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# Opening Up Education for Inclusivity Across Digital Economies and Societies



Patricia Cedeño de Pablos, Milledia D. Lytras,  
Xi Zhang, and Kwok Tai Chui

Kil Global Knowledge in Leadership

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# Chapter 10

## Kahoot!


### A Game-Based Learning Tool as an Effective Medium to Improve Students' Achievement in Rural Areas

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#### ABSTRACT

*Learning strategies in the digitalization era are vastly expanding. Students are comprised of the millennials for whom life cannot be separated from technology and the internet. The ever-expanding technology has posed new challenge on the teaching process of millennials, and one of which is the growing importance and increased involvement of technology that empower a host of new learning tools. One of the most prominent open-access teaching/learning tool is Kahoot! This chapter aims to complement studies about the use of game-based methods at higher education. The survey was conducted for 1 year at a university located in a small city in Indonesia. A total of 415 students were actively involved in measuring their perceptions of games-based learning tools called Kahoot! Furthermore, this study also measured differences in outcomes between faculties, types of subjects, and commonly used research methods. The result shows that Kahoot! positively impacts student academic achievement as measured by student motivation, enjoyment, engagement, and concentration.*

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## INTRODUCTION

Indonesia has witnessed major improvement on access to education in the last few decades (Rosser, 2018). According to the Director General of Learning and Student Affairs (2017), education in Indonesia is getting better. Based on the 2015 Program for International Student Assessment (PISA) report, Indonesia is ranked 62 out of 72 countries in the world (youthcorpsindonesia, 2017). This position has increased since 2017 in which Indonesia entered the World Education Ranking issued by the Organization for Economic Co-operation and Development (OECD) that ranked 57th out of 65 countries (Kabar Rantau, 2017). Based on another survey, Ali (2018) argues that Indonesia was in 108th position in the world with a score of 0.603. In general, the quality of education in Indonesia is still below Palestine, Samoa and Mongolia. Based on the survey, 44% of the population completed secondary education while 11% of the students failed to complete their education or dropped out of school.

The poor quality of education in Indonesia caused by various factors. In addition to curriculum issues (Suratno, 2016), Sukasni & Efendy (2017) added such factors as costs, educational goals, national exams, and facilities. The teaching system plays an important role in increasing the effectiveness of learning, according to Zulfikar (2009), improving the quality of teaching can be done through mentoring and recruitment of the instructors, but the application of learning assessment system is also another important matter that must be considered. Firman and Tola (2014) argues that teaching process in Indonesia requires ICT intervention as an important part of the curriculum and teaching tools for schools, universities and training institutions. Thus, teachers in Indonesia must be adept at utilizing ICT and are not resisting to adopt its latest development (Harendita, 2013). Moreover, lecturers should be able to keep up with every technological progress so that education can be more dynamic. One of the uses of technology in teaching is to get familiar with the use of ICT in the teaching process including the use of game-based teaching methods.

KUK et al. (2012) suggested that the game-based learning model is a new teaching strategy in the field of computer engineering. Pivec & Dziabenko (2004) has introduced games at the University. Gamification can be used across different levels of education and subjects (Bicen & Kocakoyun, 2018). Students can learn the topics more easily and handle difficult material in a fun way. Kahoot! is a popular e-learning that promotes metacognitive activeness in class and student attendance in college, both undergraduate and postgraduate.

Garut University is one of the private universities in Indonesia, located in Garut Regency, Indonesia. Kahoot! has been introduced and used at Garut University as a teaching tool since 2017 in several courses and several classes. Kahoot is commonly used as an evaluation activity before the lecture begins which is called readiness acceptance test – a kind of pretest – or becomes part of the quiz activity (post-test). The purpose of this study is to measure the effectiveness of Kahoot! in facilitating the students understanding, academic achievement and activeness. As its implication, the outcome of this study can be used as a consideration for the integration of ICT-based learning tools in overall teaching methods at Garut University in particular and in various campuses in Indonesia in general.

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# **Kahoot! A game-based learning tool as an effective medium to improve students' achievement in rural area**

**Abstract.** Learning strategies in the digitalization era are vastly expanding. Students are comprised of the millennials which life cannot be separated from technology and the internet. Globalization provides the millennials with more free access to education, insight, technology, and morals and culture. The ever-expanding technology has posed new challenge on the teaching process of millennials and one of which with growing importance is increased involvement of technology that empower a host of new learning tool. One of the most prominent open-access teaching / learning tool is Kahoot!. This study aims to complement studies about the use of game-based methods at higher education. The survey was conducted for 1 year at a university located in a small city in Indonesia. A total of 415 students were actively involved in measuring their perceptions of games-based learning tools called Kahoot!. Furthermore, this study also measured differences in outcomes between faculties, types of subjects, and commonly used research methods. The result shows that Kahoot! positively impact student's academic achievements as measured by student motivation, enjoyment, engagement and concentration.

**Keywords.** Learning strategies, Kahoot!, Globalization, Millenials

## **1. Introduction**

Indonesian has witnessed major improvement on access to education in the last few decades (Rosser, 2018). According to the Director General of Learning and Student Affairs (2017), education in Indonesia is getting better. Based on the 2015 Program for International Student Assessment (PISA) report, Indonesia is ranked 62 out of 72 countries in the world (youthcorpsindonesia, 2017). This position has increased since 2017 in which Indonesia entered the World Education Ranking issued by the Organization for Economic Co-operation and Development (OECD) that ranked 57th out of 65 countries (Kabar Rantau, 2017). Based on another survey, Ali (2018) argues that Indonesia was in 108th position in the world with a score of 0.603. In general, the quality of education in Indonesia is still below Palestine, Samoa and Mongolia. Based on the survey, 44% of the population completed secondary education while 11% of the students failed to complete their education or dropped out of school.

The poor quality of education in Indonesia caused by various factors. In addition to curriculum issues (Suratno, 2016), Sukasni & Efendy (2017) added such factors as costs, educational goals, national exams, and facilities. The teaching system plays an important role in increasing the effectiveness of learning, according to Zulfikar (2009), improving the quality of teaching can be done through mentoring and recruitment of the instructors, but the application of learning assessment system is also another important matter that must be considered. Firman and Tola (2014) argues that teaching process in Indonesia requires ICT intervention as an important part of the curriculum and teaching tools for schools, universities and training institutions. Thus, teachers in Indonesia must be adept at utilizing ICT and are not resisting to adopt its latest development (Harendita, 2013). Moreover, lecturers should be able to keep up with every technological progress so that education can be more dynamic. One of the uses of technology in teaching is to get familiar with the use of ICT in the teaching process including the use of game-based teaching methods.

KUK et al. (2012) suggested that the game-based learning model is a new teaching strategy in the field of computer engineering. Pivec & Dziabenko (2004) has introduced games at the University. Gamification can be used across different levels of education and subjects (Bicen & Kocakoyun, 2018). Students can learn the topics more easily and handle difficult material in a fun way. Kahoot! is a popular e-learning that promotes metacognitive activeness in class and student attendance in college, both undergraduate and postgraduate.

University of Garut is one of the private universities in Indonesia, located in Garut Regency, Indonesia. Kahoot! has been introduced and used at University of Garut as a teaching tool since 2017 in several courses and several classes. Kahoot is commonly used as an evaluation activity before the lecture begins which is called readiness acceptance test – a kind of pretest – or becomes part of the quiz activity (post-test). The purpose of this study is to measure the effectiveness of Kahoot! in facilitating the students understanding, academic achievement and activeness. As its implication, the outcome of this study can be

used as a consideration for the integration of ICT-based learning tools in overall teaching methods at University of Garut in particular and in various campuses in Indonesia in general.

## **2. Literatur Review**

### **2.1 Learning Strategy**

The traditional concept of learning strategy has its own instrument as its main mode of inquiry. However, of the many studies, only a few are able to explain practically the formation of learning strategies due to the difficulty of finding methods to extrapolate from theory to practice (Oha, 2016). Shi (2017) stated that a teacher is encouraged to choose the right learning techniques and strategies so that students understand the strategies and how to improve the level of independent learning. Interesting findings from the Sherri study in Kotz (2016) which indicate that millennials want to enjoy learning. If they think it is unpleasant then the material is considered boring and becomes less effective (Kotz, 2016). Skiba & Barton (2006) suggest using interactive devices such as web-based tools and interaction spaces that involve students in a common workspace.

### **2.2 Gamification**

Many experts agree that computers and hypermedia can be used as cognitive tools in learning, which give advantages as well as other things that use computer assistance (KUK et al., 2012). Gamification can be explained through three concepts; dynamics, mechanics, and components (Werbach & Hunter, 2012). Gamification using game-based mechanics, aesthetics and thinking to involve people, motivate action, promote learning, and solve problems also been studied by Kapp (2012). The use of games as teaching tools, especially primary schools has been evaluated in England and Italy (Allsop & Jessel, 2015), the result is that most teachers feel that the use of games in the classroom is very interesting, but a small number of teachers are still worried about the use of the game both in term of curriculum compatibility and how they monitor their students. Game-based teaching is also considered effective in improving students' mathematical abilities in Iran (Bahrami et al., 2012). Educational games can have positive impacts on student learning and motivation and this is influenced by the selection of the type of game as a learning strategy (Aina, 2013). Pivec & Dziabenko (2004) also said that the game-based learning model was very successfully used in formal education, particularly in military, medical, and physical training, etc. Moreover, Dellos (2015) claimed that using a game-based learning model works best in education.

### **2.3 Student Perception**

Perception is a very complex cognitive process that produces a unique picture of the world, a picture that may be very different from reality (Dhingra & Dhingra, 2011). Research on student perceptions of learning tools has been done by Chitanana (2010) on a tool called the Global Teenager project. Furthermore, Bicent & Kocakoyun (2018) conducted a survey of students' perceptions of Games-based learning, Kahoot!. The result is the gamification method increases students' interest in the classroom, and increases student ambition for success. Buckley et al (2017) explored the perceptions of undergraduate students regarding gamification effectiveness that was influenced by motivation, competition scores, group dynamics, gender and challenges faced in learning activities. The study of student perceptions of the learning methods offered by the campus was carried out by Lui et al. (2006), by experimenting using weblogs, and the results concluded that weblogs were able to gradually cultivate student perceptions. Perception is the awareness of something through the senses by seeing, hearing, understanding, or becoming aware of something. Important perception is known because it helps in shaping one's goals and their views on something included in the learning objectives.

### **2.4 Student Achievement**

The teacher's method of delivering material has a significant impact on student achievement (Heck, 2009). Different student characteristics and practical learning models help students actively participate in discussions and solve problems according to integrated instructions (Wei et al., 2018). Riswanto & Aryani (2017) added that student motivation affects student achievement.

Learning method using Kahoot! has a significant impact on motivation, engagement, enjoyment and concentration but does not have a significant impact on improving learning (Wang et al., 2016). Kahoot! also proven to increase the motivation and ambition of students in general (Bicen & Kocakoyun, 2018).

Iwamoto et al. (2017) added that Kahoot! can improve student performance because it creates fun and engagement.

## **2.5 Motivation**

Motivation refers to the reasons underlying behavior that are characterized by desire and will (Lai, 2011). Motivation is also one of the most important factors that influence the success of gamification (Sailer et al., 2017). Academically, motivation is defined as the pleasure of learning in school accompanied by assignment orientation, curiosity, persistence, endogenous tasks, and daring to do new, difficult and challenging tasks (Gottfried, 1990). Complex motivational constructs related to learning and offering a curriculum that is changed by applying theory and motivational research conducted by Vero & Puka (2017). The results of the study recommend how motivation can erase individual and cultural differences, the development of change, and the context of the classroom. Learning motivation can be improved by using the gamification method, not only increasing motivation, but also having a positive effect on the subject (Samur, 2015). Kahoot! is a gamification method that can improve student learning motivation (Licorish et al., 2017).

## **2.6 Enjoyment**

Enjoyment is sometimes called "interest" (Blunsdon et al., 2003). This is still considered important in university level learning (Winch, 2017). The importance of enjoyment in learning is also conveyed by Al-Shara (2015), where the love and respect of the teacher and the giving of opportunities are the factors that enjoyment. Enjoyment comes from kinesthetic experiences and the attainment of personal goals and is defined as "positive affective responses to experiences that reflect general feelings such as pleasure, likes, and joy" (Scanlon & Lewthwaite, 1986).

## **2.7 Engagement**

Engagement is not a new concept for education, for a long time many educators have been interested and concerned with student engagement (Kim et al., 2017). Learning engagement is defined as behavior directed to show deep involvement in learning activities (Ke et al., 2015). Development of game-based learning activities increases student involvement in learning (Poondej & Lerdpornkulrat, 2016). Student involvement refers to the extent to which students' active involvement, level of attention, interest, and enthusiasm is shown by students when they take part in the learning process (Reeve, 2012). The use of games ensures that learning methods will lead to integrated student involvement and compile learning experiences that give rise to high motivation (Ke et al., 2015). Engagement is an experience that continues to improve concentration, interest, behavior, and cognitive involvement during activities (Shernoff, 2013). Licorish et al. (2017) reports that the use of Kahoot! can foster interactivity and engagement of students during college, through the process of answering questions, participating in quiz, and discussions triggered by Kahoot!. Use of Kahoot! encourage broader participation in the class compared to conventional classes that do not use the gamification method.

## **2.8 Concentration**

Deep investment is very feasible regarding productive concentration using mobile learning (Li & Yang, 2016). Lu & Yang (2018) suggest that there are significant interaction effects of visual/verbal learning styles on learning achievement. Li & Yang (2016) conducted an almost similar experiment on university students namely how cell phones can have an effect on the interaction of teaching styles and interests, as well as the concentration of student learning. The results of the study indicated that appropriate cellular learning material must be developed and used to educate students based on their respective concentration, interests, and learning styles.

## **2.9 Learning Outcome**

Learning outcomes are statements that describe knowledge or skills that must be obtained by students at the end of a particular task, class, course or program, and help students understand why such knowledge and skills will be useful to them (Greenleaf, 2008). According to Battersby (1999) of the Learning Outcomes Network explains that learning outcomes are more than just a few sentences added to existing lesson plans or curricula; on the contrary, the development of learning outcomes and their use in one instruction unit forms learning and assessment activities and can increase student involvement and learning. Meanwhile, Lesch (2012) also stated that learning outcomes are statements of something very important that is achieved by students that show the end of the program. Learning Outcomes can be seen

either from the results of the quiz or test scores (Iwamoto, 2017). The purpose of learning outcomes is to clarify to students, what is expected as students when successfully completing students/courses/programs (UNSW, 2017). Good learning outcomes emphasize application and knowledge integration, so students will be able to use the material, both in the context of the classroom and more broadly. Learning outcomes differ from the goal; the learning outcome is related to the results of the learning process, while the aims are related to the output of the teaching and the instructor's intentions (Gosling & Moon, 2002).

### 2.10 Kahoot!

Plump & LaRosa (2017) mentioned that Kahoot! is an appropriate game and provides good experience for undergraduate and postgraduate students. The use of the Kahoot! application is very easy and simple to follow (Bicen & Kocakoyun, 2018). After making a quiz question, the lecturer logs into the Kahoot account! which is usually "My Kahoots!". The lecturer then receives a PIN code that is informed to the student, and by entering the same PIN code in Kahoot! on their respective devices (eg gadgets and laptops), students can already take the Kahoot! quiz (Thomas, 2014). Kahoot! design has a combination of mechanics, dynamics and components that support the positive impact of learning (Bicen & Kocakoyun, 2018). Table 1 below shows Game Mechanics and Game Dynamics from Kahoot!.

Table 1. Game Mechanics and Game Dynamics

Game Mechanic	Game Dynamics
Points	Reward
Level	Status
Trophies, Badges, Achievements	Achievement
Virtual Goods	Self-expression
Leader Boards	Competition
Virtual Presents	Altruism

Source: Bunchball (2010)

The use of Kahoot! in Turkey provided extraordinary results in which students were driven by their ambition to excel in their class and thus it has positive motivational effects on students (Bicen & Kocakoyun, 2018). Kahoot! tested on economics courses for non-economic majors at Harper Adams University in UK and the results were very impressive especially in respect to the atmosphere of active learning in the classroom when Kahoot! played (Mu & Paparas, 2015). Whereas according to Dellos (2015), Kahoot! creates a pleasant and competitive environment in promoting learning and being able to improve student academic achievement (Iwamoto et al., 2017).

### 3. Methodology

This research is a type of experimental research with a pre-test and post-test model. The population of this study was level 3 (third year) students consisting of 5 classes of the Faculty of Economics and 4 classes of the Faculty of Social and Political Sciences at the University of Garut. A total of 415 students participated in this survey, where all of them were observed as respondents (saturated samples). Courses that use kahoot! in teaching activities include decision making theory, management control systems, research methods and social statistics. Respondent profile research is presented in Table 2.

Table 2. Profile of Respondents

No	Faculty	Courses	Class Number	Number of Respondents	Control Respondent
1	Economics	Decision making theory	1	40	40
		Management control systems	2	60	30
		Research methods	1	40	40
2	Social and Political Sciences	Decision making theory	2	70	35
		Social statistics	1	30	30
Total			7	240	175

The treatment descriptions of the research process were as follows:

- i. All students who were treated and assume the role as controls were given lecture material, 4 days before the lecture day; they were told that they would be given a quiz before the lecture took place.
- ii. Students who were treated were also asked to install Kahoot! on a smartphone that could be downloaded via Google Play. For students who did not have an Android application, they could use a laptop. Students were also told that Kahoot! would be a quiz activity learning tool.
- iii. For all classes that were treated, quiz questions were given in the form of multiple choices with each question provided with 20 seconds as the time to choose the correct answer.
- iv. Through the Kahoot! application, participants would compete to be the fastest in choosing the correct answers. The faster and the higher amount of correct answers, the higher the score they got. Questions answered incorrectly, got a zero score.
- v. After answering questions, in real time, participants would also know that their answers were right or wrong.
- vi. Kahoot! then shows the leaderboard that contain 5 top-ranked participants at the end of each question. Kahoot! also provided special notification if there were participants who suddenly overtake other participants or made the best progress.
- vii. The lecturer as a facilitator, provided brief explanations of the questions that rose at the end of each question and also all of available choices as well as the argument for the right answers.
- viii. If in the middle of the game, participants got unexpected trouble, such as smartphones battery outage or got disconnected from the internet, the game cannot be stopped or repeated and thus the participant was automatically eliminated.
- ix. After the game was finished, the teacher would immediately be able to see the student's performance for each question, including information on how long did it take for students to answer the questions and the order of students based on time needed to answer the question.
- x. The results of the quiz were downloaded and stored in excel format.
- xi. The quiz using Kahoot! were held 7 times from 14 meetings within the same semester.
- xii. The questions of the quiz on the same subject were the same even though the subject were attended by 2 classes.

The results of the quiz are processed data obtained from Kahoot! and then it becomes the input that is processed to produce descriptive statistics namely mean and standard deviation. The data are further analyzed by using independent t-test to make a comparison between 2 groups and using ANOVA testing for 3 groups. The comparison test is to test the differences between groups by using 0.05 significance levels. The design of the research test and its hypothesis for the two groups is presented in Figure 1.

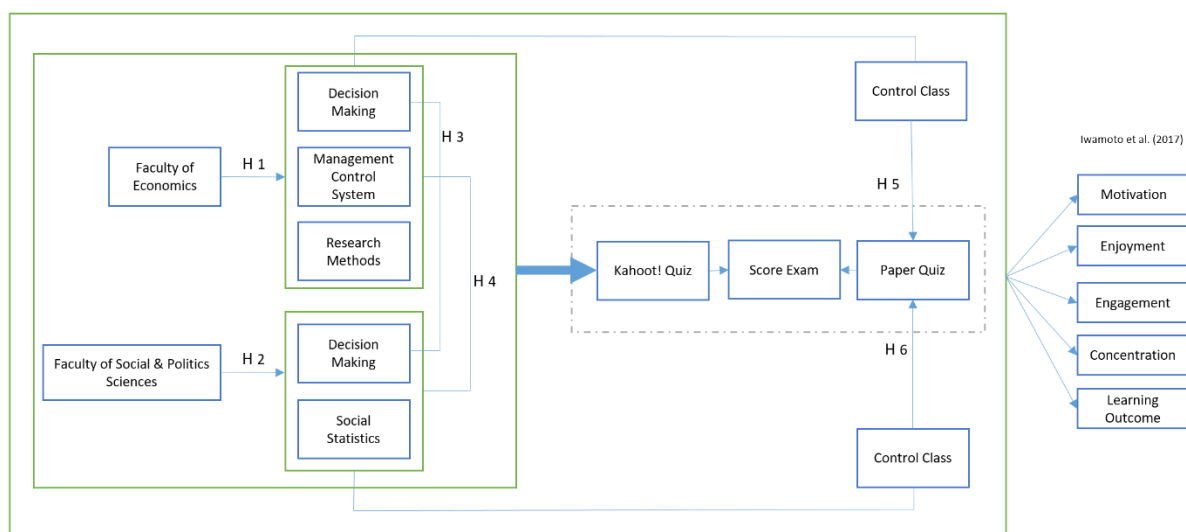


Figure 1. Conceptual Framework

Table 3. Testing Scheme for 2 Groups

No	Group 1	Group 2	Hypothesis
1	Faculty of Economics	Faculty of Economics (control)	H <sub>0</sub> : There is no difference in the test results between using Kahoot! in learning activities with conventional quiz method on students of the Faculty of Economics, University of Garut

			H <sub>1</sub> : There is difference in the test results between using Kahoot! in learning activities with conventional quiz method on students of the Faculty of Economics, University of Garut
2	Faculty of Economics	Faculty of Social and Political Sciences	H <sub>0</sub> : There is no difference in the quiz results using Kahoot! between students of Faculty of Social and Political Sciences, University of Garut  H <sub>1</sub> : There is difference in the quiz results using Kahoot! between students of Faculty of Social and Political Sciences, University of Garut
3	The course of Decision Making Theory in Faculty of Economics	The course of Decision Making Theory in Faculty of Social and Political Sciences	H <sub>0</sub> : There is no difference in the quiz results using Kahoot! between students of Faculty of Social and Political Sciences, University of Garut in the Subject of Decision Making Theory  H <sub>1</sub> : There is difference in the quiz results using Kahoot! between students of Faculty of Social and Political Sciences, University of Garut in the Subject of Decision Making Theory
4	The course of Decision Making Theory in Faculty of Social and Political Sciences	The course of Social Statistics in Faculty of Social and Political Sciences	H <sub>0</sub> : There is no difference in quiz results using Kahoot! between the subjects of Decision Making Theory and Social Statistics courses in students of the Faculty of Social and Political Sciences, University of Garut  H <sub>1</sub> : There is difference in quiz results using Kahoot! between the subjects of Decision Making Theory and Social Statistics courses in students of the Faculty of Social and Political Sciences, University of Garut
5	Faculty of Social and Political Sciences	Faculty of Social and Political Sciences (control)	H <sub>0</sub> : There is no difference in the test results between using Kahoot! in learning activities with conventional quiz method on students of the Faculty of Social and Political Sciences, University of Garut  H <sub>1</sub> : There is difference in the test results between using Kahoot! in learning activities with conventional quiz method on students of the Faculty of Social and Political Sciences, University of Garut

Table 4. Testing Scheme for 3 Groups

Group 1	Group 2	Group 3	Hypothesis
The course of Decision Making Theory, management control systems, research methods and social statistics.	The course of Management Control Systems	The course of Research Methods	H <sub>0</sub> : There were no significant differences between the calculated averages from the quiz results in the Course of Decision Making Theory, Management Control Systems and Research Methods  H <sub>1</sub> : There were significant differences between the calculated averages from the quiz results in the Course of Decision Making Theory, Management Control Systems and Research Methods

In addition to conducting comparison tests by using scores as the indicators to measure learning outcomes, the questionnaires are also distributed to all students who learn to use Kahoot! and asked for their responses regarding the impact of Kahoot! towards motivation, engagement, enjoyment and concentration. The indicators in the questionnaires are adopted and modified from Wang (2016). The scale used in the questionnaire is Likert scale with a rating of 4 represents strongly agree, 3 represents agree, 2 represents disagree and 1 represents strongly disagree. The data processing uses the concept of the value range as follows:

*Stage 1:* determine the lowest and the highest score range by multiplying the number of saturated samples,  $N = 240$  respondents with the lowest weight (score 1) and the highest weight (score 4). The lowest range 240 and the highest range is 960.

*Stage 2:* determine the interval for each score using the formula

$$Rs = \frac{N(n-1)}{5}$$

Description:  $N$  = number of samples;  $n$  = number of assessment criteria. In this study  $N = 240$  and  $n = 4$  (from Likert score), so that the resulting interval:

$$Rs = \frac{N(n-1)}{5} = \frac{240(4-1)}{4} = 180$$

*Stage 3:* after determining the interval, the next step is to list the rating scales for each criterion, presented in Table 5.

Table 5. Interval Description

Interval	Description
240 – 420	Very Poor
421 – 600	Poor
601 – 780	Good
781 – 960	Very Good

## 4. Results and Discussion

### 4.1 Characteristics of Research Objects

#### a. Profile of the Faculty of Economics, University of Garut

The Faculty of Economics of University of Garut is the most favorite faculty at University of Garut with the highest student intake scores among other faculties at University of Garut. The faculty consists of three study programs namely management, accounting, and tourism. From the curriculum and research activities, this faculty is dominated by a quantitative approach.

#### b. Profile of the Faculty of Social and Political Sciences, University of Garut

Unlike the Faculty of Economics, the Faculty of Social and Political Sciences (FISIP) of University of Garut consists of only 1 study program which is the science of state administration. The number of students range between 120-150 people per year. In term of curriculum and research activities, this faculty is dominated by qualitative approach. There are slices of courses with the Faculty of Economics, in addition to compulsory subjects such as statistics, decision-making theory courses which are taught by the same lecturers that also teach in Faculty of Economics.

#### c. Course Descriptions of Decision Making Theory

This course contains the concepts of decision making in organizations that deal with strategic issues that support their effectiveness such as: bounded rationality, uncertainty, negotiation, game theory, complexity, and system thinking.

#### d. Course Description Management Control Systems

The Management Control System is a system used by the management to ensure that the organization has implemented the strategy efficiently and effectively in order to achieve the stated goals. The management control system consists of the management control structure and process. The management control structure is the elements that form a control system that consist of responsibility centers. The management control process is the way the management control system works which consists of programming, budgeting, measurement, reporting and analysis.

*e. Course Descriptions for Social Statistics*

This course discusses issues related to collecting, processing, presenting and analyzing data as well as procedures for drawing conclusions in general data, using either point data or periodic data. Data analysis methods used in drawing conclusions including the size of the central value, dispersion, gap and rift, index, periodic data analysis and regression, also correlation analysis. This course also discusses theories, concepts and techniques for drawing conclusions on population parameters based on statistical values derived from sample data. The discussion in this course emphasizes statistical estimation and testing techniques.

**4.2 The Impact of Kahoot! towards Student Achievement**

**4.2.1 Impact to Motivation**

One research that is worth to be noted on the importance of developing academic motivation was carried out by Panisoara et al. (2015). Growing student motivation is very important because it can help good achievement (Meece & McColskey, 1997). Table 6 shows students' responses to the impact of Kahoot! towards increasing student motivation in the class. At first, many students followed Kahoot! because it was requested by the lecturer, but after joining Kahoot!, their motivation developed, because there were many simple insights they got during Kahoot! Although, Sailer et al. (2017) raised the issue of how different aspects of gamification (Kahoot!) affect different motivational results. Licorish et al. (2017) explained that Kahoot! motivate students to be able to perform well in lectures, engage with lecturers, friends and material content, also motivate students to learn to compete in class.

Table 6. Student Response Regarding Motivation in Playing Kahoot!

No	Item	Total Score	Mean	Category
1	I join Kahoot! based on the instructions of my lecturer	900	300	Very Good
2	I don't think Kahoot! important to do	310	103,3	Very Poor
3	I took the quiz using Kahoot! because there are many new knowledge that I can get	910	303,3	Very Good

**4.2.2 Impact to Enjoyment**

Enjoyment improve students understanding about the course material and any material can be manipulated to add more fun (Winch, 2017). Designing a pleasant learning atmosphere for students are the responsibility of a facilitator. Fun learning is very important in the learning process so that students can enjoy learning and therefore learning objectives can be achieved effectively. Table 7 shows that generally students at the University of Garut provide positive feedback as to Kahoot! ability in stimulating enjoyment. In short, Kahoot! could reduce boredom. There is an interesting finding as showed by Table 10, which reveals that students think that "to complete the quiz giving me a satisfaction" does not received the highest possible response (i.e. very good), but if it done in a fun way, the result is quite satisfactory.

Table 7. Student Response Regarding Enjoyment in Playing Kahoot!

No	Item	Total Score	Mean	Category
1	To complete the quiz gave me satisfaction	780	260	Good
2	The quiz was boring and not engaging	400	133,3	Very Poor
3	It gave me satisfaction to complete the quiz in a	890	296,7	Very Good



	satisfactory way			
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### 4.2.3 Impact to Engagement

Gamification of education is an educational approach where the mechanism of play is applied (Poondej & Lerdpornkulrat, 2016). Table 8 shows that students consider Kahoot! raises engagement in learning with scores that fall within “very good” category. These results are in line with the results of the study of Wang et al (2016) with the same indicator, namely “I felt increased pulse when I answered questions in the quiz”. The results of this study are in line with the results of research by Licorish et al. (2017) who suggested that Kahoot! as one of the gamification platforms gives students more opportunities to engage with lecturers, colleagues and lecture content by changing class dynamics. The importance is also noted by Ke et al. (2015) which argues that content engagement during the game is needed as a core action game. According to Radoff (2011), the level of engagement is good when playing games fall into the "flow" category. Flow is an optimal mental condition where there is a balance between challenges in the game and the skill of the player (Radoff, 2011). El-Nasr & Smith (2006) have proven that the use of the Kahoot! application for Computer Science, Mathematics and Physics courses can enrich student learning experiences and support student engagement.

Table 8. Student Response Regarding Engagement in Playing Kahoot!

No	Item	Total Score	Mean	Category
1	To do well on the quiz was the most satisfactory in the lecture	870	290	Very Good
2	I felt increased pulse when I answered questions in the quiz	850	283,3	Very Good

### 4.2.4 Concentration

In learning, concentration really needs to be practiced. Some students expressed the importance of concentrating. One student even said that, "when we concentrate, we can do things perfectly and on target, and the possibility of mistakes will decrease." Other student said, "Concentration makes us confident because we can make better decisions and make better choices and overcome problems". Table 9 shows that Kahoot! can be used as a tool for students to practice their concentrating skill. Students response "very good" on two indicators and "good" on one indicator is a condition implied that students expect some help from their friends when answering questions on Kahoot!.

Tabel 9. Student Response Regarding Concentration in Playing Kahoot!

No	Item	Total Score	Mean	Category
1	I concentrated on the quiz to get correct answer	950	316,7	Very Good
2	I wanted to answer quiz without help from others	780	260	Good
3	I wished to do better on the quiz than most other students in the class	800	266,7	Very Good

### 4.2.5 Learning Outcome

Table 10 shows in details the hypotheses which are accepted and rejected in this study. Based on the six hypotheses proposed, the findings show conclude that H0 are rejected in five hypotheses and H0 is accepted in one hypothesis. There are no significant differences in the results of the quiz that used Kahoot! between the Decision Making course and the Social Statistics course at the Faculty of Social and Political Sciences at the University of Garut. Presumably, it is because those courses taught by the same lecturer with the same syllabus and teaching method (No. 3).

In Hypothesis 1, the difference in the average score of the quiz between Decision Making Theory, Management Control Systems, and Research Methods are due to different approaches that are applied in those courses. Decision-making theory course at University of Garut use quantitative approach with

compulsory statistics courses meanwhile management control system course which is the continuation of the strategic management course is dominated by qualitative approach. As to research method course, it provides some overview of both the quantitative and qualitative approaches during the learning process.

Although the Statistics course is the prerequisite for Decision Making Theory courses (No. 2), it turns out that there are differences in the average score of the quiz that used Kahoot!. This result shows that there is no evidence that support a connection between the prerequisite courses and advanced courses in terms of student achievement. Hypotheses 4 and 5 show that there are differences in test results between the courses that use Kahoot! as part of the method and the courses that do not use Kahoot! both in Faculty of Economics and Faculty of Political and Science. The courses that use Kahoot! as a learning tool produces an average value higher than those that do not use. In general, the use of Kahoot! produces different impact in different faculty. It would be a good evaluation material for the faculty member between faculties regarding the causes of the differences. It can occur due to differences in approach, basic courses, and the overall learning atmosphere or the intake of student achievement.

Table 10. Test Results Using T-test

No	Faculty	Courses	Mean	Std. Deviation	Hypothesis Result
1	Faculty of Economics	Decision Making Theory	5254	1603	Ho Rejected
		Management Control Systems	4179	1562	
		Research Method	5906	3187	
2	Faculty of Social and Political Sciences	Decision Making Theory	5992	1585	Ho Rejected
		Social Statistics	7605	2681	
3	Faculty of Economics	Decision Making Theory	5254	1603	Ho Accepted
	Faculty of Social and Political Sciences		5992	1585	
4	Faculty of Social and Political Sciences	Treatment with Kahoot!	79	12	Ho Rejected
		Control	68	9	
5	Faculty of Economics	Treatment with Kahoot!	81	10	Ho Rejected
		Control	68	20	
6	Faculty of Economics	Overall	4980	2268	Ho Rejected
	Faculty of Social and Political Sciences		7121	2510	

## 5. Conclusion and Recommendation

Gamification is not only designed to produce pleasure for students. Kahoot! as a form of gamification is an instructional approach that can be used to increase the effectiveness of instruction in student learning. The results show that the teaching method that uses Kahoot! promote better understanding, achievement and activeness of the material. There are significant differences in achievement between classes that use Kahoot! and classes that don't use Kahoot!. The average class score that use Kahoot! is bigger than the class that doesn't use Kahoot!. Student intakes affect the final results of student achievement, as evidenced by the existence of differences in scores between students of the Faculty of Economics and the Faculty of Social and Political Sciences. Students in the Faculty of Economics have a better total final score because of better student intake. In general, students' perceptions on Kahoot! is very good. They argue that Kahoot! help them achieve more in class. Kahoot! is also considered as able in influencing motivation, enjoyment, engagement and practicing the concentration of students.

Standards of quality depend on the outcome of the program, assessment, measurement and comparison to meet the demands of modern society. The initial testing on the impact of Kahoot! in improving student achievement that is conducted in several pilot classes at the University of Garut found differences in results although only in different subjects or different faculties. The process of integrating gamification methods into traditional learning methods could produce different effects on different students, faculty policies, and different types of subjects although the results of the analysis cannot be obtained yet.

Despite of its merits, this research compares testing of learning outcome between several subjects and is carried out only in two faculties from seven faculties at University of Garut. Therefore, further study is needed to see how much influence Kahoot! has towards the learning outcome of the students of the University of Garut as a whole. In addition to comparison tests on the subject, comparison tests can also be conducted between undergraduate level (levels 1, 2, 3, and 4) at the University of Garut. Another recommendation from this study is the implementation of Kahoot! throughout the University of Garut. Students consider Kahoot! as able to provide positive results in term of motivation, engagement, enjoyment and concentration in the classroom. This is certainly a positive finding to support the growth of the University of Garut especially to enrich students' general learning experiences and to improve student achievement.

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