INTERACTIVE QUIZZES KAHOOT! AS MULTIMEDIA TOOLS THAT EFFECT STUDENTS' INTEREST, ENGAGEMENT AND MOTIVATION IN ENGINEERING MATHEMATICS 2 COURSE AT POLITEKNIK SEBERANG PERAI

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ABSTRACT

This study was conducted to investigate effectiveness an interactive guiz Kahoot! As multimedia tools that support teaching and learning Engineering Mathematics 2 courses in Seberang Perai Polytechnic. This study focused on three aspects that is to identify the positive effects of the use of Kahoot to the interest, engagement and motivation of students in the process of teaching and learning in the classroom. A total of 35 students from the second semester of Electrical Engineering Department in December 2016 sessions selected for this study. The study was conducted using a survey method which involves distributing the questionnaire. Data were analyzed using IBM SPSS Version 22 software and guantitative method was used. The findings of the study reveals that majority of students agreed that they were excited playing the guiz and positive towards topic after playing the game using Kahoot. Average percentage student agree that interactive quiz kahoot effect their interest is 89.55%, engagement 82.15% and motivation 85.7%. Thus, we can conclude that the use of Kahoot is interactive presentations flow that has a positive impact on P&P activities in particular aspects of the teaching and learning process such as interest, engagement and motivation.

Keywords: interactive quiz Kahoot, Engineering Mathematics 2 course, Engagement

1. Introduction

The development of information and communication technologies have greatly influenced the culture of life today, in the education sector in particular, the application of this technology in teaching and learning to provide a new shift in pedagogical techniques. Some previous research has shown that the use of technology has been able to revolutionize teaching techniques, students learn methods and a whole way of education ran in accordance with the present era.

Educators today facing one of the extreme tasks that is to engaging a wide and various group of students. With varying degrees of motivation, commitment, ability, and learning styles or methods, students originated to the learning practice (Kirkland & O'Riordan, 2008). A trend that has been applied in various environment including workplace training, education, and social media are game-based learning and gamification. A lot of individuals have been showing to game-based engagement methods in one form or another, whether they've been alert of it or not (Pho & Dinscore, 2015). Numerous investigators in recent years, have studied the efficiency of digital technology in the raise of learning motivation and efficiency can be boosted as stated by many of previous study and, the current introduction of developed gaming elements has made such games progressively popular (Liu & Chen,2013).

A best practice considered in education is game-based learning. Effective tool for teachers to apply in the classroom, which is game learning since it engages learners in problem solving, critical thinking and recall of syllabus supported by empirical data and study. Present version of game-based learning are digital games using by teachers to engage their students in expressive and fun doings (Dellos, 2015).

Kahoot is one of multimedia tools, a game-based response systems, game-based learning platform that convert chalk and talk classroom into a game display. Kahoot consist of quiz, discussion, jumble and survey application was built by teachers to stimulate student interest during the process of learning through an interactive learning environment. This application can be used through a variety of devices such as computers, tablets and smartphones, it is speedily gaining traction in classes with "bring your own device" policies. Teachers can build a variety of topics related quiz to be tested by sharing pin numbers quiz to be answered by the students. The screen in front of the class will be the main display that will display questions while students will use their devices to answer questions based on the number of options granted. Indirectly, this will make students focus on answering the question because it requires students to give priority to questions that are only available on the main screen display in front of the class. When setting up questions for the quiz, there are selection of options offered including uploading videos, pictures and music with the intention of inspire students with their thinking or to simply deliver positive and energy to the quiz. Teachers and students can view students' game result because Kahoot provide the result in an Excel Document.

1.1. Problem Statement

At the polytechnics, Engineering Mathematics 2 is a course that must be taken by students in the second semester of the Department of Electrical Engineering. The course consists of 3 topics, namely Chapter 1: Exponent and Logarithmic, Chapter 2: Chapter 3: Differentiation and Integration. Assessment and Evaluation Report results of the session in June 2016 shows the percentage CLO 1 and 2 by 47% and 44% only and both CLO below the targeted set of 50% should be exceeded.

This problem is caused by a lack of understanding of students in the topic being taught, students are not interested in mathematics and a lack of student engagement and motivation in the classroom. One of the factors that contribute to this problem is the method used by the lecturers do not attract students and lack of exercises to students. Most lecturers are only using traditional learning methods in teaching and learning.

For Chapter 2 and Chapter 3, according to assessment specification table in syllabus DBM2013, no quiz that should be evaluated. It causes students revise less these topics. Too much of exercise or quiz also need lectures spend time on checking. In addition, lecturers also have to marking students out assessment exercises that should be evaluated as their carry marks. Therefore, the use of interactive multimedia quizzes Kahoot used in this study. Researchers hope to use the multimedia Kahoot, load lecturers to mark the quiz questions can be reduced, the problem of student interest, engagement and can be overcome.

1.2. Research Objectives

The objective of this study was to:

- 1.2.1 Identify positive effect on students' interest in teaching and learning in the classroom using kahoot.
- 1.2.2 Identify the effect on students' engagement with Kahoot use.
- 1.2.3 Identify the effect on students' motivation using Kahoot.

1.3. Research Questions

The questions in this study is:

- 1.3.1 Is the use of interactive Quizzes Kahoot can provide a positive impact on students' interest in the classroom?
- 1.3.2 Is the use of interactive Quizzes Kahoot can increase student engagement in the classroom?
- 1.3.3 Is the use of interactive Quizzes Kahoot can affect students' motivation?

1.4. Significant Of The Research

This study is important because it can enhance interest of students through the use of kahoot game such as quiz in the process of learning. In addition, this study will facilitate the process of teaching and learning in the classroom and can also reduce the burden on teachers. The use of Kahoot can be share to the lecturers so that teaching and learning process more focused and enjoy. Further, the use of Kahoot quiz game is expected to increase and improve students' engagement and motivation. Indirectly, they will be able to improve the image of the polytechnic as a polytechnic that meet the government's intention to produce students who excellent.

1.5.Research Limitations

This study involves only two classes of second semester student of electrical engineering who take Engineering Mathematics 2 courses. Topics to be assessed only topic 2 in Engineering Mathematics 2 which is Differentiation topic. Kahoot use also requires strong wireless internet data and can only be accessed using smartphones because not all class in Politeknik Seberang Perai completed with computers.

2. Literature Review

In order to engage students and enhance learning, game-based learning includes the practise of games and gaming principles in the classroom (Graham, 2015). Students have the chance to learn while having fun when using games in classroom. Just not simply taking a pen and paper quiz, students feel stimulated to shine because they are playing a game (Marello, 2014). Roses, et al. (2003) stated that even at the end of the application time, children were highly motivated to play with video games. This obviously being the chosen activity compared to the traditional pedagogical activities. The stated outcomes give solid proof for the positive effects of the trial instrument on children's interest and motivation. The conclusion that children's motivation is guaranteed through the use of video games in the classroom permitted by all findings from the preferences study as well as from classroom observations and teacher reports. Jui-Mei, Chun-Ming, Hwang & Yueh-Chiao (2011) used game based learning in a nutrition course, discovering that this approach was more effective in enhancing the learning effectiveness and attitudes of students than traditional PPT teaching and even influenced their dietary habits.

One the most frequently conveyed positive feelings in the classroom is enjoyment. Students' enjoyment was establish to be connected to effort and performance (Schukajow & Krug, 2014). The finding of his study stated that, "a close reciprocal connection between the positive emotion of enjoyment and interest was found. Initial interest influenced enjoyment during task processing, and enjoyment while learning mathematics affected students' interest after the teaching unit" (Schukajlow, 2015).

This is supported by the finding from Wang (2015) for the wear out game-based student response system using Kahoot find that close to 90% of the students agreed that they were engaged during the quiz session, thought it was fun and motivating to play the game using lecture and observation shows 100% students were active during quiz session. In his another study about gamifying quizzing in classroom (Wang, Zhu, &Saetro,2016), for a lecture using game-based quizzes there is tendency that students were more motivated, 84% of students disagree the quiz using kahoot was boring and not engaging. Result on concentration shows that 78% students concentrated on the quiz to get the correct answer using Kahoot compared to 61% concentrated on paper. Learning outcome for Kahoot quiz

has higher mean value from paper quiz but the difference is not statistically significant. According to Wang and Lieberoth (2016), there are statistically significant difference for concentration, engagement, enjoyment, and motivation using distinction in of audio and points. The classroom dynamics affected by audio and music in a significant positive way during his observations in the classroom.

Research by Premanand (2014) about gamification in classroom show that 96% students enjoyed the game using Kahoot and it was found to be inspiring. For the applied game-based pedagogy in future, 78% student would voice to their teachers about the game while 63% of teachers decided that it was really an eye-opener for them. Tanaka et al (2016) implemented the quiz with ranking on gamification elements using e-Learning system and evaluated its effects to students' motivation and score. The outcome of the research, 44% students' response the questionnaire that their motivation toward the preparation of the quiz was increased.

Since most of students using smartphones to access Kahoot, research by Guerrero, Jaume, Juiz and Lera (2016) shows that student involvement rises with the use of mobile devices for theory classes and they are prepared to participate in class events and share their own grades.

For any teacher teaching a course wants students to engage in a significant amount of assigned readings, the use of online quizzes is greatly suggested. Students seem to benefit from the use of such online quizzes as they turn to energetically engaged in the course material (Hillman, 2012).

3. Research Methodology

The instrument used to obtain data from participants in this study were questionnaires form. The use of the questionnaire is justified in view of the limited time and respondents are not influenced by the behavior of researchers. According to Mohd Majid (2004), the use of the questionnaire can be get more consistent answers. The questionnaire used in this study consists of the items reviewed in terms of their perception of the enjoyment, engagement and motivation and concentration of students during the teaching and learning activities. The questionnaire consists of 15 items with a five-point Likert scale as shown in Table 3.1 to be answered by the students based on their perception. The data from the study were analyzed using IBM Statistical Packages for the Social Science (SPSS) version 22.

These items are a result of modification of previous study, namely a study on The Wear out Effect of a Game-based Student Response System by Al Wang (2015) and The Effect of points and audio on concentration, engagement, enjoyment, learning, motivation and classroom dynamics using Kahoot! By Al Wang (2016)

A total of 35 students from DTK2A class in semester 2 for December 2016 session from Electrical Engineering Department who took Engineering Mathematics 2 at Polytechnic involved as samples in this study. At the start of the study, P&P activities are carried out and at the end of class, student were given Kahoot online Quizzes. Researcher presents multiple choice quiz using Kahoot's quiz maker tool. Using smartphones with internet connection, students access the URL link and receive a password to access the quiz. Students and researcher can see how many students are enrolled by displaying the quiz through the projector. Researcher began the quiz once the whole class in enrolled. Each quiz' question is timed, students are playing against each other. After a timeout, the students get the results immediately on their devices and the top 5 leading students are displayed. After finished the quizzes session, questionnaires form were distributed to the students.

Table 1.	Five	Point	Likert	Scale
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Score	Category
1	Strongly Disagree
2	Disagree
3	Uncertain
4	Agree
5	Strongly Agree

4. Result And Analysis

Data analysis was done was to investigate students' perceptions the use of interactive quizzes kahoot. The data analysis was done by calculate the percentages and mean for each item assessed in the questionnaire conducted. The findings will be discussed based on the objectives of the study (i) Is the use of interactive Quizzes Kahoot can provide a positive impact on students' interest in the classroom? (ii) Is the use of interactive Quizzes Kahoot can increase student engagement in the classroom? (iii) Is the use of interactive Quizzes Kahoot can affect students' motivation?

4.1. Is the use of interactive Quizzes can provide a positive impact Kahoot on students' interest in the classroom?

Statement		P Q	Mean				
		1	2	3	4	5	
1.	Playing the quiz hold my attention	2.9	0.0	5.7	28.6	62.9	4.49
2.	I concentrate more when playing against other students	0.0	2.9	11.4	31.4	54.3	4.37

Table 2 . F	Result	on	Concentration
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Table 3. Result on Enjoyment

Statement		Perc	Mean				
		1	2	3	4	5	
7.	Playing the quiz was fun	0.0	0.0	8.6	20.0	71.4	4.63
8.	It was fun to compete against others	2.9	0.0	11.4	22.9	62.9	4.43
9.	It was fun to play together in the same room	0.0	0.0	5.7	25.7	68.6	4.63

To view the results of a positive impact on student interest, we will measure in terms of concentration and enjoyment. According to Schukajlow (2015), there are strong relationship between positive emotion of enjoyment and interest while concentration are connected to the view that an activity is "fun" (Rosas, 2003). The statement 1 to 2 in Table 2 are related to concentration. 91.5% student agree that playing the quiz hold their attention and 2.9 % which is 1 respondent strongly disagree with this statement. For statement "I concentrate more when playing against other student", 54.3 strongly agree that they were concentrate more, 31.4% of respondents agree, 2.9% disagree and 11.4 have neutral opinion on this statement (4 respondent). From this result, 85.7% agree that they were concentrate more when playing against other student. Playing the quiz using Kahoot need

to student be more active and fast to answer the questions because every questions have limited time to answer. If they not perform fast, they will lost.

The statement 7 to 9 in Table 3 are related to the enjoyment. The result shows that 91.4% respondents agree that playing the quiz was fun and no respondents not agree with the statement. For statement, "It was fun to compete against others", 85.8% agree and 2.9% strongly disagree. This implies that interactive quizzes Kahoot has made students compete in a healthy and has created enjoyment of competition. Majority of students (94.3%) agree that it was fun to play together in the same room. Based on this result, majority of student agree that playing the quiz using Kahoot give the enjoyment. With the audio and music in Kahoot, it can make the class more cheerful. During playing the quiz, observation by researcher noticed that, majority of student started to laugh whether they can answer the quiz correctly or not. It shows that they really enjoy with it.

Statement "I am more positive towards topic after playing the game" have 4.54 of mean and almost all of respondent, 33 out of 35 respondent agree that after playing the game, they more positive towards topic. It shows that, the using of Kahoot has attract students' interest to this course Engineering Mathematics 2.

4.2. Is the use of interactive Quizzes Kahoot can increase student engagement in the classroom?

Statement -		Percentage Statement Question by Likert Scale					Mean
		1	2	3	4	5	moun
3.	I thought playing the quiz was excited	0.0	2.9	8.6	25.7	62.9	4.49
4.	I felt increased pulse when answering questions	0.0	0.0	11.4	34.3	54.3	4.43
5.	I was engaged while playing	0.0	0.0	22.9	31.4	45.7	4.23
6.	I communicated with other players while playing	0.0	0.0	25.7	20.0	54.3	4.29

Table 4. Result on Engagement

The statement 3 until 6 related to student' engagement. Statement 4 "I thought playing the quiz was excited" have 4.49 of mean and majority of respondent (88.6%) agree and 1 respondent (2.9%) disagree. It shows that no depression during the quiz session. For statement "I felt increased pulse when answering questions" give mean 4.43. 19 respondents (54.3%) strongly agree and 12 respondents agree that they felt increased pulse when answering to get the best answers. 77.1% of respondent agree that they were engaged while playing while 22.9% respondent have neutral idea about this. This figure may result from of during the quiz, some of them disconnect from playing due to low of internet connection. With min 4.29 for "I communicated with other players while playing", 54.3% (19 respondents) strongly agree and 20.0% agree (7 respondents) and the rest choose neutral. Since they standing near each other, communicate each other to develop and maintain the play (The National Strategies, 2009)

(iii) Is the use of interactive Quizzes Kahoot can affect students' motivation?

Statement		Perce	Mean				
		1	2	3	4	5	
10.	It was important to do well on the quiz	5.7	0.0	11.4	25.7	57.1	4.63
11.	Playing the quiz could be of some value to me	0.0	0.0	14.3	25.7	60.0	4.40
12.	I try very hard to do well on the quiz	0.0	0.0	14.3	31.4	54.3	4.40
13.	Playing the quiz made me motivated about the subject	0.0	0.0	14.3	25.7	60.0	4.46

Table 5. Result on Motivation

The statement 10 to 13 are related of students' motivation and effort. 82.8% of student (29 respondents) agree that it was important to do well on the quiz while 5.7% disagree. Since the mark of this quiz will not include in their carry marks so some of them feel that it is not important to do well on the quiz. For statement "Playing the quiz could be of some value to me" have 4.40 of mean with 18 respondents (51.4%) strongly agree, 37.4% agree and 4 respondents choose neutral. It shows that there are high spirit in the classroom.

Majority of respondents (85.7%) agree that they were try hard to do well on the quiz. It shows that they try to calculate the answer for the questions given and there are focused students in classroom. From that, they will learn something from the Kahoot' quiz. 5 respondents (14.3%) chose neutral. It is because since the question have multiple choice answer, some student did not want to calculate the answer, so they just answer the quiz according their instinct. For statement "Playing the quiz made me motivated about the subject", 21 respondents strongly agree and 9 respondents agree. Majority of respondents agree that playing the quiz can made them motivated to this subject. It shows that interactive quiz Kahoot improve and change their mind about Engineering Mathematics 2 course.

The highest mean (4.60) and almost all of students (94.3%) wished that Kahoot should use in other classes. It shows that they like the interactive quizzes Kahoot and this learning technique accepted by majority of students and wished to remain using this method in the future. This is supported by free comment from questionnaires shows students write "Good", "Very good", "use it a lot", " I feel awesome" and "it was very fun",

5. Conclusion

Kahoot creates a learning environment if students really engaged with the game. Since students can also see their speed in answering questions through the position and time displayed on the main screen at the front of the class. It indirectly creates an atmosphere of healthy competition among students through an interactive game. Not only that, Kahoot also able to create an atmosphere of fun and learning and discipline of students in terms of dealing time to answer a question. Average percentage student agree that interactive quiz kahoot effect their interest is 89.55%, engagement 82.15% and motivation 85.7%. It can be conclude that majority of student agree kahoot give positive effect on their interest, engagement and motivation. Even though there was no control group for comparison, the researcher believed that students' interest, engagement and motivation significantly increased. Kahoot use in P & P is also the element of edutainment and viewed very suitable to be implemented in the 21st century learning For future study, researcher suggest to implemented interactive quiz kahoot to Mechanical Engineering students as respondent. Besides that, to get the accurate result, we need more respondents and using Kahoot many times. Research also can be done to investigate effectiveness of Kahoot when students create their own quizzes and use the quiz to test their peers' knowledge.

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