of assessment methods such as interviews, writing the news, doing analysis, developing a website, recording the video, editing the video and doing a stand-upper. The students need to do a showcase to present their multimedia project which is the jewel in the crown of the multimedia journalism course. All the skills that they have learned during the 14 weeks will be transformed into one group which is the website project. The students are free to investigate any news that interests them and then start developing their website from scratch and employ multimedia content and stories such as videos, infographic, map, audio, pictures, links, graphics, illustrations and long written news. These all mediums are to transfer knowledge and describe a story or an event to the audiences [5]. Thus, the developing of the website is a platform to prove that this course is using both theoretical and hands on techniques.

For individual projects, each student need to find any event related to the University and try to produce a stand upper for at least three minutes. They can also be creative by doing short interviews, asking prompt questions and develop their own talent and practice journalism skills as a journalist. They are free to choose any topics but they have to be aware of the fundamentals of media law and ethics. In the stand upper assignment, they have to use gestures, good intonation, informative news script which can enhance their skills in delivering fast reporting. Most importantly, they have to uploaded the stand upper project in You Tube so that the news they produced can be watched by massive audience and this is important to practice the multimedia elements in reporting news [6]. Granito & Chernobilsky [7] explained that this technique is also to create awareness among students that technology is very effective in learning process. For group projects, each group should develop their own free website where they will produce news through text, video, audio, pictures, timeline, infographic and maps. They have to be very investigative and have a skill in narrative reporting. The website project will be shown in a showcase and will be evaluated by juries appointed according to the criteria and measurements determined.

Alongside to enhance the key practical skills, the course also allows the students to open up their minds to think beyond. Through the news they investigated, it encourages them to provide their own views by being highly critical persons on why that particular issue happened and this would lead to worthy and serious academic study and debate. They also have to know how to solve the issue, to whom they should refer to if they face similar issues and many more. This makes them more alert to current situation. On top of that, this kind of assignment will build students' experience by building an impressive website project to showcase their work to the mass.
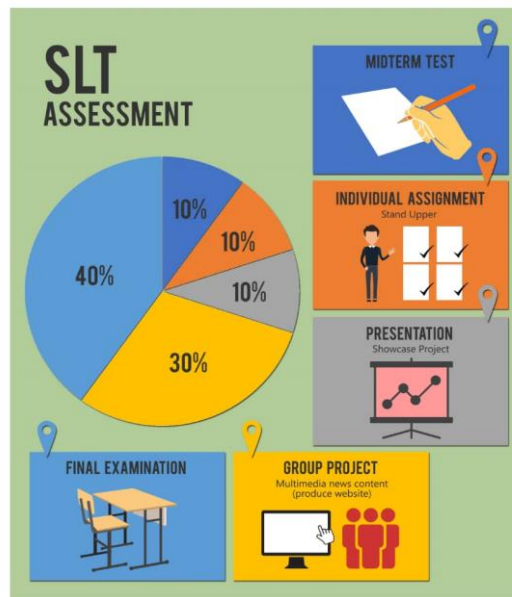
Figure 1: Types of Assessment for Multimedia Journalism Subject

3. RESULT AND DISCUSSION

To get the data, students are encouraged to get fresh primary data by doing interviews. Through this, students will learn how to generate information by finding the correct person to be interviewed in order to generate exclusive information. Students will learn how to identify potential stories from research or interviews and pick that story as the main issue. Then, students will learn to draft the questions and to record the interviews. From the recording, students learn how to use editing software to bring pictures to life and discover how to effectively interview people on camera. From this experience, students will learn to know what are the best practices of how to conduct successful interviews.

Upon the interview, the most important part is to ensure that each students carry the responsibilities by applying media law and ethics. Students have to be very careful in writing down the information given by the interviewees, pictures taken to accompany the text and many more. The students should behave when reporting especially on sensitive issues involving children/facts as they have to avoid defamation, libel, copyright, misrepresentation, privacy as the website project is going online! As a conclusion, learning Multimedia Journalism subject could be interesting as the Communication Program in USIM approaches interactive methods by producing stand upper and website projects in order to introduce students on how to apply the newsgathering, news writing, video and audio production skills and legal and ethical knowledge in order to produce a portfolio of original multimedia journalism.

4. CONCLUSION

In USIM, learning the subject of Multimedia Journalism could be the most interesting subject where students are free to explore any topics or issues that they want to investigate so that they can develop a clear and concise writing style. This kind of method gives opportunities to the students to think and become the investigator. In this course, students will learn the basic concepts and skills needed to write for a range of journalism platforms including online, radio, TV and magazines. Apart from that, they will learn the core skills of research, writing, accuracy and balance common to all journalism.

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E-MERIT AS A TOOL TO EVALUATE STUDENTS' PARTICIPATION ON SOFT SKILLS DEVELOPMENT

Zurina A. S.[1], Nur 'Izzati Z.[2], Hukil Sino[3], Koh K. W.[4], Mohamad K. M.H.[5], Norinsan K.O.[*]

[1] Social, Environment and Development Sustainability Research Centre (SEEDS), Faculty of Social Sciences and Humanities, UKM
[2] Sustainability of Language Sciences Research Centre, Faculty of Social Sciences and Humanities, UKM
[3] Diagnostic & Applied Health Sciences, Faculty of Health Sciences
[4] History, Politics and Security Research Centre, Faculty of Social Sciences and Humanities
[5] Tun Hussein Onn Residential College, UKM
[6] School of Applied Physics Studies, Faculty of Sciences and Technology
43600 UKM Bangi, Selangor

*Correspondence Author email: insan@ukm.edu.my

ABSTRACT

The e-Merit system was introduced in Kolej Tun Hussein Onn, Universiti Kebangsaan Malaysia to provide students with recognition and appreciation whenever they join any activities handle or organize by the residential college in both level; university or college. The e-Merit system was designed as a tool to evaluate students' participation and credit will be given in marks or points over their active participation or contribution on the activities. Thus, in creating balanced students that have excellent academic and good soft skills to be more marketable, focus on academic and soft skills development is measure using the e-Merit System. The researchers find that the participation from the students of the residential college on learning innovation is measured in accordance with the rubrics on how the e-Merit system marks is count.

Keywords: e-Merit System, Industry Revolution, Soft Skills Development, Kolej Tun Hussein Onn

1. INTRODUCTION

Technology advancement has changed human's perspective in the ability to change a better life in line with the present development. The emergence of high-tech tools such as phones, cars, planes and other machines have significantly changed the face of the world (Reischauer 2018; Duricin & Herceg 2018; Vaidya et al. 2018). Nevertheless, the rapid advancement of this technology provides important roles and responsibilities to the authorities especially in residential college of each University. Students mostly spend more of their time in their respective residential colleges rather than in class or faculty. Hence, it is possible for the students to develop their academic and soft skills whilst they staying in their room.

The 4.0 industrial revolution further emphasizes on the development of virtual technology. It can be seen that the use of human labor is no longer preferred and will certainly affects human life in particular (Saucedo et al., 2018). This is supported by Nawabjan et al. (2018) that explains the introduction to the "Internet of Things" (IoT) and industrial revolution 4.0 has opened a new perspective in human daily interactions. There are many applications that have been used and enjoyed by the global community as a proof that the Industrial Revolution 4.0 explains that the ability of information technology is capable in overhauling not only in the business world but also in human life (Vaidya et al., 2018). Therefore, the technology industry is increasingly unpredictable as today's society has a need for lifestyles, communications, jobs and others. According to Amir et al. (2018),

he stated that one third of the world's population uses social media to learn, share information and they become part of the community through the processes.

As there are rapid changes in the development of the industrial revolution and its needs to the world of careers and jobs, the effected target are those employees and students who demand to get a job after graduating with a Bachelor Degree. Their overall CGPA shows that they are eligible to apply for any jobs but companies nowadays needed more than that. Companies needed applicants with soft skills, career and life skills, learning and innovation skills and other skills as value added.

This is supported by Jamil et al. (2016), he explained that students need to have other skills together with excellent educational result as it helps the students to have the latest and relevant knowledge as well as soft skills that will drive the students to be positive and confident.

In encouraging the participation and involvement of students collectively, the size of the participation cannot be measured and assessed properly. Therefore, a system that can evaluate needs to be developed in order to assure the measurement and assessment is properly done. The e-Merit system is one of the online system developed by Kolej Tun Hussein Onn to measure the involvement of the college residential and to act as alternative system to replace manually merits filling in the merit books previously. In summary, it is a systematic assessment of individual performance with components and standard aspects provided. Therefore, the system has the ability to measure the involvement of students directly or indirectly.

1.1   Problem Statement

a) The function of a residential college that acts not only as a residence but also a center of human development among students.
b) The previous manual merit system is somewhat complicated in implementation and inefficient in time.

1.2   Research Question

a) How to evaluate the students' participation on activities conducted or implemented by a residential college?
b) Is the effectiveness of the e-Merit System (as a tool of measurement) in an alternative and comprehensive assessment works?

1.3 Research Objective

a) To identify the participation of college residents on the activities organized by the residential colleges
b) To study the effectiveness of the e-Merit System (as a tool of measurement) in an alternative and comprehensive assessment works

Students nowadays need to face challenges of the new industrial revolution 4.0. Students now need to have value added such as soft and essential skills to survive in career after they graduated. Students currently tend to fail to identify the potential in themselves, and refused to develop and understand their own capabilities (Amir et al 2018). Therefore, students need to have confidence and understand that they have the potential and capacity to succeed like others. In the same time, they need to improve the skills they lacks in such as public speaking, innovative, group skills and others.

In addition, Othman et al. (2018) shows that students conquered ICT skills, teamwork and practice low communication compared to other soft skills. Therefore, students who stay in residential colleges should take the opportunity to participate in as many programs and events are organized by colleges or universities as they could. The residential college is seen as the second home of students throughout their study. Rather than that, residential college is also seen as the second learning center because they spend more time here compared to faculty. Hence, residential colleges need to organize more activities, events and programs that are useful to ensure that these students can develop value added that they should have. According to Othman et al. (2018) he emphasized that activities organized by residential colleges and universities have the objective of producing high-confidence, proactive and competitive students. Hence, various mega programs are held to meet the needs of students to be more marketable. Plus, good planning and implementation would help to improve their value added. This is proved by Darus (2008), the planning and implementation of college and university activities involved four main groups that are the administrators, advisors and observers, implementers and targeted groups. Therefore, the identified and the targeted groups are responsible in ensuring the success of the program.

To conclude, programs and events organized by residential colleges and universities provide high impact aspect on future and graduate students in long term directly or indirectly. For students who are active in faculty and residential colleges, they are able to seize the opportunity and seen to have the value added in line with the current market demand.

2. METHODOLOGY

This study involved the students of Tun Hussein Onn College, Universiti Kebangsaan Malaysia. The students are in Year 1, Year 2, and Year-End (3 and 4) from 10 faculties in UKM. Distribution of questionnaires as the main database from iSTAR's final report is conducted using quantitative methods. Document analysis is also implemented as a method for collecting research data.

The e-Merit system aims to recognize students' participation in college and university activities. This is one of the medium used in the selection of the new students for each semester and session renewal. The e-Merit system also functions to record all activities and programs attended by Tun Hussein Onn College students. Below is the Tun Hussein Onn College e-Merit system portal and steps on how to access the system.
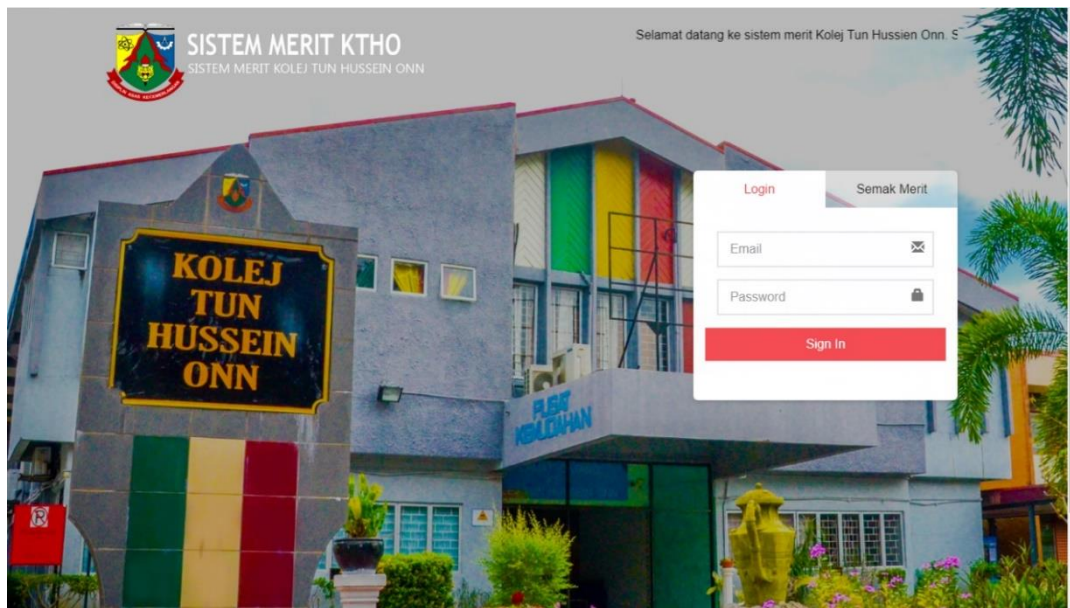
Main page for the e-Merit System of Kolej Tun Hussein Onn
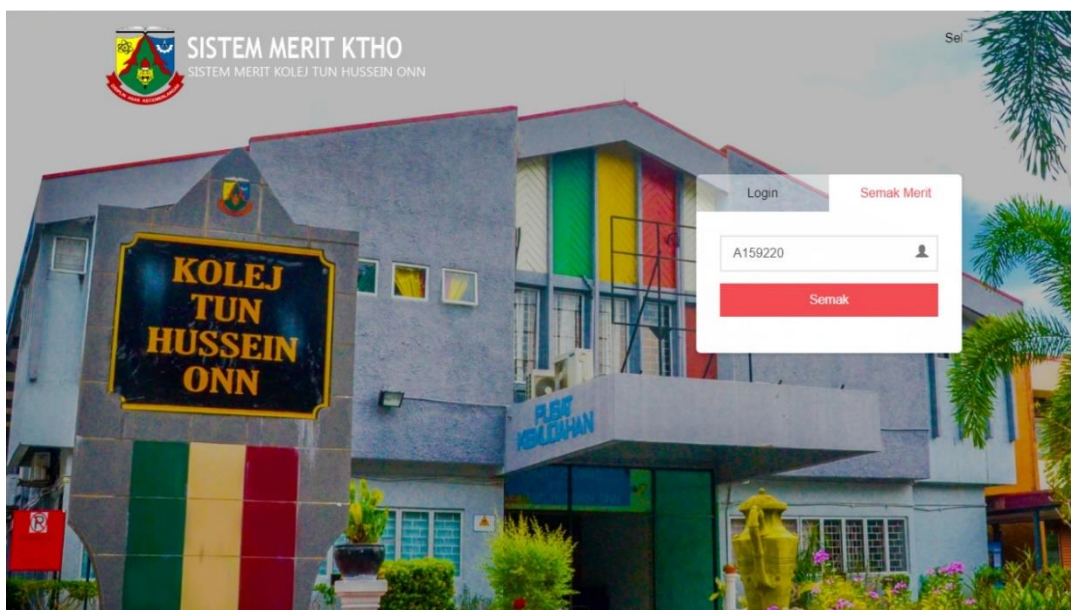
The "Check Merit" Menu by Logging in Matrix Number
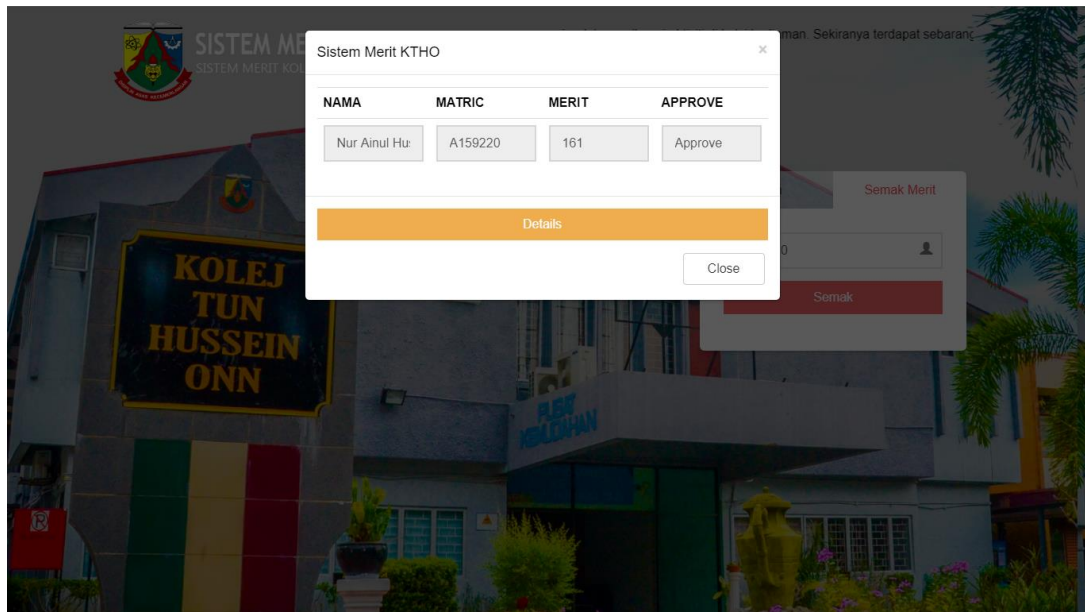
Total Merit Given will be shown

Nama	NUR AINUL HUSNA BINTI BAZLAN
Matric	A159220
Tahun	TAHUN 2
Pengajian	PENGAJIAN BAHASA MELAYU
Fakulti	FSSK
Palapes	TIDAK

Id	Program/Ulasan	Jawatan	Merit	Status
1	KEMPEN DERMA DARAH	PESERTA / PENONTON	1	APPROVE
2	SEMPEC	AHLI JAWATANKUASA (PROGRAM BIASA)	6	APPROVE
3	TAKLIMAT PROGRAM MOBILITI/PERTUKARAN PELAJAR	MAJLIS TERTINGGI (PROGRAM BIASA)	10	APPROVE
4	MALAM ANUGERAH PELAJAR KE 21	AHLI JAWATANKUASA (PROGRAM MEGA)	8	APPROVE
5	KELAB AKADEMIK	MEP	12	APPROVE
6	PROGRAM XPLORASI MAKLUMAT	MEP	12	APPROVE
7	PERTANDINGAN 3 MINUTES PITCHING AIR ASIA	MEP	12	APPROVE
8	KELAB HELAA	MEP	12	APPROVE
9	AKTIVASI BLOK	MEP	12	APPROVE

The full list of their participations can be seen directly and print out

3. RESULT AND DISCUSSION

Table 1 and Diagram 1 shows the categories of program and students' participation in activities held by University or Residential Colleges. There are 10 categories available which are leadership, academic, welfare, entrepreneurship, culture, spirituality, volunteerism, unity, sport & recreation and yearly appreciation. In total, there are 40 activities held throughout 2017/2018 session. In average, 406 students have joined each activity held. The most favorite categories joined are yearly appreciation and volunteerism.

Table 1: Categories of Program Held by Residential College and Universities in 2017/2018

Category	Participation	Total Programs
Leadership	301	7
Academic	340	4
Welfare	611	6
Entrepreneurship	310	2
Culture	152	6
Spirituality	450	2
Volunteerism	721	8
Unity	265	3
Sport & Recreation	183	1
Yearly Appreciation	730	1

Category of program held by Residential College and Universities in 2017/2018
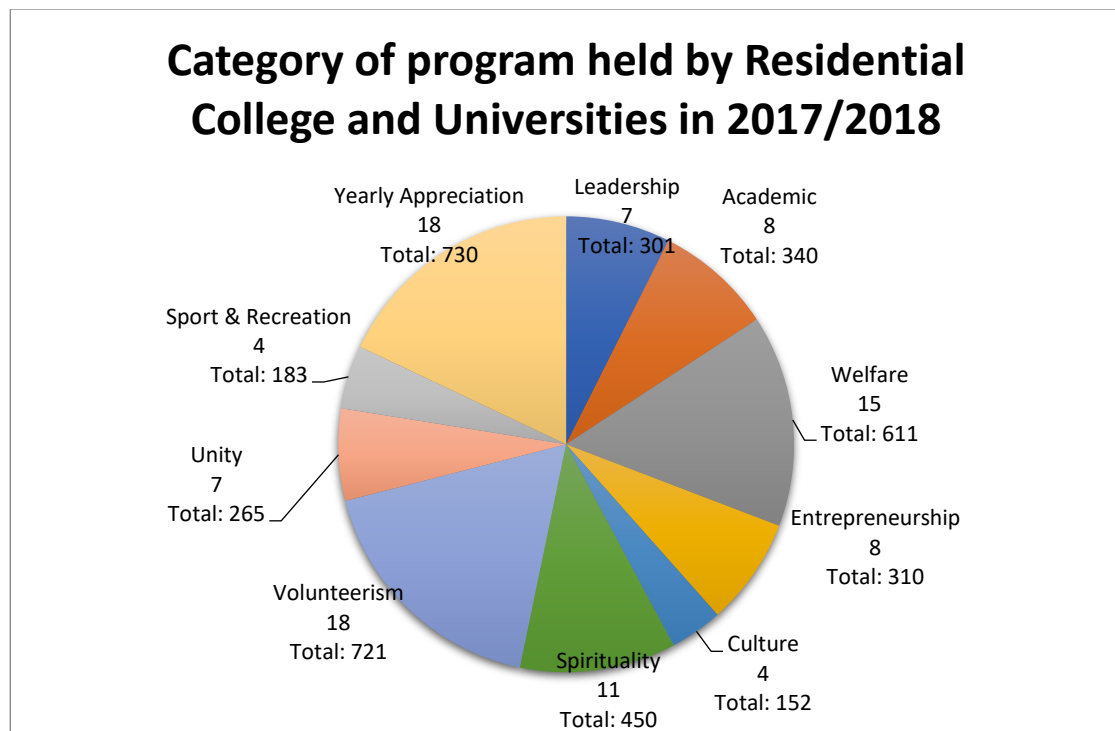
Diagram 1: Categories of Program Held by Residential College and Universities in 2017/2018

Diagram 2 shows the cumulative result of students' academic in Kolej Tun Hussein Onn for 2017/2018 session. 522 students (81.3%) managed to get 3.00 above, 99 students (15.4%) managed to get 2.50-2.99, and 21 students (3.27%) managed to get 1.00 – 2.49. Students who succeed to score 3.00 and above are classified as excellent student. In average, students that are actively involved in activities and program held by the university or residential college managed to get total CGPA of 3.00-4.00. In the same time, they managed to collect average of 30.6 marks for their e-Merit grading score.

Diagram 2 Students' Cumullative Academic Result (CGPA) in Kolej Tun Hussein Onn for 2017/2018 Session

CGPA Range	Number of Students
3.67 - 4.00	70
3.50 - 3.66	104
3.00 - 3.49	348
2.50 - 2.99	99
2.00 - 2.49	18
1.00 - 1.99	3
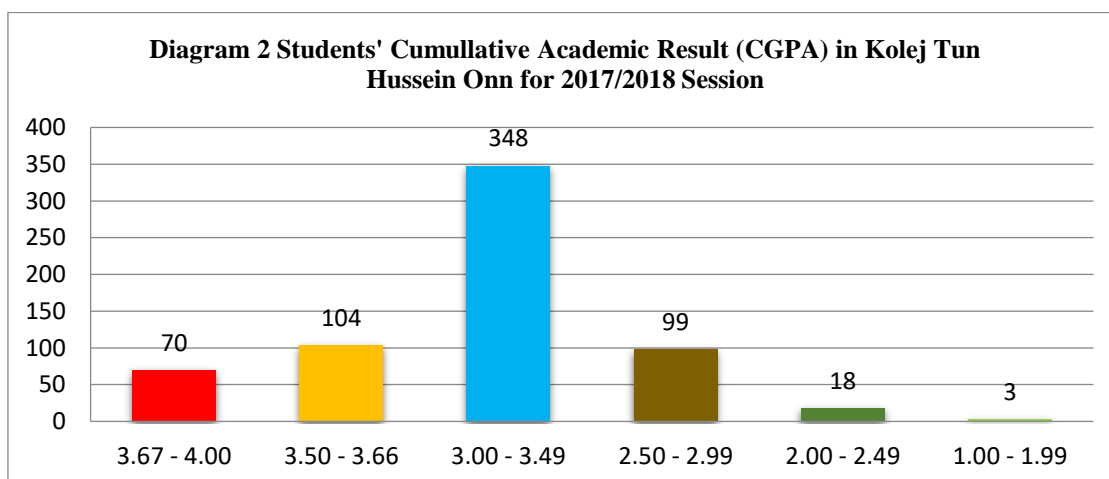
Diagram 2: Students' Cumulative Academic Result (CGPA) in Kolej Tun Hussein Onn for 2017/2018 Session

e-Merit grading score through KTHO's students cumulative results (CGPA) is based on the overall average range of students of each session. Excellent grades ranging from 30 - 40 marks, Good Grades is 20 -29 while Medium Grades is 1 -19.

Table 2: e-Merit Grading Score

Marks	Grade
30-40	Excellent
20-29	Good
1-19	Fair

The result shows the assessment throughout the program in pre-program and post-program. 80% agreed that the secretariat had done their best, 72.0% agreed that the suitability of the venue held, 78.7% agreed on the suitability of the content, 80.0% on the activity effectiveness and 77.3% agreed that the objective of the program have been achieved. In average, this assessment achieved 78.0% and classified as A in e-Merit Grading Score.

Table 3 : Assessment Throughout the Program = Pre and Post

Category	Total (%)
Secretariat	80.0

Suitability of the Activity	72.0
Content of the Activity	78.67
Effectiveness of the Activity	80.0
The Process of the Activity	80.0
Achievement on the Objective Focused	77.33

The e-Merit scoring (Management Assessment) grade is based on the assessments provided throughout the program by the secretariat and participants. Grading scores are as follows. 75-100 (A), 49 -74 (B0, 23-48 (C) and 1 - 22 (D). This grading classification focused throughout the whole program and activities organized by colleges and universities to measure the success of each program.

Table 4 : e-Merit Grading Score (Administration Assessment)

Marks	Grade Given
75-100	A
49-74	B
23-48	C
1-22	D

Participation among college residential are collective because it is valued based on accumulated merit points. Therefore, the results of this study analysis shows that respondents have high involvement in each program organized by college and university. Through the analysis, based on Diagram 3, 61.9% agreed that the e-Merit System is easily accessible while 38.1% disagreed.
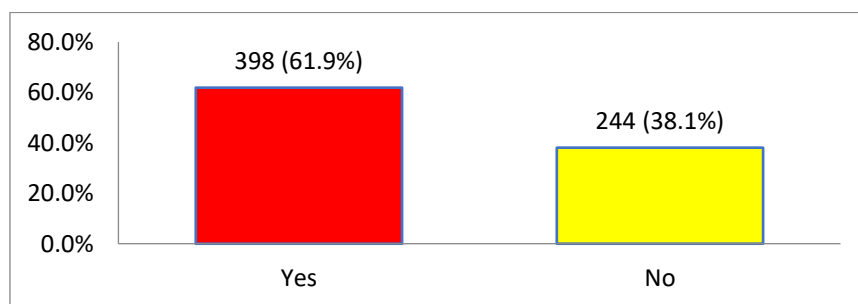
Diagram32 : Accessibility of the e-Merit System

The list of students' information can be accessed via e-Merit system. Students can also print their overall results by logging in using their Matrix Number.

4. CONCLUSION

The e-Merit System has given a positive impact on the students' soft skills development. The findings have proved that the students who actively involved in activities held by university or residential college has more potential to score higher CGPA. Therefore, the e-Merit system acts as a tool of measurement in determining the ability of the students. In the same time, students are indirectly prepared to face their career and life challenges. In addition, it is highly-recognized that in organizing programs, the students possessed skills such as information acquisition skills, high level thinking skills, teamwork skills, communication skills and time management skills.

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IMPLEMENTATION OF MIPBL FRAMEWORK FOR FUTURE TECHNOLOGISTS

Zanariah J.[1*], Faaizah S.[1], Hazmilah H.[1]

[1] Centre for Technopreneurship Development , Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*]Corresponding e-mail: zanariahjano@utem.edu.my

ABSTRACT

This paper had two fold objectives; to apply MIPBL in a class of future technologists at the Faculty of Engineering Technology and to assess students' perspectives on the effectiveness of the MIPBL framework. Questionnaires were developed for the purpose of investigating students' perceptions of effectiveness of soft skill implementation and determining feasibilty of promoting MIPBL. The MIPBL comprised modules and assesment kits. Samples consist of students of third year cohort of Engineering Technology Faculty. The findings yielded positive outcomes in terms of students' collaborative skills, engagement and motivation, higher order thinking and problem solving skills.

Keywords*: MIPBL; framework; technologists*

1. INTRODUCTION

Rapid evolution of technologies needs students to instill long life learning and self-learning skills to cater to today's demand of advanced technologies. However, much literature reveal the lacking of technical competence and soft skills among Asian graduates. To curb the problem, many innovation tools and approaches including problem based learning, Student Centred Learning, Project based learning have been devised to engage students for deep learning and inculcate develop essential skills like self-directed learning and problem solving. Most employers hire employees who are able to think critically and creatively, take risks and solve problems. Indeed, soft skills are essential in today's work environment. However, only few Asian employees possess these skills because most future employees lack of flexibility, adaptability, enthusiasm and motivation [1] (Manpower Group, 2013). Besides, another study highlighted the three most essential skills that leaders need today; managing change – 79%, negotiating and resolving conflict (68%), and collaborating with others (68%) [2] (Cegos Group,2013). Problem Based Learning together with Information and Communication Technology (ICT) tools is compatible for effective process of teaching and learning.

MOOC and Problem Based Learning have been integrated into a framework known as MIPBL [3] . The main focus of the present study is applying the MIPBL tool designed previously into the Critical and Creative Thinking Class for future technologists at the Faculty of Engineering Technology. This study is timely because the teaching and learning process in institutions of higher learning in Malaysia are aiming for innovation-led industry realms.

1.2 MIPBL: How ICT Has Been Integrated
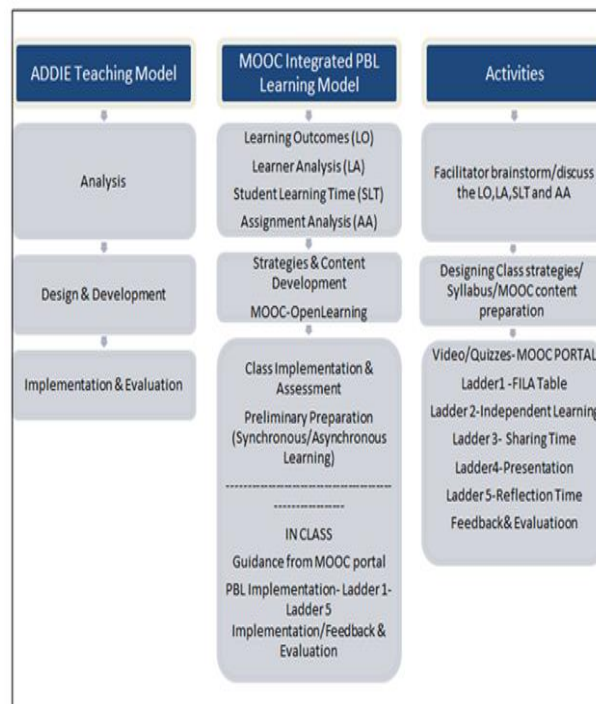
The development process of MIPBL (Jano, 2017) framework includes several phases and corresponding activities. Figure 1 highlight the framework.

Basing on Addie Teaching Model, the first phase comprises the analyses for Learning outcomes (LO), learner Analysis (LA), Student Learning Time SLT), Assignment Analysis (AA) where the activities consist of Facilitators brainstorm and detail the overview of LO,LA,SLT and AA. Next, Design and Development consist of Strategies and Content Development blended with the MOOC learning where activities reflect the designing of class strategies, syllabus, MOOC content preparation. The final phase covers the Implementation and Evaluation which include the preparation for Synchronous/ Asynchronous Learning and corresponding activities like video/quizzes-MOOC Portal, PBL implementation in classroom. Feedback and Evaluation are devised for each ongoing activity.

Figure 1: Learning Model for MOOC integrated PBL (MIPBL)

2. METHODOLOGY

2.1 Method

A mixed method approach was used namely quantitative approach through an experimental approach (Implementation of MIPBL) and a survey (questionnaires) as well as qualitative one (semi-structured interview) where students perceive their learning experience through MOOC integrated PBL framework. [4] Flynn (2005) stated that qualitative data yield the richness and validity of gathered data.

2.2 Samples

There were 7 PBL groups in this cohort of these engineering technologists. The samples were chosen through purposive sampling (3rd year students of Engineering Technology Faculty. 237 students participated in this study.

2.3 Procedure

The study employed a mixed method approach using action research, questionnaire and semi-structured interview The data were collected through the action research or implementation of MIPBL to the cohorts. Facilitators employed MIPBL in these PBL groups. Research site: Faculty of Engineering Technology.

2.4 Data collection

Research instruments used were questionnaire and semi-structured interview questions focused on the students' experience in using the MIPBL and their insights on the responses given in the questionnaires. The questionnaire data were analysed using descriptive statistics and the results are supported with insights obtained from the interview sessions.

3. RESULTS

3.1 Action Research

The development process of MIPBL (Jano, 2017) framework includes several phases and corresponding activities. The students comprised equal gender, ethnicity, state of origin, and academic status. A minimum of 8-10 hours were allocated for self-directed-learning (SDL) activities between Monday and Friday. In addition, between the PBL sessions, the students are provided with notes to scaffold the PBL curriculum. The PBL is mainly on the Green Innovation. Initially, the students underwent a preliminary PBL workshop where they were given an exposure to the PBL concept, the students' roles and responsibility of in PBL, the roles and responsibility of the facilitators in PBL and the Faculty's expectations. The students are also exposed to a simulated PBL followed by a MOOC presentation of the implementation of PBL for the course.

3.2 Survey via questionnaires

The findings yielded positive outcomes in terms of collaborative skills, engagement, motivation, higher order thinking and problem solving skills. Table 1 indicates the mean and standard deviation of each construct.

Table 1: The score of constructs

Construct	Mean	Std Deviation
Collaborative skills	4.09	.734
Engagement	4.01	.707
Higher order thinking	4.04	.772
Problem	4.06	.768

The result as a whole was relatively high (M > 4.0).

3.3 Qualitative data from the interview

The interview sessions with the respondents indicated that the students found the use of MIPBL was worthwhile because it generates all the skills namely collaborative skills, engagement, motivation, higher order thinking and problem solving skills. Some excerpts are as follows:

R1: MIPBL triggers group discussion among the member so we can discuss how to solve the problems;

R2: It makes us more engaged in the activities. We can retain information longer through pictures and audio; R3: It was not easy to use the technology due to unfamiliarity in the initial stage;

R4: Some of the technologies were hard to use at first but I got the hang of it, its ok.

R5: The server was slow.

4. SUMMARY

MIPBL is an effective teaching-learning tool. The findings yielded positive outcomes in terms of students' collaborative skills, engagement and motivation, higher order thinking and problem solving skills. This study has revealed the positive influence of MIPBL tool. MIPBL can certainly help pave the path for active learning to take place where the acquisition of knowledge can be made more meaningful for students.

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THE PERSPECTIVES OF PHILOSOPHY OF SCIENCE AND TECHNOLOGY ON THE RELATIONSHIP BETWEEN ERGONOMICS LABORATORY AND STRESS

Norunnajjah A.[1,2,*], Hafzan A. [1,2*], Noridah A. [1,2*]

[1] Pusat Bahasa dan Pembangunan Insan, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2] Research Group SICOMM, C-TeD, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Corresponding e-mail: najjah@utem.edu.my

ABSTRACT – *The purpose of this study is to look at the perspectives of the philosophy of science and technology of the impact of engineering ergonomic laboratory on stress among students' state of mind in a systematic way. A total of 102 respondents from Universiti Teknikal Malaysia Melaka (UTeM) had been selected for this study. Meanwhile, the selected manufacturing laboratories for this study are of three varieties of areas such as fabrication, robotics and graphic engineering lab. The statistical test for relationship was conducted using a Pearson correlation. As a result, the study shows that there is a significant relationship between ergonomic laboratory and stress among students.*

1. INTRODUCTION

High demand for products in the manufacturing industry had driven the human workers to work faster and adapt to their un-ergonomically designed workstation. Some tasks at assembly workstations require human workers to stand for a prolonged period of time to assemble the products. The impact of long working hours on health has been of major concern since the late 19th century. Also, with the combination of other adverse aspects of work organization such as irregular working hours and intense performance demands are strongly associated with fatigue, stress, decrements in performance, adverse health behaviours, and both acute and chronic physical disorders. Improved methodologies are needed to track the exposure to long working hours and irregular shifts longitudinally. Meanwhile, the Islamic philosophy of science and technology look at ergonomic as a significant issue because in Islam, "Divine" Ergonomic is represented by Allah, the Supreme Engineer.

Ergonomics is a science that addresses human performance factors (human engineering) and how they relate to the job, the workplace, tools, and the environment. Meanwhile, the applied ergonomics aims at ergonomists and all those who are interested in applying ergonomics/human factors in the

design, planning and management of technical and social systems at work or leisure. In other word, ergonomics is putting "people first." The word 'ergonomics' derives from the Greek ergon' (work) and 'nomos' (laws) to denote the science of work; ergonomics is a systems-oriented discipline which now extends across all aspects of human activity [1].

This concept of health helps us understand the relationship of causes and effects that is triggered when the issue of stress is due to psycho-physiological changes, which result from the individual's confrontation with a situation that somehow confusing, annoying and threatening. In short, ergonomics is known as comfort design, functional design, and user-friendly systems, and the practice of designing products, systems or processes to take proper account of the interaction between them and the people who use them. And Islam does not look at ergonomic issue differently because His Names designate the ergonomic concept in His creations, such as *As-Salaam* (Flawless), *Al-Bari* (Harmony), *Al-Musawwir* (Fashioner), *Al-'Adl* (The Just) and *Al-Muhsin* (The Beneficent).

There are two important things in ergonomic; firstly, is the ergonomic awareness and secondly, is the application of ergonomics that should be practical. Research has shown that ergonomics is most effective when it is approached as a participatory process of management and employees working together to adapt job tasks, including equipment, tools, environment, and methods [2]. Meanwhile, there is a study conducted on the ergonomic awareness among workers performing Manual Material Handling (MMH) activities. The evaluation of ergonomic awareness on MMH amongst workers in the research area shows that they possess a moderate ergonomic awareness level [3]. Then, there is an increasing weight placed internationally on participatory action-oriented methods in improving ergonomic aspects of work and preventing stress at work. The merits of these participatory methods are widely recognized as means of promoting the initiative of workers and managers applying workable solutions in diversifying work settings. The result of study concludes that the reviewed participatory methods used in both workplace improvement and stress prevention programs confirm the importance of building on local good practices in response to increasingly diversifying ergonomics-related and psychosocial needs [4].

However, on the issue of stress, it relates to human cognition and psychology. It stresses that ergonomics has established a fruitful dialogue with psychology, and with cognitive science, in general [5]. It is supported by two groups of researchers who suggested that ergonomics should integrate the physical and the cognitive dimensions [6] [7]. Another research done had studied the ergonomic workstation factors, in order to explain the work stress outcomes and then found out that when workstations are ergonomically designed, it help the organizations to minimize work stress impacts [8]. This is supported by other research whose experimental study was to investigate the effects of product assembly on operators' performance. Workstations for assembly tasks should be designed so that they are adjustable to operators' comfort in order for them to relieve stress and improve performance [9].

More studies show that women are endangered by insensitivity of ergonomic problem. A study found out that more women get Musculoskeletal Disorders (MSDs) than men. This higher rate is due to job and physical differences between men and women. Thus, ergonomics is significant to increase the comfort and the productivity of the female workers and at the same time avoiding stress due to MSDs [10]. Meanwhile, a study which focus on university students has emphasizes that there is a relationship between stress and learning qualities among university students. Stress can be triggered by challenges that arise in the new stage of a student's life, as well as the demands in the campus, the gruelling routine and that includes the adaptation to the university environment, thereby raising,

physiological symptoms like flu, gastrointestinal disorders, headache, hypertension, as well as psychological anxiety, pessimism, fatigue and others[11].

School children also have ergonomic issues and a study investigated the effects of postural discomfort on school children due to heavy school backpack. The results indicate that the prevalence of postural complaints among school children is considerably high [12]. Another research has evaluated the ergonomic deficiencies in Nigerian workstations. The results of the investigation showed that chair height, chair arm/ back, temperature and desk height returned high error of 72%, 66%, 47% and 46% respectively, indicate poor furniture and uncontrolled temperature in the workstations, an indication that majority of employers in this part of the world do not bother with workers' welfare in terms of working facilities provided for them. Instead, employers are more concern about profit margins [13].

In order to find a flexible solution for these complex problems of society, one study tried to find the knowledge gaps and research challenges in the contemporary ergonomics. It is found that ergonomics has significantly contributed to the design improvements for all kinds of systems with people, work systems, and product/service systems and will continue to demonstrate its value more successfully to the industry stakeholders. In the first conclusion, the paper hypothesizes that, there is a complex relationship between ergonomics and stress which significantly affects the learning quality of student at laboratory [14].

Ergonomic is not an alien field in Islam. Actually, Islam stresses on the importance of ergonomic in human life and Allah even has shown it in His creations. Then, it is important to see the Islamic philosophy of science and technology's perspective on ergonomics and stress by identifying the suitable Names of Allah, as described by many Islamic scholars who believe that these manifestations of Names of Allah should be applied as follows: Firstly, *As-Salaam* (Flawless) is this state of being free of all faults, errors, danger and trouble. Then Muslim engineers must seek Allah's aid and support in their works in developing technology from fault, error or bring danger and trouble to others; either endangers himself, other mankind or the universe. Secondly, is *Al- Bari* (Harmony) and He is The One who orders His creation with perfect harmony and therefore, the servants of Allah must be harmoniously beneficent.

Thirdly, is *Al-Musawwir* (Fashioner) and Allah is the Perfect Artist who gives everything its most unique and beautiful forms. Thus, the servants of Allah must make things beautifully, manifest in all that Allah has created, because no beauty is possible in opposition to the beauty created by Allah or other than it. The next Name of Allah is, *Al-'Adl* (The Just) wherein He is the Absolute Justice. Justice is the opposite of tyranny. Tyranny causes pain, destruction and disturbance. Justice secures peace, balance and order and harmony. In short, ergonomic things fulfil the idea of 'just' because it fits people physically, emotionally and cognitively. Lastly is the name of Allah *Al-Muhsin* (The Benevolent) wherein, Allah is the possession of all quantitative knowledge. A good servant who is aware of this attribute would ponder over things he intends to do, whether they are right or wrong [15] [16][17][18].

This study concentrates on a variable namely; ergonomics and its correlation with an associate factor which is stress. This study is related to The Occupational Safety and Health Act 1994 that aims to secure the safety, health and welfare of person at work, to protect others against safety or health risks in connection with the activities of persons at work, and to promote an occupational environment for persons at work, which is adapted to their physiological and psychological needs. The main objective of the study is to examine ergonomics and its relation to stress. Specifically this article is written to

determine the relationship between ergonomics and stress. In that case the hypothesis as follows: The combination of ergonomic factors has a significant effect on stress at work.

2. METHODOLOGY

The study is located at Universiti Teknikal Malaysia Melaka. Three manufacturing labs were selected for this study and they are fabrication, robotics and graphic engineering labs. The sample utilized in the present study is obtained through a proportionate stratified random sampling method. Engineering manufacturing students were selected for this research. Data for the present study was collected via questionnaire distributions. The questionnaires were developed based upon an extant research related to ergonomics and work stress. The items use a 5-point Likert scale, ranging from (1) strictly disagree to (5) strictly agree. The questionnaire consisted of positive and negative statements, with the negative statements being recoded accordingly.

3. RESULT AND DISCUSSION

Descriptive results have focused on these two variables namely ergonomic and stress in laboratory work. The respondents' profile is illustrated as in Table 1. The respondents of this study consisted of engineering faculty students from UTeM. Initially, a total of 102 students were systematically selected. It shows the distribution of demographics profile of respondents. Demographical analysis shows that out of sample of 150. Based on demographics analysis, the personal details are classified as gender, year of study and type of laboratory they studied in. Based on the results, the majority of the respondents are males students which consist of 54% or 55 respondents, while the minority respondent are female which consist of 46% or 47 respondents. Respondent are first year students with value 42% as a majority of the overall 102 respondents in this result. This followed by 36% of respondents (37 respondents) among third year students. Lastly, 22% of respondent (22 respondents) are second year students. Whereas, the number of students according to the selected laboratory observed that 42% respondent or 43 students are from fabrication laboratory. Meanwhile 37% respondent or 38 students are from robotic laboratory and lastly 22% or 21 students are from engineering graphic laboratory. The correlation between laboratory ergonomic and stress were tested.

Variable	N	%
Sex		
Male	55	53.9%
Female	47	46.1%
Laboratory		
Fabrication	43	42.2%
Robotic	38	36.3%
Engineering graphic	21	21.6%
Years of study		
Year 1	43	42.2%
Year 2	22	21.6%
Year 3	37	36.3%

Table 1 Distribution of respondents' profile   (n= 102)

Note: SD = Standard Deviation

Meanwhile, Table 2 shows the relationship between the studied variables. The findings indicate that there is a significant relationship between laboratory ergonomics and stress. Correlation coefficient ranges between .50 to 1. Overall Correlation coefficient indicates medium to large relationship is based on to Cohen Hoberman Inventory of Physical Symptoms (CHIPS) and widely used by most researchers [19]. The findings support H1 and show that the human variable health and body postures has a significant relationship with workplace stress outcomes

Correlation is a technique which measures the strength of association between two variables the results show there is positive correlation among the variables of study. Correlation is significant at 0.01 levels (2 tailed). Thus, there is a strong relationship between ergonomic slackness and stress problem among students.

This significant relationship supports one study. The ergonomic workstation reveals that 38.4% of the changes in workplace stress outcomes are due to the relationship between stress and ergonomic factors, which include human; machine; work area; and environmental factors. Among the four major components, only human ($\beta = 0.459$) and environment ($\beta = 0.287$) factors are significantly related to stress, while machine and work areas are not significantly related to workplace stress outcomes [20].

Ergonomics → Relationship → Stress .548**(.00)
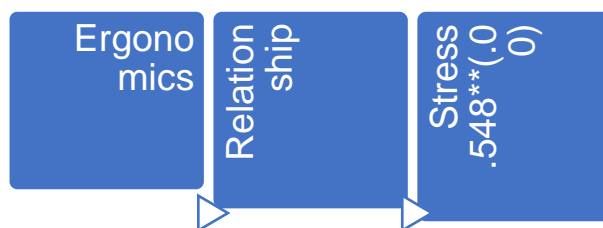
Table 2: Relationship between ergonomic and stress

4. CONCLUSION

According to NIOSH book of guideline On Occupational Safety and Health, the working posture and task should be designed to avoid strain and damage to any part of the body such as the tendons, muscles, ligaments, and especially the back. The workers also should be able to maintain an upright and forward facing posture. The work should be arranged so that it may be done either in seated or standing positions [21]. According to the Islamic perspective, if a man follows the guidance given in the foundation of Islamic philosophy on science and technology, then there will be no issue of ergonomic factors or stress problems [22]. However, since man is not perfect that those aspects are unavoidable, minimum impact is still possible.

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BEV-K

(BUSINESS ENGLISH VOCABULARY USING KAHOOT!)

Mohd Juraimi O., Mohd Baharim M.[2] ,Muhammad Luqman I. H.[3], Nik Ahmad Kamal Juhari N.H.[4], Tengku Mohd Farid T. A.l A.[5], Nurul Iman A.B.[6]

[1] Jabatan Pangajian Umum, Kolej Poly Tech MARA Kuantan,

Jalan Gambang, 25150 Kuantan, Pahang

[2,3,4,5] Akademi Pengajian Bahasa, Universiti Teknologi MARA Kelantan,

Bukit Ilmu, 18500 Machang, Kelantan

[6] Centre for Language Studies and Generic Development, Universiti Malaysia Kelantan,

16300 Bachok, Kelantan

[*]Corresponding e-mail: juraimi@gapps.kptm.edu.my

ABSTRACT

The use of technology is making a big wave in many areas of pedagogy. The application of technology has created a positive impact in language teaching and learning. As such, this study experimented with an application called Kahoot! to present an interactive learning platform for studying English language terminology for business purposes. The findings showed that Business English Vocabulary Using Kahoot! (BEV-K) stimulates students' focus and is effective in teaching and learning business English terminology. It can be concluded that the use of this application increased students' motivation and is highly recommended as a pedagogical tool to promote an effective and fun learning environment

Keywords: e-learning, online learning, ESL, business English, Kahoot

1. INTRODUCTION

Various fields of studies have adapted technology in facilitating the delivery of course content; enhancing students' understanding, providing real-time interaction with instructors irrespective of time and place and enabling learners to learn at their own pace. Previous studies embarked in developing blended learning tools to assist students in learning Business English terminology [1,3]. Nursyuhada'Ab Wahab and Yunus [2] looked into various online platforms used by students in their blended learning for their English for Specific Purpose (ESP) course. Nevertheless, this study zooms into the usage of the specific platform known as *Kahoot!* to encourage undergraduates to learn English language terminology for business purposes.

Kahoot! is a game-based student response system (GSRS) launched by the instructor in a web-browser on a laptop connected to a large screen. *Kahoot!* provides a tool for creating quizzes including adding pictures and YouTube videos to the questions. It also makes it possible to publish and share your own quizzes, and edit quizzes made by others.

When playing *Kahoot!*, the students log into the system using a gamepin (a number) and a nickname. The goal for the students is to answer the correct answer as fast as possible to get as many points as possible. Figure 1 shows how *Kahoot!* is played. A question is shown on the large screen along with four or less alternative answers shown in different colors with associated graphical symbols. The students give their answers by choosing the color and symbol she or he believes corresponds to the correct answer.

Figure 1: *Kahoot!* instructor and user interface

2. METHODOLOGY

In this study, the ADDIE Model (Analyse, Design, Develop, Implement, Evaluate Instructional Design) was applied to develop the content of BEV-K.

ANALYSE- A needs analysis was conducted among 150 business students namely from two campuses, UiTM Kelantan and Kolej Poly Tech MARA Kuantan. From the need analysis, it was found that students have difficulty in comprehending business terminologies in the subject related to their business courses.

DESIGN- The research team designed the content related to business terminologies and decided to use the *Kahoot!* platform to facilitate students' learning

IMPLEMENTATION – The learning platform Business English Vocabulary Using *Kahoot!* (BEV-K was implemented to the targeted group namely 200 users from both UiTM Kelantan and Kolej PolyTech MARA Kuantan.

EVALUATION – The feedback from instructors and users of BEV-K were gathered as part of the evaluation process.

3. RESULTS & DISCUSSION

The study found that most students (78.5 %) deemed *Kahoot!* as a fun learning tool. This is due to the nature of the game itself which promotes students to actively be involved in answering questions. It has also boosted confidence in students to participate especially among those who are less active and are shy in class. It was found that the respondents believe they can learn and understand business terminologies easily by participating in games like *Kahoot!* In addition, 82.3% of the respondents concluded that difficult terminologies can easily be understood as they are learnt while playing games and 75.5% perceived to have positive feelings about using this application as it is a stress free way to learn.

Due to the high percentage of positive feelings towards the application, 85.5% of the students responded that they highly recommend this application to be used in the next lessons.

Based on the findings, the researchers believe that this application has high potential to be applied not only in learning business terminologies but also in other lessons and subjects.

The findings proved that the use of this application is a novelty that can be applied by the instructors in teaching the English language. Indeed, BEV-K stimulates students' focus and is effective in teaching and learning business English terminologies.

The use of games and quizzes makes learning fun and creates healthy competition among the students. This application is used and applied in Universiti Teknologi MARA (UiTM) Kelantan and Kolej PolyTech MARA , Kuantan as a part of teaching and learning business English terminologies, hence may be applied in local institutions with the same context.

4. CONCLUSION

It can be concluded that the use of this application has increased students' motivation and is highly recommended as a pedagogical tool to assist teahing Business English terminologies in an effective and fun learning environment.

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MOTIVATIONAL FACTORS AFFECTING ENTREPRENEURIAL INTENTION AMONG UTeM ENGINEERING STUDENTS

H.Musa[1,2], A.R.Abdullah[3] , M.Sedek[2] , A.K.Abdul Hamid[4]

[1] Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka

[2] Center for Technopreneurship Development, Universiti Teknikal Malaysia Melaka

[3] Centre of Excellence in Robotic and Industrial Automation, Universiti Teknikal Malaysia Melaka

[4] Must Read Sdn Bhd, Batu Caves Selangor

[*]Corresponding e-mail: haslindamusa@utem.edu.my

ABSTRACT

Engineering student's willingness to engage in entrepreneurship may be affected by many different factors. Entrepreneurship intention is found to determine student's willingness to engage into entrepreneurial behavior in the future. The main objective of this work is identifying the relationship of internal and external motivational factors towards entrepreneurship intentions among the engineering students at the university. This study only focused on the internal motivation factors, with three (3) main factors which are the need for achievement, the need for affiliation and the need for power. Whereas, the external motivation factors only focused on the other three (3) main factors include the entrepreneurial role models, the family background, and the entrepreneurship education. The data were collected among University Teknikal Malaysia Melaka (UTeM) engineering students, both in the main campus and in the industrial campus.

Keywords: Entrepreneurship; entrepreneurship intention; engineering students

1. INTRODUCTION

Entrepreneurship has become one of the trend that is growing rapidly in Malaysia and overseas. Entrepreneurship is important and has been widely acknowledge as a contributor to job creation, innovation and economic development to the nations [1]. These days, entrepreneurship has widely impact and attract many young people especially among students of higher learning institutes (IPT) to engage in entrepreneurship, eespecially with the introduction of online business includes websites and information technology [2]. This is because the entrepreneurial programme held at universities were able to attract and increase students acceptance about entrepreneurship.

Students intention towards entrepreneurship has become an interesting topic. Many past studies have been conducted to investigated the motivations to become self – employed and to find out what is it about certain people especially young entrepreneurs that drives them to take on the risk, the uncertainty and the independent structure of business ownership. In the findings by Rae & Melton [3], the study explores entrepreneurial attributes among the students in the United States of America (USA). Their mission were to established the mindset in creating graduates with personal, economic

and societal value, which also supported by Musa et at [4] whose studied the case of entrepreneurisal education through understanding the students emotional intelligence and stress.

2. RESEARCH OBJECTIVES

The research objectives for this study are as follows:

1. To examine the internal motivational factors towards the intention to become entrepreneurs among UTeM engineering students.

2. To examine the external motivational factors towards the intention to become entrepreneurs among UTeM engineering students.

3. To determine the relationship between the internal and external motivational factors and intention to become entrepreneurs among UTeM engineering students.

3. RESEARCH METHODOLOGY

In this chapter, the researcher, explained the research method that will be used to carry out the study.

3.1 Research Model
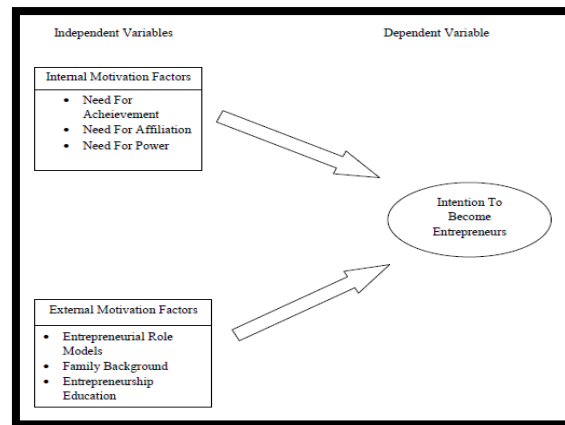
Figure 1: Resaerch Model

3.2 Hypothesis

In order to check the relationship between the independent and dependent variables, six (6) hypotheseses were developed.

Hypothesis 1

H0 : There is no significant relationship between the entrepreneurial role model and the intention to become entrepreneur.

H1 : There is a significant relationship between the entrepreneurial role model and the intention to become entrepreneur.

Hypothesis 2

H0 : There is no significant relationship between family background and the intention to become entrepreneur.

H1 : There is a significant relationship between the family background and the intention to become entrepreneur.

Hypothesis 3

H0 : There is no significant relationship between entrepreneurship education and the intention to become entrepreneur.

H1 : There is a significant relationship between the entrepreneurship education and the intention to become entrepreneur.

Hypothesis 4

H0 : There is no significant relationship between the need for achievement and the intention to become entrepreneur.

H1 : There is a significant relationship between the need for achievement and the intention to become entrepreneur.

Hypothesis 5

H0 : There is no significant relationship between the need for affiliation and the intention to become entrepreneur.

H1 : There is a significant relationship between the need for affiliation and the intention to become entrepreneur.

Hypothesis 6

H0 : There is no significant relationship between the need for power and the intention to become entrepreneur.

H1 : There is a significant relationship between the need for power and the intention to become entrepreneur.

3.3 Research Design (Descriptive Method)

This research used descriptive data analysis as the research design which the researcher done more of the description and explanation on the topic of the motivation factors affecting entrepreneurial intention among UTeM engineering students.

3.4 Methodological Choice

To achieve the research objective and research problem the researcher have conducted quantitative research method. Quantitative research examines the relationships between variables from the theoretical framework, which are measured numerically and analyzed using a range of statistical techniques.

4. DATA ANALYSIS

The questionnaires have been distributed to 150 respondents consisting of 30 respondents for each of five (5) engineering faculties at UTeM. The 5 engineering faculties consists of Faculty of Mechanical, engineering Technology, Manufacturing, Electrical, and Electronics. To get the results of reliability analysis, every respondent answers in questionnaire were determined by using descriptive analysis and followed by the scale measurements. Moreover, Pearson's correlation analysis and multiple regression analysis were also used. Based on the results, the majority of the respondent were male which consists of 53.3% of the sample size. And age between 23 – 27 years old represented the largest age group consists of 62%. Results showed that 37.3% out of 150 respondents have a family own business while 62.7% showed respondents who do not own family business. Descriptive statistic used to determine of independent variables that is entrepreneurial role models, family background, entrepreneurship education, need for achievement, need for affiliation, and need for power show on the table on the number of mean and standard deviation.

4.1 Reliability

Table 1: Reliability Statistics Reliability Statistics

Cronbach's Alpha	N of Items
.952	34

Cronbach's Alpha was used to examine the reliability of the 34 items it used to measure the seven constructs. Based on the result, the Cronbach's Alpha is excellent and showed its value of 0.952.

4.2 Pearson Correlation Analysis

Table 2: Correlation (DV is Y)

	Y	X1	X2	X3
Y Pearson Correlation	1	.997**	.966**	.977**
Sig. (2-tailed)		.000	.000	.000
N	150	150	150	150
X1 Pearson Correlation	.977**	1	.975**	.988**
Sig. (2-tailed)	.000		.000	.000
N	150		150	150
X2 Pearson Correlation	.966**	.975**	1	.964**
Sig. (2-tailed)	.000	.000		.000
N	150	150	150	150
X3 Pearson Correlation	.977**	.988**	.964**	1
Sig. (2-tailed)	.000	.000	.000	
N	150	150	150	150

**.Correlation is significant at the 0.05 level (2-tailed).

	Y	X4	X5	X6
Y Pearson Correlation	1	.975**	.974**	.962**
Sig. (2-tailed)		.000	.000	.000
N	150	150	150	150
X4 Pearson Correlation	.975**	1	.985**	.971**
Sig. (2-tailed)	.000		.000	.000
N	150		150	150
X5 Pearson Correlation	.974**	.985**	1	.970**
Sig. (2-tailed)	.000	.000		.000
N	150	150	150	150
X6 Pearson Correlation	.962**	.971**	.970**	1
Sig. (2-tailed)	.000	.000	.000	
N	150	150	150	150

**. Correlation is significant at the 0.05 level (2-tailed).

Pearson Correlation Coefficient is used to measure the validity of the data relationship between set of two variables. There is a very strong relationship between entrepreneurial role model and the intention to become entrepreneur among UTeM final year engineering students. The value of the coefficient correlation is 0.997. Next, there is a very strong relationship between family background and the intention to become entrepreneur among UTeM final year engineering students. The value of the coefficient correlation is 0.966. Furthermore, a very strong relationship between entrepreneurship education and the intention to become entrepreneur among UTeM final year engineering students. The value of the coefficient correlation is 0.977. Moreover, very strong relationship between need for achievement and the intention to become entrepreneur. The value of the coefficient correlation is 0.975. Besides that, there is a very strong relationship between need for affiliation and the intention to become entrepreneur. The value of the coefficient correlation is 0.974. Last but not least, there is a very strong relationship between need for power and the intention to become entrepreneur among UTeM final year engineering students. The value of the coefficient correlation is 0.962.

4.3 Multiple Regression

Table 3: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.983[a]	.965	.964	.19057

a. Predictors: (Constant), Entrepreneurial Role Model, Family Background, Entrepreneurship Education, Need For Achievement, Need For Affiliation, Need For Power.

Table 4: ANOVA

ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	145.254	6	24.209	666.613	.000b
	Residual	5.193	143	.036		
	Total	150.447	149			

a. Dependent Variable: INTENTION

b. Predictors: (Constant), NEED.FOR.POWER, FAMILY.BACKGROUND, ENTREPRENEURSHIP.EDUCATION, NEED.FOR.AFFILIATION, ENTREPRENEURIAL.ROLE.MODEL, NEED.FOR.ACHIEVEMENT

Table 5: Coefficients

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.099	.043		2.320	.022
	ENTREPRENEURIAL.ROLE.MODEL	.248	.111	.247	2.240	.027
	FAMILY.BACKGROUND	.245	.065	.246	3.756	.000
	ENTREPRENEURSHIP.EDUCATION	.460	.134	.463	3.436	.001
	NEED.FOR.ACHIEVEMENT	-.149	.142	-.150	-1.049	.296
	NEED.FOR.AFFILIATION	-.004	.095	-.004	-.042	.967
	NEED.FOR.POWER	.191	.071	.193	2.698	.008

a. Dependent Variable : Intention To Become Entrepreneur

Analysis of Multiple Regression Analysis (MRA), R is 0.983 shows excellent relationship. This is means that the respondent is good on the intention to become entrepreneur among UTeM engineering students. Furthermore, the positive sign of R implies a positive relationship. Only 96.5% of the variable affect in the intention to become entrepreneur. While the other 3.5% is contribute to the other independent variables which not discuss in this research. From ANOVA table, shows significance level of the Multiple Regression Analysis (MRA) test is below than P = 0.05 which is a 5% level of confident in the result. Based on Coefficient Table above, it shows the relationship between variables and the significant of each of independent variables that affect the intention to become entrepreneur. It can be analyse with P < 0.05 the coeffiecient are significant. The first factor, entrepreneurial role models is significant to the intention to become entrepreneur as its value 0.027, below than 0.05. The second factor which is family background is significant with value 0.000, below than 0.05. Third factor which is entrepreneurship education is significant with value 0.001, below than 0.05. Fourth factor which is need for achievement is insignificant to the intention to become entrepreneur with value 0.296, more than 0.05. Fifth factor which is need for affiliation is also insignificant with value 0.967.Lastly, the last factor which is need for power is significant with value 0.008 , below than 0.05.

5. DISCUSSION AND RECOMMENDATION

5.1 Conclusion

This research is about the motivation factors affecting entrepreneurial intention among UTeM engineering students. The finding shows that there is a significant relationship between the intention to become entrepreneur (dependent variable) and external and internal motivation factors (independent variables). But, there is two factors that is not significant which are the need for achievement and the need for affiliation that has no effect with the intention to become entrepreneur among UTeM final year engineering students.

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ENHANCING STUDENTS LEARNING USING WHATSAPP APPLICATION IN CLASSROOM ACTIVITIES: A CASE STUDY IN A TECHNICAL COURSE AT UNIVERSITI TEKNIKAL MALAYSIA MELAKA (UTEM)

Jariah M. J.[2,*], Siti Nurul Mahfuzah M.[3], Zulkifli M.R.[4], Muliati S.[2] and Faaizah S.[2]

[1] Fakulti Kejuruteraan Pembuatan , Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[2] Centre for Academics Excellence and Scholarship (CAES), Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[3] Fakulti Teknologi Maklumat dan Komunikasi, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya,76100 Durian Tunggal, Melaka, Malaysia

[4] Fakulti Teknologi Kejuruteraan Mekanikal dan Pembuatan, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya,76100 Durian Tunggal, Melaka, Malaysia

*Corresponding e-mail: jariah@utem.edu.my

Keywords: Whatsapp; enhance, classroom activities;

ABSTRACT

The objective of this study to find out the effectiveness of using WhatsApp in classroom activities to enhance students learning in a technical course (Manufacturing Sustainability) of a Manufacturing Engineering Degree at Universiti Teknikal Malaysia Melaka (UTeM). This is in contrast to the common utilization of whatsapp in learning which is usually involved with communication outside the classroom. The utilization of whatapps in class activities as a learning platform is designed by the lecturer/facilitator to take advantage on its ease and flexibility in participation and personalized learning gadget (students' own smartphone). This is also to overcome the major drawbacks of using whatsapp out of classroom which is commonly related to lack of 'facilitator/expert review' on the content matter of the discussion, opinions and articles posted on the social media. Students' perspective are analysed through questionnaire participation. The questionnaire involved four dimension of learning and teaching that are teaching method; evaluation of learning methods, guidance and supervision as well as equipment and technical. Findings from the questionnaire analyses shows that students had agreed that using Whatsapp in classroom activities is beneficial due to its quick and easy distribution of learning materials (learning resources and discussion output). Moreover equipment and technical factors also contributed to the effectiveness which are; it is easy to download, operate, easy to access whatapps at students' own mobile phone and it is inexpensive to utilize whatapps compared to other learning app/gadget/social media platform. However, students also agreed that lecturer/facilitators' creativity and innovative way in designing learning activities using whatapps application is recommended for the utilization of this social media as a learning and teaching platform.

1. INTRODUCTION

WhatsApp is one of popular social media tools that can be used for teaching and learning purpose. In other word, WhatsApp can be seen as a social network services and has been used as a platform for higher education institutions (Yin, 2016). For learning purpose, WhatsApp allows user to send text messages, attached images, audio files, video files, and links to related resources. User can add 256 contacts in a group which is the creator of the group act as an administrator and have privilege to remove members without need the approval from the group members.

Align with 21st century educational tools, Mishew and Anderson (2015) highlighted that through WhatsApp, learners can share knowledge, information, materials and opinions. Through this technology also will benefit to enhance learning engagement, improve critical skills and positively influence discussions among students in group. In other related works, Mashru and Ami (2015) used WhasApp to improve vocabulary which is learners could use additional resources like website links related to vocabulary enrichment. Gon and Alka (2017) and Cetinkaya (2017) looked at advantages of challenges using WhatsApp as shown in Table 1.

Table 1: Advantages and Challenges using WhatsApp

ASPECTS	ADVANTAGES	CHALLENGES
TECHNICAL	- Simple to Use - Free of charge - Easily available and downloadable - Privacy - Fast communication	- No smartphone - Message flooding - Time consuming - Group Maintenance - Eye strain - Mobile internet quota - Battery life - Memory capacity
EDUCATIONAL	- Conducive environment - Sense of belonging to the group - Sharing learning content - Interaction with instructor - Contribution to student-student communication - Peer support - Naturality and comfort in self-expression	- High expectation of instructor availability - Huge amount of learning materials makes it confusing - Use of inappropriate language - Difficulty in editing the post - Leaving the group
INSTRUCTIONAL	- Easy accessibility to learning material - Instructor available - Learning anytime anywhere - Provide secure environment - Organizing academic activities - Learning unwittingly	- No efforts by some student - Some students share material to impress instructor without actually learning about it - Shift in perception/lost concentration - Deletion of the messages

Few researchers had mentioned that learning via WhatsApp application can improve student achievement and motivation of preparation with a groups (Mashru & Ami, 2015; Sayan, 2016). The advantages of using whatsaspp include facilitator's availability dand learning anytime. However, there are still limitation on using WhatsApp which is usually related to information are overload, students without WhatsApp felt isolated and social pressure due to the public nature of the app and other technical disadvantages for example time consuming and eye strain (Rosenberg & Christa, 2018). Pooja et al (2017) also stressed that WhatsApp consumes much of time of students, make students lost their concentration as well as causes distractions with the home assignments.

Based on the numerous pros and cons related to Whatsapp use in teaching and communication; this case study is conducted in order to analyze the effectiveness of Whatsapp application in classroom to enhance learning during face to face learning session. This is in contrast to the common utilization of whatsapp in learning which is usually involved with communication outside the lecture session. The utilization of whatapps in class activities as a learning platform is designed by the lecturer/facilitator to take advantage on its ease and flexibility in participation, personalized learning gadget (students' own smartphone) thus makes it is expected to be highly acceptable and interesting to the students. This is also to overcome the major drawbacks of using whatsapp out of the face to face lecture slot which is commonly related to lack of 'peer review', of the opinions and articles posted on social media (Rateesh, sareen).

2. METHODOLOGY

2.1. In Class Students' Activity

A whatsapp group is created and administered by the lecturer of the course i.e. Manufacturing Sustainability. In general, one class section of this course consists 50-70 students. The delivery of this course is using student centered learning approach. Besides lecturing, learning activities involved group discussion, presentation and tutorials in class. Mostly, students works in a group of 5-6 person and appointed their own group leader. To enhance learning particularly in facilitating the class activities through active participation, instant feedback and personalized learning; whatsapp application is utilized as a platform for the student centered learning activities in class. As such, a main whatsapp group is created and administered by the courses' lecturer; and each leader of the students' group is made as this whatsapp group members. The leader of each group is also a registered member of the students' whatsapp group (according to their respective section); that is always created by the students themselves and administered by the students' representative. Using this setup, for a 2 hour learning session, a class session usually start with a lecturer sharing the main content using a slide presentation for the first 30minutes. The lecturer then distribute the main topic for student discussion with an identified outcome for example a mind map to be presented at the end of 30 minutes. The produced discussion product (e.g. a mind map) was then shared by each leader to the whatsapps group administered by the lecturer and as well to the sections' whatsapp group managed by the students' representative. Using this way of sharing, the discussion is more organized and personalized as each students' had access to the learning materials under discussion without the needs to enroll to two different whatsapps group (except for the group leaders). Moreover, the feedback on outcome of discussion is available to be shared instantly and further discussion on the contents provided is available to be conducted while students' are referring to it on their own gadget.

2.2. Data Collection

Data collection was carried out using analytical descriptive method by distributing questionnaire to sixty (60) participants (students of Manufacturing Sustainability course), who are in their final year study of Bachelor of Manufacturing Engineering with Honours at Universiti Teknikal Malaysia Melaka The questionnaire consists of 16 questions which is group into 4 four dimension; which are teaching methodology; evaluation of learning methods, guidance and supervision and equipment and technical. Participants response are using likert scale (1 strong disagree -5 strongly agree).

Table 1: The use of WhatsApp application in Class to Enhance Students' Learning Questionnaire

NO.	DIMENSION	CIRCLE				
		KAEDAH PENGAJARAN				
		TEACHING METHODS				
1	Is this your first learning experience using whatsapp in class activities in achieving the learning outcome.	1	2	3	4	5
2.	It is an interesting learning platform with the learning activities design by the lecturer.	1	2	3	4	5
3.	Learning scenarios with gamification design using whatapps platform is beneficial.	1	2	3	4	5
4.	Lecturers creativity and innovative way in designing learning activities using whatapps application is recommended.	1	2	3	4	5
5.	Experiencing efficient learning due to quick and easy distribution of learning materials (learning resources and discussion output)	1	2	3	4	5
6.	Learning environment using whatapps platform is interesting and fun.	1	2	3	4	5

KAEDAH PENILAIAN PEMBELAJARAN

EVALUATION OF LEARNING METHODS

7.	Using Whatapps help me to learn from my colleague's good/mistake.	1	2	3	4	5
8.	Instant feedback and reflection by lecturer and my colleague's on achieving the learning outcome based on activities on whatapps platform is crucial and help mein learning Manufacturing sustainability	1	2	3	4	5
9.	Using Whatapps help me to get immediate feedback from my lecturer	1	2	3	4	5

BIMBINGAN DAN PENYELIAAN

GUIDANCE AND SUPERVISION

10.	Learning objectives are more personalized for each lecture session.	1	2	3	4	5
11.	Its motivate me to engage in class activities, interact and give opinion when class activities are carried out using whatsapp platform	1	2	3	4	5
12.	Based on learning activities on whatsapp help me to improve skills in gathering information abd using evidence to support argument.Pensyarah sentiasa memberi peluang berinteraksi dan memberi pendapat di dalam kelas dalam meningkatkan keyakinan pelajar.	1	2	3	4	5

*PERALATAN DAN TEKNIKAL

EQUIPMENT AND TECHNICAL

13.	It is easy to download/use whatapps at your mobile phone compared to other learning app/gadget/social media platform e.g. facebook, youtube, ulearn	1	2	3	4	5
14.	It is easy to operate whatapps at your mobile phone compared to other learning app/gadget/social media platform e.g. facebook, youtube, ulearn	1	2	3	4	5
15.	It is easy to access whatapps at your mobile phone phone compared to other learning app/gadget social media platform e.g. facebook, youtube, ulearn	1	2	3	4	5
16.	It is inexpensive to utilize whatapps at your mobile phone phone compared to other learning app/gadget social media platform e.g. facebook, youtube, ulearn	1	2	3	4	5

3. RESULTS AND DISCUSSION

The overall questionnaires result is shown in Figure 1. From these results it was shown that 91% of the students agreed that using WhatsApp in class activities is helpful to enhance learning during a face to face lecture session. While remaining 6 % is quiet agree and only 3% is disagree.
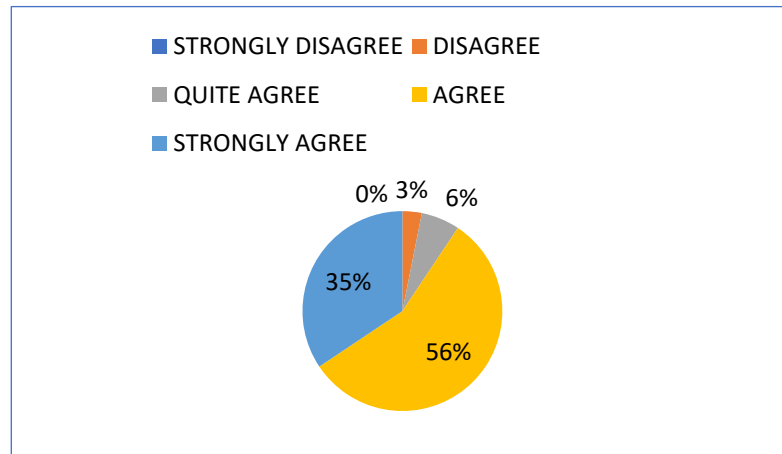
Figure 1: Students' response on the use of whatsapps application in class activities to enhance students learning

Fig. 2 shows the average distribution of questionnaire statements (1-16) given in table I. It shows that for each item, the mean value is > 4.0, indicating that all participants are agreeable to the use of Whatsapp in class activities. The highest mean value of is 4.50 for item 5 which is participants agree on experiencing efficient learning due to quick and easy distribution of learning materials (learning resources and discussion output).
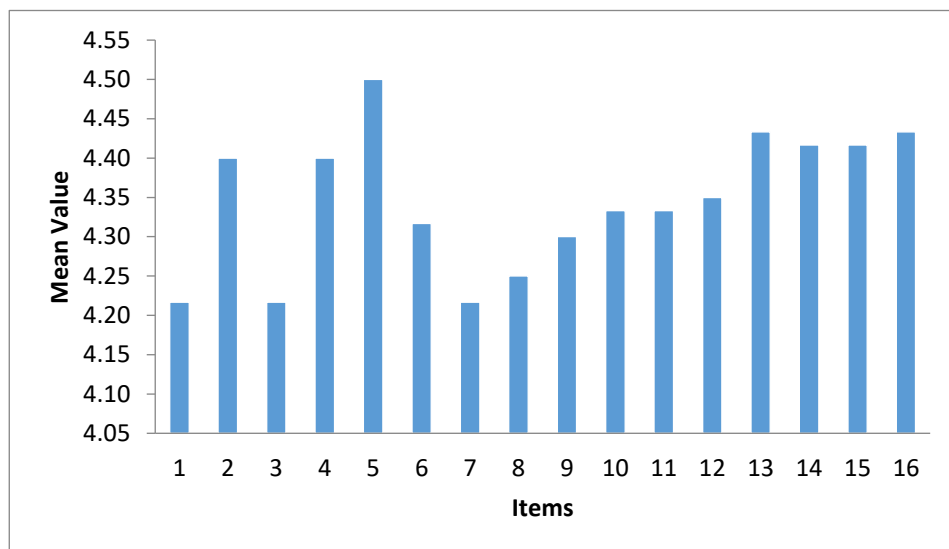
Figure 2: Mean value of WhatsApp Questionnaire items (1-16)

The average mean value of the four dimension of learning and teaching according to the participants' response are show in Figure 3. For each learning and teaching dimensions, it is found that the use of whatsapp in classroom activities is agreed with the highest mean (4.43) due to the equipment and technical reason. Factors related to this dimension; easy to download/use whatapps; easy to operate whatapps, easy to access whatapps at participants own mobile phone and it is inexpensive to utilize

whatapps compared to other learning app/gadget/social media platform. This response is agreed by most of the participants as shown by the small deviation of the questionnaire finding (table 2).
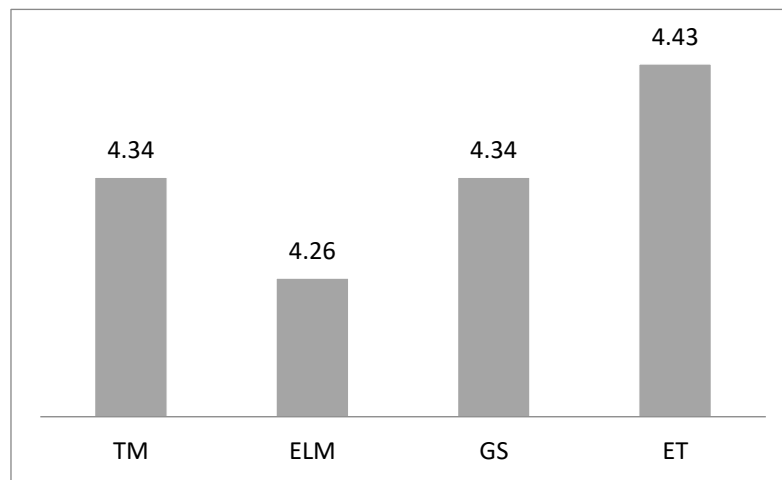
Figure 3: Average mean value of the four dimension of learning and teaching. TM-teaching method; ELM evaluation of learning methods, GS-guidance and supervision, ET-equipment and technical.

Table 2: The average mean value and standard deviation of the four dimension of learning and teaching.

DIMENSION	MEANS	STANDARD DEVIATION (S. D)

Teaching Methods	4.34	0.11
Evaluation of Learning Methods	4.26	0.04
Guidance and Supervision	4.34	0.01
Equipment and Technical	4.40	0.01

4. CONCLUSION

The use WhatsApp in the classroom activities for learning and teaching of a technical course e.g. Manufacturing Sustainability can be declared worthy of being applied in the classroom. Technical obstacles arise due to the use WhatsApp application in learning platform outside the class room (for example: information loading, lack of facilitator confirmation on discussion, time consuming and eyestrain) are not an issue. This is due to the utilization of Whatsapp in classroom activities is designed by the lecturer/facilitator to take advantage on its ease and flexibility in participation and personalized learning gadget (students' own smartphone) as a   as the utilization in class. The finding in this case study had suggest that students had a good perspective and agreed that using Whatsapp in classroom activities is beneficial related to the four dimension in learning and teaching that are teaching method; evaluation of learning methods, guidance and supervision and equipment and technical.

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Oral Communication Apprehension and MUET Speaking Performance of Engineering Undergraduates in a Technical University

Subatira B., Indra Devi S., Linda K.M.S.
Centre for Languages & Human Development, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Corresponding e-mail: subatira@utem.edu.my

ABSTRACT

Fear of speaking especially in the English language is a hindrance to most local graduates during their job – seeking ventures. This study attempts to identify the level of oral communication apprehension (OCA) among the UTeM Mechanical Engineering undergraduates. It also aims to determine if there is a possible correlation between the undergraduates' OCA level and their performance in the MUET Speaking assessment. Results indicate that the undergraduates had a higher level of OCA in public speaking activities. There is a negative correlation between the undergraduates' OCA and their MUET Speaking scores. Hence, English language instructors play an important role in lowering their students' OCA during their lessons.

Keywords: Oral communication apprehension; speaking performance; engineering undergraduates

1. INTRODUCTION

Despite the fact that the Malaysian education system provides a compulsory 11-13 years of English language learning in the formal classrooms, many students if not most, still lack the ability to speak the language competently without displaying any signs of speaking fears. These fears of speaking in the English language often hinder their performance at the tertiary level. This is more so as the medium of instruction in the Engineering programmes in the local universities are in English. When these students leave the universities to look for jobs, again the same problem arises during their job interviews. Mastery of the English language is utmost important nowadays. Competitions are very stiff and only the best graduates will be hired by the ever competing multinational companies in the country. Thus being skillful in communicating in the English language is no longer a preference but rather a must for all Engineering undergraduates .

Communication apprehension (CA) is defined as "the fear or anxiety associated with real or anticipated communication with others" [1]. CA occurs in a variety of settings and often results in negative outcomes for both speakers and listeners. McCroskey [2] further defines CA as more of a way an individual feels about communication and less about how they communicate. This feeling of anxiety could come from the lack of proficiency in the language, the feeling of insecurity when communicating in the language and the lack of practice to use the language. Even individuals who are highly proficient in a language can have a high CA level.

Researchers [3,4,5], claim that students showed a significant level of CA which negatively affected their language learning outcomes. Similarly, Mustapha et al. [6] observed a high level of CA in most EFL students while Noor Raha and Kaur [7] found a moderate level of CA in most of the students in a classroom communication course. The same was reported by, Pitt et al. [8] that CA had a significant negative effect on sales students' performance. However, Devi and Feroz [9]

discovered that CA did not show any linear relationship with students' oral presentation performance.

This study aims to find out the level of oral communication apprehension among the Mechanical Engineering undergraduates of UTeM. It looks into the four specific communication contexts which these undergraduates often engage in namely group discussion, meeting, interpersonal communication and public speaking. It also aims to determine if the level of oral communication apprehension among the Mechanical Engineering undergraduates of UTeM has any impacts on their performance in the MUET Speaking assessment.

2. METHODOLOGY
2.1   Procedures

The 50 participants consisting of 33 males and 17 females selected for the study were all 3rd year students pursuing the Bachelor of Mechanical Engineering at Universiti Teknikal Malaysia Melaka (UTeM).   All these participants were in the same class attending the English for Professional Communication (EPC) subject.

The Personal Report of Communication (PRCA-24) questionnaire developed by McCroskey [2] was used to measure the students' oral communication apprehension level. The questionnaire contains 24 items which are aimed at measuring students' level of apprehension while communicating in the English language in various situations. The instrument is most widely used in college classes and measures overall anxiety as well as anxiety in four communication contexts: interpersonal or dyadic, small group, meeting or large group and public speaking. The PRCA-24 questionnaire requires the participants to rate each item by using the scale based on the rubrics stated. The instrument states that the individual scores should range between 24 and 120. Individuals with scores below 55 are considered to have a low level of communication apprehension. Those with scores between 55 and 83 are considered having a moderate level of communication apprehension while scores above 83 indicate a high level of communication apprehension.

Another instrument used was the students' MUET speaking assessment score. The maximum score for the MUET Speaking assessment is 45. The MUET speaking assessment score was used to determine the relationship between the students' communication apprehension level and their speaking performance.

3. RESULTS AND DISCUSSION
3.1 Measure of students' oral communication apprehension

Table 1 indicates the overall communication apprehension of the 50 students who completed the PRCA-24. The maximum score was 98 and the minimum was 40. The mean value of communication apprehension among them was 70.54 and standard deviation was 14.11.

Table 1: Analysis of 50 students' Personal Report of Communication Apprehension

Mean	70.54
Std. Deviation	14.11
Minimum	40
Maximum	98

Table 2 shows the details of PRCA scores of the students. It is pertinent to note that on the whole, 84% of the total respondents of this survey indicated that they are affected by problems of communication apprehension while communicating in the four types of settings such as group discussions, meetings, interpersonal communication and public speaking.

Table 2: Communication Apprehension score of 50 students

CA level	Frequency	Percent
Low	8	16.0
Moderate	32	64.0
High	10	20.0
Total	50	100.0

Table 3 shows the 50 students' sub scores for four communication contexts which are group discussions, meetings, interpersonal communications and public speaking. The data reveals that the students were most apprehensive in public speaking situations and were least apprehensive in communicating in group discussions.

Table 3: Descriptive statistics for students' level of communication apprehension in four contexts of communication

Contexts	N	Mean	Std. Deviation
Group Discussion	50	14.64	3.83
Meeting	50	17.84	4.62
Interpersonal Communication	50	17.36	4.59
Public Speaking	50	20.68	4.55
Overall CA level	50	70.54	14.11

These findings agree with the findings in Pitt et al.'s [8] study which claimed the public speaking having the highest level of communication apprehension. Charlesworth [10] too found that the highest level of OCA was contributed by the public speaking task.

4. CONCLUSIONS

The results indicate the presence of CA among the Mechanical Engineering students albeit at a moderate level. English language instructors need to design their lessons in such a way which will lower the effect of communication apprehension in the students. With minimal communication apprehension, chances are great that our Engineering undergraduates will be able to upgrade their English communication skills.

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MEASURING AFFECTIVE DOMAIN IN PROGRAMMING TECHNIQUE COURSE
USING MASSIVE OPEN ONLINE COURSE

Ahmad Shaarizan S.[1*], Norasiken B.[2],
Zaiton A. M.[3], Hazmilah H.[4]

[1,2] Centre for Instructional Resources and Technology, Universiti Teknikal Malaysia Melaka,

[3] Faculty of Electronic and Computer Engineering, Universiti Teknikal Malaysia Melaka,

[4] Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[*]Corresponding e-mail: shaarizan@utem.edu.my

Keywords: Affective learning, MOOC, behaviors

ABSTRACT – *This study evaluates the affective domain of students learning Programming Technique course that have at UTeM. This course is taught using blended learning approach where the sources is put on Massive Open Online Courses (MOOC). For the chosen topic, the students have undergone self-learning process without going to the classroom. Samples were asked to use a questionnaire instrument for assessing attitudes and behaviours. Results of the study indicate that development of MOOC provide a holistic element that will produce students with excellent academic achievement and good behaviour. The study also proposed a MOOC development life cycle model.*

1. INTRODUCTION

Affective domain in learning and teaching is the most complex, the emotional life of the students and reflects the confidence of the students, attitudes, perceptions, desires, feelings, values, priorities, and interests [1, 2, 3]. This paper will discuss on the literature review of 21st century learning approach using e-learning and how the affective domain is measure using Massive Open Online Courses (MOOC). After that, the paper will explain the methodology that we use to measure the affective domain. Later, the discussion will continue with the evaluation of affective domain for this sample case. Lastly the paper will end with the discussion and conclusion.

2. LITERATURE REVIEW

With the use of ICT in education has increased and the spread of network technologies, they have caused the e-Learning practice to evolve significantly. The term e-learning may be defined as learning facilitated and supported using ICT. This may include several activities from the use of the technology to support the learning process as part of an approach called blended learning to learning that is entirely delivers [4]. The term e-Learning therefore covers the use of computers and technology as the main tools for knowledge exchange within teaching and learning. The term 'e' in e-learning used to represent 'electronic' but now; it merely signifies the use of technology [5]. Some circles within the education sector itself refer the 'e' as 'enhanced'. The implementation of e-Learning will be able

to provide distance learning or off campus learning for the students [6]. It is also a great tool for a blended learning and teaching approach which mean the students will be exposing with both face-to-face interactions as well as using the technology. E-Learning also will support the uses of technology to support a wide range of educational activity [4].

With the development and growth of e-Learning, lecturers at the universities must develop the materials needed for the e-Learning such as the iBook, videos containing lecture series and other e-learning materials. These resources can be classified as e-content materials are also important in the growth of the local learning system. The e-content should be available for the students to use at any point of time. As for example is by putting learning materials inside university's Learning Management System (LMS). LMS can act as the Virtual Learning Experience (VLE) for the students and the educators can either use the vast variety of platforms available online or they can use the LMS that are already developed by the university [4]. Once the e-content have been developed and it has reached the specification required by the educators, the educators are now able to turn the learning process around or as they call it Flipped Learning.

3. RESEARCH QUESTION

This study try to emphasis the following research questions:
(i) Is MOOC Programming Technique development methodology for teaching suitable for use among students in higher education?
(ii) Is MOOC Programming Technique effectively implement students' affective domain?

4. METHODOLOGY

MOOC Programming Technique development was carried out based on a life cycle model which involved five phases namely analysis phase, design phase, the development phase, implementation phase and evaluation phase. This study proposed a model which is called Model Lifecycle MOOC Programming Technique.

5. MOOC PROGRAMMING TECHNIQUE DEVELOPMENT

This section describes the findings of a study on the development of MOOC Programming Technique, which have been choose as a sample. MOOC Programming Technique contain twelve sub-topics which is deliver for one semester of study. This subject implemented online approach using the MOOC platform. At Universiti Teknikal Malaysia Melaka (UTeM), C++ language is used as programming technique subject. This is a compulsory subject for engineering and ICT undergraduate students. MOOC Programming Technique provide menu selection as listed below:

- Home Menu
- Student Guidelines Menu
- Modules & Activities
- Peer Content
- Groups
- The Team Profile
- UTeM Portal
- UTeM MOOC
- Administer Students

- Course Setup

6. DISCUSSION

In general, this study has two main findings. Firstly, the outcomes regarding the development of education MOOC Programming Technique itself. Secondly, regarding the MOOC Programming Technique evaluation of students' affective learning using MOOC Programming Technique in learning and teaching process.

7. CONCLUSION

This research has produced findings that involve the development of Programming Technique course in MOOC. MOOC Programming Technique development process has considered various factors in ensuring MOOC Programming Technique is suited to Information Technology education such as syllabus, and learning and teaching objectives that have been set. A holistic development model is designed and developed to serve as a guide to designers, builders and specialist subjects of MOOC for Information Technology related fields.

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THE HUMAN FACTOR OF QUALITY CHILD CARE PROGRAM: A CASE STUDY AT THE IIUM EDUCARE

Mustapha, N.A.[1], Kamarudin, M.F.[2,3.]

[1] Faculty of Education, Open University Malaysia

[2] Pusat Bahasa dan Pembangunan Insan, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

[3] Research Group RIMA, C-TeD, Universiti Teknikal Malaysia Melaka,

Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia

*Corresponding e-mail: mohdfauzi@utem.edu.my

ABSTRACT – *Educating the young children is not an easy task. High quality education warrants measures be taken on the overall aspects of child care centres namely organizational and structures, programs and curriculum, environment, and health and safety aspects. The purpose of this study is to obtain understanding of the teachers' conception of quality child care. This case study is set at the International Islamic University Malaysia (IIUM) EDUCARE child care center aimed to better understand the needs of young children through the eyes of the teachers. Open ended interviews questions were used to extract teachers' experiences and concerns. Findings revealed that the human factor contributes to the main conception of quality that includes efficient management, staff commitment, environment, and teaching learning materials. Additional domains of quality such as systematic activities and safety is also stressed.*

1. INTRODUCTION

There has been growing evidence that high quality childhood education programs produce positive outcomes for children affecting their developing skills such as social, cognitive, and language skills [1]. The National Research Council's asserts that there is a relationship between the quality of Early Childhood Program and the positive outcome for children's development. Quality childcare environment does affect children's physical, emotional, and cognitive development. Emphasis on the few limits to be imposed on children, variety of play environment, developmentally appropriate activities to choose to play, and experienced teachers or care providers. A well planned, play oriented, and child centered child care is also to be considered in the quality child care definition [2]. The structure of a child care center is similar to the frame of a house. It includes the legal structure, written policies and procedures, the physical environment and the philosophical structure of the programme.

1.1 Quality Child Care Model

Literature emphasizes on the organization and structures in initiating the child care programs for the staff, parents and children. Most important is the role of leaders to develop and upgrade the program through coordinated, systemic efforts with stakeholders to create and support the mentioned infrastructure that will contribute to quality early childhood education [3].

Figure 1: Quality Child Care: Teachers's Conceptions.

In the Vision 2020, the commitment to the promotion of the importance of early childhood education has been drawn up and yet the result is far from what it is supposed to achieve. Despite the mushrooming childcare centers throughout Malaysia, the standardization of the childcare centers programme structure is seen to be difficult or even impossible. Very few studies have been conducted on care takers or teachers' understanding of early childhood programme quality in Malaysia. Knowing the positive outcomes of quality childcare, this is an attempt to understand the teachers' conceptions of quality childcare.

2. RESEARCH QUESTIONS

This paper aims to answer the followings:

1) What are the conceptions of teachers with regards to quality in child care program at IIUM EDUCARE?
2) What are teachers' preferred childcare characteristics?
3) Why is quality childcare program important?
4) What factors or elements contribute to quality childcare?

3. RESEARCH METHODOLOGY

This study uses Charmaz's Constructivist Grounded Theory, a qualitative research methodology, within the interpretivist paradigm. Charmaz argues a Grounded Theory that is based on constructivism and interpretivism [4]. Participants consisted of teachers of the EDUCARE. Open ended interviews questions are designed to gather information concerning teachers' conceptions

based on their insights and experiences of quality childcare programme at their own premises. This is followed with a Focus Group Discussion (FGD. The researcher then examined the interview transcripts for possible emerging themes through the open, axial and selective coding.

3.1 Structured In-depth Interviews

A loosely structured in-depth interview structure is specially design to extract information from participants.

Table 3.1: Interview Structure

	Theme	Content
1st	Interviewee's background	- Experience & area of expertise
2nd	Quality child care (Organisation)	- Leadership, management, work system
3rd	Quality child care (Curriculum)	- Lessons & subjects, time, skills, pedagogy, technology, activities.
4th	Quality child care (Environment)	- Indoor (Classes, play area, toilet) - Outdoor (play area)
5th	Quality child care (Safety & Health)	- Equipment, food, medication & nursing

4. DATA ANALYSIS

Analysis of interview and focus group data revealed four primary themes: (a) organization and structures, (b) program or curriculum, (c) environment, and (d) safety.
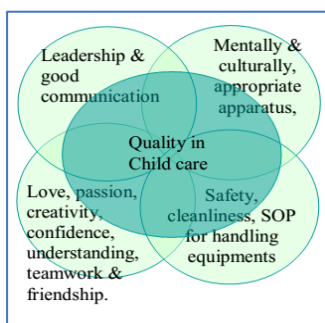

Figure 2: Human Factor of Quality Child Care: Emerging Themes

4.1 Organizations and Structures

The role of the management (leadership), capable, competent and efficient, in developing and upgrading the programs of the centre have great impact to the center. Coordinated, systemic efforts to create and support the mentioned infrastructure will contribute to quality early childhood education with the continuous assistance and engagement of stakeholders namely the teachers and parents. Good and efficient communication through regular and constant two way communication between staff and the management in the formal and informal meetings are seen to be a bridge for an effective relationship.

4.2 Health and Safety

A safe and clean environment is a crucil factor as children are easily infected by viruses from the environment. Proper food preparation and handling are to be taken care off by not neglecting the basic food nutritious for the children to grow healthily. Safety of equipments used are taken seriously such as making sure that all equipments have round and not sharp edges.

4.3 Programme and Curriculum

Developing mentally and culturally appropriate curriculum framework is essential towards excellent teaching and learning process. Programs must be designed to incorporate play activities that relates directly to children's growth and development. Age appropriate learning environment with specially design apparatus and carefully scheduled programmes ensure that time are managed wisely for quality education to take place. The education aspects such as language, cognitive, physical and emotion are further integrated systematically in work schedule, regulations and timetable of staff and children.

4.4 Environment (Teachers and Parents)

The commitment, creativity, love and passion towards children from all stakeholders namesly parents and teachers are crucial. Continuous and relevant training contribute to better learning experience for stakeholders contributing to better communication and confidence when handle situations. Establishing partnership with parents through activities such as meetings, gatherings, discussions, report day, and events brings about teamwork, understanding and friendship. A happy environment will make the teachers perform efficiently.

5. DISCUSSION AND RECOMMENDATION

5.1 Conclusion

Participants conceptions of quality revolve around the human factor (leaders, staff amd parents) effectiveness of administration and management with the children, staff as well as the parents, staff training, staff commitment, and the teaching and learning materials. This suggests the importance of the efficient management in policy development and service improvement. Thorough coordination and regulation of child care services need to be improvised and upgraded. Child care management need to be well versed in short terms and long terms planning of the quality aspect of child education handling challenges, problems and critical situations that determine quality child care program.

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MASTERING THE ENGLISH TENSE/ASPECT SYSTEM THROUGH INNOVATIVE VERB DIAGRAM AND BOARD GAMES

Samsiah A.-H., Nik Izyani N. N. & Sharon Lim S.-L. & Husna Nurul Izzah J.

English Language Learning Centre, Centre for Fundamental and Liberal Education,

Universiti Malaysia Terengganu, 20130 Kuala Terengganu, Terengganu, Malaysia

*Corresponding e-mail: samsiah@umt.edu.my

Keywords: EFL learners, verb tense, games-based learning, visual representation

ABSTRACT – *Learning the different English tenses and aspects is often a struggle for EFL learners. When a verb is poorly conjugated or the auxiliary is wrongly matched, the meaning changes and renders the sentence meaningless. This paper discusses an innovative teaching method that uses a verb diagram called tense-o-gram, which literally means tenses on a diagram, to teach English tenses, aspects and two sentence constructions. It is accompanied by an enrichment activity using verb tense board games. The findings show that tense-o-gram is definitely an effective cognitive organiser while the board games add excitement to otherwise a dull grammar exercise.*

1. INTRODUCTION

To acquire the English language, mastery of English grammar is a must. Yet, learning and applying English grammar learnt have been proven very difficult to EFL learners [2]. Students writings, be it at secondary or tertiary levels, are saddled with grammatical errors. The primary reason lies in the complexity of the English tense system which is not easy to comprehend and remember and the big difference in the grammatical rules between English and the learners' first language [3], making the transfer of linguistic knowledge from L1 to L2 challenging as they have to reconfigure or remap their L1 linguistic knowledge to fit the L2 system [16].

The challenges of teaching English grammar to EFL learners have continued to be researched and discussed by not only researchers in the field of second language acquisition (SLA) but also by teachers on the frontline. Grammar instruction, in particular the English tense system, has remained the same and traditional which is focusing on accuracy of form and usage [12]. Teachers insist on spending some class time on teaching the rules of English grammar despite the contention by the advocates of communicative language teaching (CLT) that explicit instruction on grammar is going against the natural order of acquisition. Nevertheless, both explicit instruction on accuracy of form and usage in class and implicit input from CLT seem to have had moderate to little impact to EFL learners' acquisition of English grammar [11; 1]. Students are still very weak in mastering the complex English tenses and aspects at lower secondary level [11] and the trend continues to students at the tertiary level [23]. Hence, the question of what else can teachers do to teach the English grammar explicitly or implicitly or both with more impact?

2. LITERATURE REVIEW

The traditional way of teaching English verb tenses is to focus on one or two items in the tense system at the time [13; 6] before moving on to the next item. For example, the present simple and past simple tenses are taught first. The forms, rules and sentence samples are given following the introduction of these tenses and exercises and drills in the form of pen and paper come right after that. Having mastered the simple tenses, learners will proceed to chapter two which deals with the progressive tense. In other words, to learn the simple aspect of the English tense system requires a minimum of three to four weeks. Yet, EFL students, especially adult learners need to use a combination of tenses and aspects in any writing and speaking task almost immediately. Thus, there has to be a way in which the English tenses and aspects could be presented in a more complete form and at a glance to help EFL learners see the differences in constructions.

The English tense system is extremely complex with different conjugations and rules to be remembered and understand [2, 14]. This huge amount of information to be processed all at once in a matter of seconds naturally overloads an EFL learner's short term memory. A better strategy in remembering the many tenses and aspects in English language is to make use of the information processing theory. Atkinson and Shiffrin [4] identify two types of memories; short-term and long-term memories. Selected information from a reading text or lecture is transferred into the short-term memory. As this memory has a small capacity to hold information, some information may be lost before it is transferred to the long-term memory. Chunking of information is a technique to hold as much information as possible in the short-term memory [14] before the transfer. One way to chunk big amount of information is by using visual representation. Visual representation works because visual images stored in the long-term memory can be easily recalled and accessed [2]. Since using models has been proven successful to teaching English to second language learners [8, 22, 17, 21], and using visual representation helps learners to visualize, organise and remember the details of information, a verb diagram called *tense-o-gram* is designed and used to teach the English tenses and aspects.

In addition to that, pen and paper exercises and drills are no longer effective for gen-Z who populate the current classrooms. These digital natives require fun, fast and goal-oriented learning environment. Game-based learning (GBL) or gamification is an innovative approach designed to increase learners' engagement and motivation [5]. A review of studies on game-based learning (GBL) reveal that GBL is effective to increase knowledge acquisition of various subjects as well as has positive affective outcomes [9] on learning. In learning a foreign language, a few studies demonstrated that GBL facilitates vocabulary learning. Hitosugi, Schmidt, and Hayashi [9] found that vocabulary recalled from a game play was significantly higher than those learnt from a textbook. In addition, GBL offers learners with immersive space where active and meaningful learning thrives. This study was guided by the following research objective:

To examine if there is a significant difference in students' knowledge of construction of selected verbs tenses and aspects before and after using the verb diagram and game-based learning approach.

3. METHODOLOGY

Verb Diagram:

The word *Tense-o-gram* is derived from the words 'tense' and 'diagram', which literally means tense on a diagram. It is basically a diagram that arranges the many English tenses and aspects on different lines to help learners form a visual representation of the English tense system, [18, 19, 20, 21]. *Tense-o-gram* is made up of four different lines representing three different aspects in the English tense system, which are the prefect, simple, and progressive, and one passive construction. Two vertical lines that cut through the four horizontal lines represent the past, present and future tenses. A straight line in the middle of the diagram represents the simple aspect. Another is a wavy line resembling the sea wave represents the continuous/progressive. A concave line above the straight line represents the perfect aspect and the line below the wavy line is the convex line which is followed by the preposition *by*. This line represents the passive construction. The English sentences starts with a subject, followed by the verb which could tell time, aspect and agreement, and finally the object or complement to complete the sentence. To construct passive sentences require close attention since the agent of the verb is placed after a verb. The preposition *by* is put in the brackets to show that the agent is optional. In summary, there are basically three different aspects and only one passive construction of English verb tense system highlighted in the diagram which students need to know in order to sufficiently understand and use in their own writing or speaking activities.

Participants & procedure:

Fifty-three lower secondary EFL students aged 14 years old at a neighboring public school took part in the study. Prior to the study, a pretest on English grammar was administered by the English teacher on the school premise. The pretest and posttest consisted of four sections; section A was on identifying and naming the verbs in the sentences provided, section B was on conjugating verbs given into tenses and aspects given, section C was 12 multiple choice questions on choosing the correct conjugated verb to complete a sentence and section D was on conjugating given verbs to complete a cloze passage. Section A and B were designed to answer research objective 1 and section C and D to answer research question 2. The total for both pre and posttests is 77 marks. The posttest was administered two days after the study.

Students gathered in a hall and a lecture using a verb diagram called *tense-o-gram* was given on two tenses (present and past), three aspects (simple, perfect and continuous), and two sentence constructions (active and passive) for 40-50 minutes. The lecture highlighted the construction of each tense and aspect as well as called attention to the correct usage of the different tenses and aspects. Emphasis was given on tricky aspects such as present perfect and past continuous. Later, a short pen and paper exercise was carried out to familiarize the students with the verb diagram. To ensure the understanding and recall of the variety of tenses and aspects using tense-o-gram, an enrichment activity using six verb tense board games took place. Each of the games was played by four to five

students in a group for 15 to 20 minutes. The board games were named Match-it, Aux-it, Perfect Castle, Wheels of Verbs, Tense-o-gram Real Estate, and Spot the Tense. As the study was conducted during class hour, the students managed to play only two types of the board game activity each which lasted for about 40 minutes.

4. RESULTS AND DISCUSSION

The results of students' performance in two grammar tests given before and after the treatment in the form of *tense-o-gram* lecture and *tense-o-gram* board games are shown in Tables 1 and 2 below.

Table 1

Descriptive Statistics & Paired Sample *T*-Test on Overall Pre and Post Grammar Tests of Form Two EFL students

TOTAL MARKS	N	MEAN	SD	DF	*T*-VALUE	*P*-VALUE
Pre Test	53	29.30	7.43	52	-7.668	.000*
Post Test	53	41.49	12.01			

*Significant difference at $p < 0.05$

Table 2

Descriptive Statistics & Paired Sample *T*-Test on knowledge of conjugation and structure of verb tenses in Pre and Post Grammar Tests of Form Two EFL students

TOTAL MARKS	N	MEAN	SD	DF	*T*-VALUE	*P*-VALUE
Pre Test	53	19.62	5.69	52	-8.764	.000*
Post Test	53	30.96	9.52			

*Significant difference at $p < 0.05$

Tables 1 and 2 present the results of pre and post grammar tests which were designed specifically to assess the respondents' knowledge of the 8 verb tense-aspect constructions. The results indicate that these young respondents scored significantly higher after the treatment. The mean before the treatment was at 29.30 (SD: 7.43) while after the treatment the mean jumped to 41.49 (SD: 12.01). *T*-test shows that this difference is significant at $p < 0.05$. Similar result was obtained in Table 2 which looked into specific questions that assessed the respondents' knowledge of conjugation and structure of the verb tense-aspects. There was a huge improvement in the students' knowledge of conjugation and construction of the eight verb tenses only after 50 minutes of lecture and 40 minutes of board games.

The findings above suggest that the many variety of English tenses and constructions which often appear on different pages of a textbook and taught separately confuse EFL learners to no end. Evidently, when at least eight different constructions were displayed on a single diagram, learners are able to differentiate one construction from the other. When English verb board games ensued as a replacement for pen and paper drills, it excited the students as they tended to be competitive to score marks or end the game ahead of others. This excitement motivated the students to win thus urging them to recall accurate constructions of the 8 tense-aspects learnt from the lecture. With the verb diagram, recall for the eight constructions was effortless as visual representation which carry loads of information did not overload the short term memory.

The students could be seen visualizing the diagram mentally while playing the six verb-tense board games. They were able to conjugate perfect and passive verbs with 70% accuracy during the board game session. A 40 minutes pen and paper grammar drills would have worn the students out yet a 40 minute session of grammar drills in a form of board games managed to keep the students fully focused and excited. They could also be seen to help partners construct correct forms when the latter were confused. This is made possible to a large part by the visual representation of the English tenses and aspects in the form of verb diagram. What is more interesting is that, the students managed to conjugate simple present, simple past, present continuous, past continuous, present perfect, past perfect, simple present passive and simple past passive in one sitting. The opportunity to see all the conjugations and usages of the many tenses and aspects as well as active and passive sentences on one verb diagram enables the students to see the similarity and differences of the auxiliary and verb form used. The abundance of information is simplified with the use of different lines to represent different tenses and aspects. The visual image of the verb diagram which facilitates recall is a helpful resource in assisting teachers to teach the English tenses-aspects that prove problematic to EFL learners [15]. Meanwhile, board games for learning and internalizing English verb forms and usage have a huge potential in intrinsically motivating EFL learners. This study is consistent with other GBL studies that strongly suggest that board games are ideal learning tools for complex and abstract ideas and concept [7].

5. CONCLUSIONS

English verb tense is the 'heart' of English sentences. One single verb when conjugated into a few different constructions gives different meaning. The different conjugations, meanings, rules and usage usually take up a quarter of a grammar book. Having tense-o-gram in their short-term memory, learners can visualize the different lines, match the correct auxiliary with certain forms of the verb, and produce logical sentences. Tense-o-gram is definitely an important and effective teaching tool for English language teachers in teaching the English tense system as it captures all the fundamental English verb tenses and aspects and arranges them onto different lines in a single diagram. In addition, GBL is a definitely the way to go in teaching and learning of the English grammar to complement the traditional method which will never go out of fashion.

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THE INFLUENCE OF INTERACTIVE CONTENT DELIVERY USING AUGMENTED REALITY IN ENHANCING SATISFACTION OF LEARNING PROJECT COURSE AMONG POLYTECHNIC STUDENTS: EYE-CATCHING PROJECT HANDBOOK

[1]Kaliyamah, R., [1]Zulina, Z. & [2]Vicneas, M.

[1]Electrical Engineering Department, Sultan Azlan Shah Polytechnic,
35950 Behrang, Perak, Malaysia.
[2]Information and Communications Technology Department,
Sultan Azlan Shah Polytechnic, 35950 Behrang, Perak, Malaysia.

Correspondence Author email: logesri02@gmail.com

ABSTRACT

The purpose of this research is to explore the influence of eye-catching project handbook as interactive content delivery in promoting satisfaction of learning project course among polytechnic students. The eye-catching project handbook is a creative and innovative ALL-IN-ONE handbook that developed using augmented reality application. Through this handbook, students can digitally interact with objects that overlaying in real-time at the camera view of smartphones. Therefore, a research conducted to indicate how extent the interactive content delivery influences the students. A quantitative method has been used in this research. The elements of the questionnaire consist of four factors include usefulness, ease of use, ease of learning and satisfaction in learning. Based on findings, the usefulness of using the handbook is at high level with a mean of 3.53 and standard deviation of 0.6. The ease of use of using the handbook is at high level with a mean of 3.62 and standard deviation of 0.526. Furthermore, the ease of learning of this handbook at high level with a mean of 3.02 and standard deviation of 0.583. Accordingly, students' satisfaction in learning at high level with a mean of 3.52 and standard deviation of 0.549. As conclusion, the research proved that there is a positive relationship between the handbook as an interactive educational resource and its impact on providing satisfaction of learning among students. As a result, this handbook demonstrates the success of using augmented reality with enrich of basic project guidelines in order to improve learning experiences towards 4.0 education.

Keywords: handbook, augmented reality, satisfaction

1. INTRODUCTION

The evolution of education method has involved technology to increase the teaching and learning throughput. Most studies promote the use of digital learning tools in real-life scenarios (Sharples, Milrad, Arnedillo-Sánchez, & Vavoula, 2009; Ogata & Yano, 2004; Wong & Looi, 2011). The interaction between digital learning tools and the actual environment is very important in order to enhance students' personal knowledge (Wu, Lee, Chang, & Liang, 2013). The interaction can obtain through mobile learning aid such as smart phones which capable to increase students' learning experiences. Such a learning support technology is achievable through the use of augmented reality application. Augmented reality is a growing phenomenon on mobile devices, associated with the increase in mobile computing in recent years and the international ubiquity of internet access. Augmented reality presents a particularly powerful user interface (UI) to context-aware computing environments. It combines human senses with virtual objects to facilitate real-world environment interactions for users to achieve an authentic perception of the environment (Azuma, 1997). Accordingly, an all-in-one eye-catching project handbook created by using augmented reality application in a creative and innovative way. The designed handbook represents digital information with physical world settings in a variety of multimedia elements such as text, images, audio, video and animation. This allow computer generated virtual imagery to exactly overlay physical objects in

real time and students able to experience and explore it interactively through the camera of their mobile devices. Besides that, the integration of web tools in learning activities marked an important turning point. Indeed, earlier studies proved that students' experience in learning is enhanced by the usage of web technologies (Annetta, Minogue, Holmes, & Cheng, 2009; Bolliger, Supanakorn, & Boggs, 2010; Rovai, Ponton, Wighting, & Baker, 2007).

2. LITERATURE REVIEW

Towards the era of advanced technologies, there is a higher demand in perceiving technology in education setting (Olson and Riordan, 2012). Earlier studies showed that technology-based learning environments induced positive attitudes and higher satisfaction among learners toward instruction (Kulik, 1994; Schacter, 1999; Sivin-Kachala, 1998). This technology-based learning environments combine the use of computers, multimedia materials, whiteboards, internet, Web 2.0 authoring tools, simulations, games, mobile phones and immersive technologies such as augmented reality (Dror, 2008). In recent years, technology-based learning environment has increasingly focused on immersive technologies such as augmented reality and mobile learning in order to improve the satisfaction and experiences of the users in enriched multimodal learning environments (Johnson, Adams Becker, Estrada, & Freeman, 2015).

Generally, augmented reality is a technology that layers computer-generated enhancements on top of real world in order to make it more meaningful through the ability to interact with it (Augment, 2015). Researchers have documented the potential of augmented reality technology in employing such facilities to assist students in learning in real-world environments in comparisons with traditional instructions (Andujar, Mejias, & Marquez, 2011; Chen, Chi, Hung, & Kang, 2011; Kamarainen, Metcalf, Grotzer, Browne, Mazzuca, Tutwiler, & Dede, 2013; Platonov, Heibel, Meier, & Grollmann, 2006). Based on previous researches, the advanced visualization application of augmented reality has been used for educational purposes in construction training and sustainable design (Messner and Horman, 2003; Vassigh, 2008). Also, the high potential of using this technology capable to enhance the instructional methods in engineering and science as well (Shirazi and Behzadan, 2013). The effective use of augmented reality in more interactive environments of education setting capable to better define the feeling of presence in a virtual environment (Hendrix, C., & Barfield, W.,1996). Researches showed that education with augmented reality has proven to be extremely useful in increasing the students' satisfaction in learning process (T. Y. Liu & Chu, 2010; Jara, Candelas, Puente, & Torres, 2011; Di Serio, Ibáñez, & Kloos, 2013; Bujak et al., 2013; Chang et al., 2014). This clearly revealed that augmented reality technology contributed to improve academic achievement compared to traditional teaching methods as this technology enriching the real world with digital information and media.

3. PROBLEM STATEMENT

The development in the educational setting has involved high technology to enhance teaching and learning environment. Due to the unattractiveness of the existing teaching and learning method, students tend to lost attention in learning and they found it very difficult to understand. DEE5081-PROJECT1 and DEE6092-PROJECT 2 are compulsory courses to be taken by all the final year students of electrical department in Polytechnic Malaysia. The courses required knowledge of electronic components, tools and techniques in preparing circuits in order to develop a complete project. Students are tending to face problem in finding the notes and sources to start the project. They are uncertainty of the sources they find on the internet. Thus, students hard to relate the theoretical knowledge to implement it practically. Moreover, there are no interactive learning material for the course of project to attract the students. The use of augmented reality in education, and particularly in mobile learning, is still in its infancy and it remains to be seen how useful it will be in creating effective learning experiences. In order to deliver teaching and learning materials in creative and innovative approach, this handbook designed to facilitate students in understanding the basic concept of augmented reality. Throughout this handbook, the augmented reality application will be fully utilized.

4. CONCEPTUAL FRAMEWORK

 In this study, researchers have adapted the conceptual framework as illustrated in Figure 1 below.
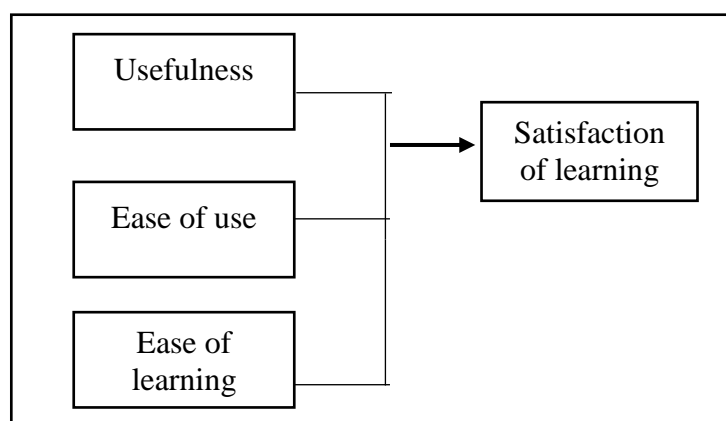

Figure 1: Research conceptual framework
[adapted from (Noraini, 2008)]

An Eye-Catching Project Handbook developed to provide an extensive overview about the Project 1 and Project 2 courses to all the final year students of electrical department in Polytechnic Malaysia. There are variety of information provided to analyse about the electronic components and tools that will be used for project development using element of multimedia. The usefulness, ease of use and ease of learning of the interactive eye-catching project handbook are independent variables for this study which are influence students' satisfaction of learning project course. Thus, students excitedly interact with objects that overlaying in real-time at the camera view of smartphones. This allow the students to satisfy with the interactive content. The results of this study will be able to show the relationship between the independent variables with the students' satisfaction of learning.

5. OBJECTIVES

The objectives of this study were:

f. To analyse the level of usefulness in using handbook as interactive content delivery using augmented reality.
g. To analyse the level of ease of use in using handbook as interactive content delivery using augmented reality.
h. To analyse the level of ease of learning in using handbook as interactive content delivery using augmented reality.
i. To analyse the level of satisfaction in using handbook as interactive content delivery using augmented reality.
j. To analyse relationship between the handbook as an interactive educational resource and its impact on providing satisfaction of learning among students.

6. RESEARCH QUESTIONS

Through this study, researchers sought to find answers to the following:

a. How is the level of usefulness in using handbook as interactive content delivery using augmented reality?
b. How is the level of ease of use in using handbook as interactive content delivery using augmented reality?
c. How is the level of ease of learning in using handbook as interactive content delivery using augmented reality?
d. How is the level of satisfaction in using handbook as interactive content delivery using augmented reality?
e. How is the relationship between the handbook as an interactive educational resource and its impact on providing satisfaction of learning among students?

7. METHODOLOGY

Methodology is an important aspect in ensuring the objectives can be achieved as planned. This research is a quantitative survey. Quantitative method focuses on aspects of data collection and analysis of data in the form of numbers.

7.1   Participants

The research was conducted at Electrical Engineering Department of Sultan Azlan Shah Polytechnic. A total of 40 respondents were chosen randomly from fourth and fifth semesters that undertaking DEE5081-PROJECT1 and DEE6092-PROJECT 2 courses.

7.2   Procedure

Eye-catching project handbook developed to provide an extensive overview about the project course. This handbook aims to detail each of the project development process. Appropriate images used as markers to identify the object to be displayed on the scene such as graphic, videos, audio, text and animation. This allows the students to visualize the processes in interactive way. Apart from

analyzing the basic concepts of project, examples that provided throughout the handbook help the students to achieve a more exciting experience, as well as outline the techniques used most commonly. Moreover, Students are enabled to actively build their own circuits and simulated it virtually. The handbooks were printed and distributed to the students that undertaking DEE5081-PROJECT1 and DEE6092-PROJECT 2 courses. The students were asked to give their judgment about the interactive handbook.

7.3   Instrument

A questionnaire was designed by using online google docs that consists of 30 items. The questionnaire was carried out at the end of semester. There are five parts in the questionnaire; Part A: Biographical information; Part B: Usefulness; Part C: Ease of use; Part D: Ease of learning and Part E: Satisfaction of learning. The four-point Likert Scale used to measure the responses by the respondents for each item in the questionnaire that ranged from 1 (strongly disagree) to 4 (strongly agree).

Table 1: Likert Scale

Score	Range
4	Strongly Agree
3	Agree
2	Disagree
1	Very Disagree

Adapted from Mohd Najib(2003)

Statistical Package for Social Sciences (SPSS) version 25 used to analyse all quantitative data gained through the questionnaire. Each part in the questionnaire interpreted according to the achievement of mean score which can be categorized into low, moderate and high as shown in Table 2.

Table 2: The interpretation of score mean

Mean Score	Level
0 – 1.33	Low
1.34 – 2.66	Moderate
2.67 – 4.00	High

Adapted from Nunally (1978)

8. RESULT AND DISCUSSION

The data collected analysed based on the result of Cronbach's Alpha through reliability test and descriptive analysis of mean and standard deviation for each factor that influence to the students' satisfaction of learning project course using eye-catching project handbook.

8.1. Reliability test

The data collected analysed based on the result of Cronbach's Alpha through reliability test. The result of the reliability test has shown that the value of Cronbach's Alpha is 0.811. This indicated that the research has good reliability as the value obtained greater than 0.7. Table 3 shows the alpha value for each item constructed in the questionnaire.

Table 3: Cronbach's Alpha score

Elements of Questionnaire	Score
Usefulness	0.749
Ease of Use	0.705
Ease of Learning	0.716
Satisfaction	0.709

8.2. Part B: Usefulness

Table 4 shows that the highest mean is for item B1- "It helps me be more effective" with mean of 3.68 and standard deviation 0.526. Based on the findings, the students realised the eye-catching project handbook is effective to use as it helps students find relevant information much easier by scanning each trigger images rather than having to separately finding for it in other resources. The lowest mean is for item B8 - "It does everything I would expect it to do" with mean of 3.40 and standard deviation 0.632.

Table 4. Part B-Usefulness

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
B1	It helps me be more effective.	3.68	0.526	High
B2	It helps me be more productive.	3.43	0.594	High
B3	It is useful.	3.43	0.675	High
B4	It gives me more control over the activities in my life..	3.53	0.640	High
B5	It makes the things I want to accomplish easier to get done.	3.58	0.594	High
B6	It saves me time when I use it.	3.58	0.549	High
B7	It meets my needs.	3.60	0.591	High
B8	It does everything I would expect it to do.	3.40	0.632	High
	Average	**3.53**	**0.6**	

8.3 Part C: Ease of Use

According to the result of Part C in Table 5, all items are at high level. This indicates that the use of this handbook with augmented reality applications was easy and enjoyable to the students.

Table 5. Part C-Ease of Use

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
C1	It is easy to use.	3.58	0.594	High
C2	It is simple to use.	3.60	0.545	High
C3	It is user friendly.	3.65	0.483	High

C4	It requires the fewest steps possible to accomplish what I want to do with it.	3.68	0.526	High
C5	It is flexible.	3.70	0.564	High
C6	Using it is effortless.	3.63	0.490	High
C7	I can use it without written instructions	3.48	0.599	High
C8	I don't notice any inconsistencies as I use it	3.63	0.490	High
C9	Both occasional and regular users would like it.	3.55	0.504	High
C10	I can recover from mistakes quickly and easily.	3.75	0.439	High
C11	I can use it successfully every time.	3.53	0.554	High
	Average	**3.62**	**0.526**	

8.4   Part D: Ease of Learning

The average mean score for Part D is 3.02. Students absolutely agreed that the interactive handbook is suitable to use for the purpose of learning with the highest mean score of 3.08 for item D4 - "I quickly became skilful with it". This results revealed that introducing students to a new instructional technology (Augmented Reality) stimulated their interest and increased their involvement in learning.

Table 6. Part D-Ease of Learning

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
D1	I learned to use it quickly.	3.03	0.480	High
D2	I easily remember how to use it.	2.95	0.639	High
D3	It is easy to learn to use it.	3.00	0.641	High
D4	I quickly became skilful with it.	3.08	0.572	High
	Average	**3.02**	**0.583**	

8.5   Part E: Satisfaction of Learning

Based on the result of Table 7, the highest mean score is for item E7 – "It is pleasant to use" with mean of 3.63 and standard deviation 0.490. The lowest mean score is for item E3 – "It is fun to use" with mean of 3.43 and standard deviation 0.549. The findings prove that use of this interactive handbook brought satisfactory among students.

Table 7. Part E-Satisfaction of Learning

NO	ITEM	MEAN	STD.DEVIATION	LEVEL
E1	I am satisfied with it.	3.50	0.599	High
E2	I would recommend it to a friend.	3.50	0.599	High
E3	It is fun to use.	3.43	0.549	High
E4	It works the way I want it to work.	3.53	0.554	High
E5	It is wonderful.	3.48	0.506	High
E6	I feel I need to have it.	3.58	0.549	High
E7	It is pleasant to use.	3.63	0.490	High
	Average	**3.52**	**0.549**	

9. CONCLUSION

The interactive content delivery using augmented reality is convenient and students can navigate easily by scanning the printed images. It is also an effective and attractive method due to the capability of saving time and energy in assessing the relevant information in other resources. Since this is an interactive method, students can digitally interact with objects that overlaying in real-time at the camera view of smartphones using Blippar reader. Correspondingly, students get motivated, excited and engaged in order to use the augmented reality as Web 2.0 technology. Besides that, the usage of augmented reality in the handbook enriching the teaching and learning experience in 21st century education. This method responds indirectly to the higher education plan in 9th shift by transforming the 21st century education to technology-based learning. Therefore, this innovative method can be widely used in most of education institute especially related to computer engineering courses.

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