SOCIAL SCIENCES & HUMANITIES

Kahoot! It: Gamification in Higher Education

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ABSTRACT

Play is a social-centred process, able to boost motivation and promote learning across all levels and ages. With the growing push for creativity in the classroom as well as the application of effective technology in teaching and learning, it can be a daunting task for educators to find fitting competitive or game-based learning platforms. Foremost, educators need to consider elements such as motivation and whether the platform is likely to foster and reinforce learning. In the present study, a cohort of undergraduates at a public university in Malaysia were exposed to the use of Kahoot!, a game-based learning platform, during their weekly lectures for one semester. The participants were students of English for the Media, which covers theoretical and practical dimensions. The latter dimension includes the learning and application of media language features and devices. Survey data (51 respondents) on the whole, indicated that the students found Kahoot! to be beneficial in terms of: 1) inducing motivation as well as engagement, and 2) fostering and reinforcing learning (for both theoretical and practical aspects). The 33-item questionnaire created by the researchers was also tested for reliability, with returned values indicating high internal consistency, thus making the instrument a reliable option for use in future studies. The findings of this study are of relevance to researchers, educators, course designers, and designers of game-based learning applications.

Keywords: Kahoot!, gamification, game-based learning, higher education, motivation, learning, knowledge reinforcement

INTRODUCTION

Technological advancement and its continuous progress has transformed how activities are performed on a daily basis. In the context of education, especially learning,

educators now have the opportunity to introduce and integrate play-based learning activities via technology in their instruction. The incorporation of play in learning has seen the emergence of a very unique concept of game-based learning. According to Zarzycka-Piskorz (2016), it is basically the use of game elements and game design techniques in non-game contexts. Game-based learning or gamification rests on the experiential nature of a game that allows learners the opportunity to be fully involved in the learning cycle. Game-based learning also garners learners' full attention and promotes knowledge retention due to its 'play nature'.

Platforms that are play-oriented and infused with learning elements are often designed with defined outcomes related to the teaching and learning aims of a particular lesson or series of lessons. Although games are play-oriented, the designing principles behind such games are based parallel to relatively specific teaching and learning context aims. The principles allow for more engagement and fun during the learning process. The engagement and fun factors of game-based learning have been found to boost learner motivation and sustain retention. Zarzycka-Piskorz (2016) highlighted that there exists strong evidence showing a relationship between game-playing and increased motivation as well as persistence.

Game-based learning tools such as Kahoot! supplement pedagogical practices with new technological solutions. Kahoot! is a digital game-based student response system that allows teachers and learners in classroom settings to interact through competitive knowledge games using existing infrastructure. Wang, Zhu and Sætre (2016) pointed out that Kahoot! represents a new generation of student response systems that focuses on student motivation and engagement through gamification. This platform is apt for increasing motivation and engagement (which promotes learning), and for assessing students' understanding of a lesson. Furthermore, gamification develops learners' metacognitive abilities, promotes empathy, and builds teamwork skills.

Additionally, a recent study on Kahoot! by Wang and Lieberoth (2016), involving almost 600 students, reiterated the advantages of using the game-based platform for learning; specifically, they reported that variation in the use of audio and points affected concentration, engagement, enjoyment and motivation, and that Kahoot!'s audio and music features affected classroom dynamics in a significant and positive manner.

In short, Kahoot! purportedly offers a host of benefits and allows educators to be creative and students to be motivated, intrinsically and extrinsically. Game-based learning provides a thrill from the ordinary, a thrill which is absent from traditional instruction and everyday life. Tools like Kahoot! can make students enjoy and continue doing tasks that they

normally would not. In her commentary on gamification, McGonigal (2011, p. 124) quite aptly stated the following:

> The real world just doesn't offer up as easily the carefully designed pleasures, the thrilling challenges, and the powerful social bonding afforded by virtual environments. Reality doesn't motivate us as effectively. Reality isn't engineered to maximize our potential. Reality wasn't designed … to make us happy. Reality, compared to games, is broken.

It is therefore viable to look into the impact of Kahoot! on the motivation and engagement of learners as well as its influence on their learning, not only at the school level but also within the context of higher education to gauge if the platform would prove to be useful for tertiary learners.

Problem Statement

It is said that "a motivated learner can't be stopped" (Prensky, 2003, p. 1). Unfortunately, much of the content that university learners today have to acquire, be it theoretical or practical, is hardly motivating. According to Prensky (2003), the words 'boring', 'dry' and 'technical' are often associated with the teaching and learning process in general. He even noted that "It is probably safe to say that today's teachers, trainers and educators are rarely as effective as they might be in the motivational department, and this

often causes real problems in getting our otherwise highly-stimulated students to learn." (p. 1)

In essence, students do not experience effective learning when there is no motivation to do so, and it can be a daunting task for educators to find fitting methods that are highly engaging and likely to foster and reinforce learning. In this advanced and technology-saturated age, gamification is an emergent approach to tertiary-level instruction. Gamification promotes motivation and facilitates effective learning through the employment of game elements, mechanics and game-based thinking (Kapp, 2014), thus making it indispensable for the teaching and learning of content that students term as 'dry' and 'boring'. The problem, however, lies in the selection of suitable platforms that can truly engage our learners and help them learn.

Closer to home, results from a survey conducted among lecturers and students of Universiti Putra Malaysia demonstrate that both parties agree that the lecture method is the least favoured and is therefore not very effective (Ismail, Elias, Mohd, Perumal, & Muthusamy, 2010).

Similarly, Yap (2016) in her paper on transforming conventional teaching classrooms into learner-centred, multimedia-mediated classrooms, pointed out that many lecturers are still using conventional teaching and that in such classrooms, "while the lecturer is explaining and writing on the board, students will be copying the same thing onto their notes, some day-dreaming and some sleeping." (p. 106).

Thang et al. (2016), in their study involving four different Malaysian public universities, highlighted that Malaysian students prefer using technology for social networking rather than for academic purposes. They noted, however, that the students do have a favourable view towards the adoption of more technology into the classroom but tend not to invest time and energy in it. The researchers suggested a possible explanation for this, that this phenomenon could be attributed to the manner in which technology is used in the classroom. This implies that while technology is abundant, the real challenge rests in educators selecting the *correct* technological platforms for use in their classrooms (that is, gaming platforms that can effectively motivate students to pay attention and learn, as well as encourage sustained learning within the Malaysian context).

This is in tandem with Yunus et al.'s (2012) position that "It is now a challenge for educators to be able to choose the right game, and to create an effective learning environment suited for our Malaysian setting ..." (p. 360). The researchers suggested that educators in Malaysia work to manipulate gaming aspects for educational purposes, and take advantage of the entertaining and addictive qualities that are generally inherent in gaming tools.

In addition, despite a plethora of studies on learning and gamification, there is an unfortunate paucity with regard to such studies within the Malaysian context specifically in relation to the use of game-based learning in higher education, thus making the present study both timely and significant.

Research Objectives

The present study focuses on examining the suitability of Kahoot!, a game-based learning platform, for use in higher education within the Malaysian context. Specifically, the study looks at the effectiveness of Kahoot! in terms of its ability to:

1) induce intrinsic and extrinsic motivation
2) foster and reinforce learning (theoretical and practical aspects)

In addition, the study is a platform to test the reliability of the 33-item questionnaire created by the researchers.

Research Questions

The present study is guided by the following research questions:

RQ1: Does the use of Kahoot! during lectures induce intrinsic motivation among learners?

RQ2: Does the use of Kahoot! during lectures induce extrinsic motivation among learners?

RQ3: Does the use of Kahoot! during lectures help foster learning?

RQ4: Does the use of Kahoot! during lectures help reinforce learning?

Research Significance

This findings contribute to the emerging field of game-based learning, and offer direction in terms of selecting suitable gamification platforms for use in the Malaysian higher education among adult learners. The findings also provide direction with regards to educational policy-planning and are on the whole, of relevance to educators, learners, and course designers. Additionally, the questionnaire designed by the researchers (with all constructs tested for reliability) is also a contribution to the field, and is of significance to scholars engaged in game-based learning research.

LITERATURE REVIEW

Gamification

The growth of personal computing and the Internet has brought about gaming diversity in the field of education. New opportunities for play to foster learning are now widely available, and one aspect of play, that it influences learning , cannot be denied. Piaget (1962) asserted that play is a crucial element in one's cognitive development from birth through to adulthood. More recently, Piaget's theory was further supported by Fromberg and Gullo (1992). According to them, language development, social competence, creativity, imagination, and thinking skills are fostered and enhanced through play. Concurrently, Frost (1992) also stressed that "play is the chief vehicle for the development of imagination and intelligence, language, social skills, and perceptual-motor abilities in infants and young children" (p. 48). In relation to Piaget's theory, Vandenberg (1986), utilising Vygotsky's theory, pointed out that "play does not only reflect, it also creates thought" (p. 21).

In the context of education, the penetration of games into learning activities, also widely known as gamification, refers to the use of pedagogical systems that are developed with gaming designs but implemented within non-game contexts, including education (Deterding, Dixon, Khaled, & Nacke, 2011). The advent of computing and the Internet has allowed videos and computer games to be used in classroom activities for the enhancement of learning processes. Of late, Internet-accessible digital tools have made gaming a mobile learning tool that can accommodate many participants in a single game, via a single platform. Thus, this does not only work towards enhancing learning but also, practically, makes the teaching and learning process much more efficient and contemporary.

Kahoot!: An Introduction

The use of technology has been proven to foster learning and reinforce learning. The fostering and reinforcement of learning through the use of computers, smartphones and tablets have improved learners' engagement and active participation in classrooms. The use technology is also undoubtedly a great assistance to teachers in terms of helping to increase motivation as well as increase the level of student participation in class, and in terms of

evaluating students' overall comprehension and development. In addition, learners also get to enjoy the opportunity to engage themselves in their learning and monitor their own progress and understanding (Koile & Singer, 2006).

Kahoot! is a unique game concept, the result of the Lecture Quiz Research Project initiated in 2006 at the Norwegian University of Science and Technology (NTNU). It is a free game-based learning platform that aims to make learning fun across all subjects in any language, and can be used with many types of digital devices. Kahoot! can also be programmed to suit learners of all ages. The platform enables teacher-learner interaction in classroom settings of various sizes via competitive knowledge games using existing infrastructure (which should include good Internet connection). The embedded graphical interfaces and audio elements present a gaming experience that can potentially promote motivation and learning among students, including adult ones.

Kahoot!: Gamification for Student Motivation and Learning

Zarzycka-Piskorz (2016) underscored that gamified education builds upon motivation, especially intrinsic motivation that encourages an individual's engagement. Game-based learning approaches increase learners' interest in the subject matter because they enjoy (or experience pleasure) as they learn, and thus are more engaged and focused in the subject. This eventually fosters learning and also results in sustainable learning. According to Suzanne (2013), gamification is sustainable or is enhanced based on the desire of an individual to achieve the expected outcome. However, this desire is conditional to the individual's sense of excitement. In essence, games in any form have the potential to increase motivation in the classroom through engagement. Zarzycka-Piskorz (2016) further described Kahoot! as an online game that promotes both cooperation and autonomy in the classroom.

Kahoot! as a game-based student response system, can be aligned to Thomas Malone's theory of intrinsically motivating instructions (Malone, 1980). This theory indicate three categories that make learning fun: 1) challenge (goals with uncertain outcomes), 2) fantasy (captivation through intrinsic or extrinsic fantasy), and 3) curiosity (sensor curiosity through graphics and audio, and cognitive curiosity). As the theory is contextualised within the classroom learning setting, the second category, fantasy, is transformed into a game show with the teacher and students playing the role of game host and competitors respectively. The initial category, challenge, involves the students being challenged to answer questions and compete against other players. The final category, curiosity, is displayed via graphics and audio and getting the students to solve cognitive puzzles. The competitive nature of play among the students in getting the correct answers compensates for the lack of variety during game play (should there be any).

Several researchers have studied the effects of educational games with regards to learning outcomes and motivation levels. Papastergiou's (2009) study's respondents indicated that the game-based learning approach created more engaging, effective and active learning. They also indicated that they enjoyed a more relaxed learning environment. A study by Anderson and Barnett (2011) on pre-service teachers' understanding of electromagnetic concepts using a game called 'Supercharged!' compared to students who conducted a more traditional inquiry of the same concepts found that the group that used video games outperformed the group that did not in terms of learning outcomes. However, there are also contrasting studies. For instance, Squire (2005) found that introducing games in the classroom does not necessarily produce positive results and can instead result in complaining students and a lack of motivation.

According to Dichev and Dicheva (2017), as games engender motivation and engagement, the proposal to gamify learning is enticing. In relation to this position, research has indicated that motivation is one of the more crucial predictors of academic achievements (Linehan, Kirman, Lawson, & Chan, 2011) as it is linked to learning-related concepts such as engagement, effort, goals, focus of attention, self-efficacy, confidence, achievement, and interest. Therefore, gamification's benefit in terms of fostering and reinforcing learning is multifold. As highlighted by Caponetto, Earp and Ott (2014), the benefits of gamification augment learning in a variety of contexts and subject areas, and promote participatory approaches, collaborations, self-guided study, efficient completion of assignments, and make assessments more effective and easier to conduct. The integration of exploratory approaches into learning also facilitates student creativity and retention.

With regards to reinforcing learning, Bonde et al.'s (2014) study on the effects of combining gamification elements with simulations to improve the motivation and learning effectiveness of biotechnology students showed that a gamified laboratory simulation can increase motivation levels and learning outcomes when compared with traditional teaching. Furthermore, in higher education, games such as Kahoot! are suitable for various instructional practices such as lectures, tutorials, assignments, projects, lab activities, class exercises and discussions, as presented by Dichev and Dicheva (2017) in their work on gamifying education.

How does Kahoot! work?

Learning games such as Kahoot! are channels to evaluate whether learning objectives have been achieved. Therefore, game-based learning activities such as quizzes serve the purpose of reviewing content based on information taught. Prensky (2005) emphasised that learning games can serve multiple functions such as the teaching of various theories, skills and behaviours, as well as languages, creativity and communication.

Additionally, research by Zarzycka-Piskorz (2016) indicated that winning a game in learning shapes an environment based on the needs of the students and to a certain extent, the requirements of a course. In this context, multiple objectives can be targeted at and eventually achieved, for example, introducing, revising and consolidating theoretical as well as practical knowledge or content.

Kahoot! (https://getkahoot.com) is a free platform which provides teachers the opportunity to: 1) create their own quizzes and surveys, or 2) use existing quizzes and surveys made accessible for public use. Scores are displayed at the end of each game and teachers are able to save the information in a digital document. As for the learners (players), they are not required to register for a Kahoot! account and will instead be provided with a game PIN prior to joining a specific game at https://kahoot.it/#/ as directed by their teacher (game host).

A learning classroom also functions as a game show, where the teacher's role is that of a game show host and the students, the players or competitors. Without neglecting the learning elements, Gee (2003) indicated that well-designed video games are learning machines that are able to increase student motivation and engagement. The strength of these games lies in having learning occur naturally without the students realising that learning is actually taking place.

Wang (2011) noted that games can mainly be integrated in education in three ways. In the context of the present study, they were included as an integrated part of traditional classroom lectures over the course of one semester to improve motivation and learning, in line with past studies by Carver, Howard, and Lane (1999), Carnevale (2005), Wang, Øfsdahl, and Mørch-Storstein (2007), Wang, Øfsdahl, and Mørch-Storstein (2008) and Wu, Wang, Børresen, and Tidemann (2011).

Related Research

A research project was conducted at the Norwegian University of Science and Technology (NTNU) by Wang et al. (2016) to investigate the effects of a traditional non-gamified response system (Clickers), a game-based response system (Kahoot!) and paper-form formative assessment for a quiz in lectures. The results were significantly inclined towards the use of Kahoot!. Students were found to be more motivated by Kahoot! as compared to Clickers and the paper-form quiz. The students' responses also indicated a higher level of satisfaction and engagement. However, a positive effect on learning outcomes was not evident as no significant differences were found.

In a K-12 study, games were also found to improve motivation, classroom dynamics, and academic achievement (Rosas et al., 2013). Sharples (2000) asserted that game-based learning has a similar effect in higher education. This was evident in Tüysüz's (2009) study which demonstrated that using a game-based learning approach can

result in better achievement in chemistry as compared to traditional learning methods. Improved learning outcomes were also detected in studies by Miller, Schweingruber, Oliver, Janice and Smith (2002), and Liao, Chen, Cheng, Chent and Chan (2011). These findings are in line with past studies that highlight the importance of games in learning.

On the whole, when educators plan to integrate gamification into learning, it is vital that they realise the importance of motivation and thus, refrain from merely incorporating the gaming element into their lectures or lessons superficially. Their efforts should take into account motivation, (intrinsic as well as extrinsic), as the driving factor behind students' engagement and interest. In other words, when gamification is intended as part of the teaching and learning process, it is crucial to ensure that one's students will actually favour the game and that the game can actually sustain their interest for a considerable period of time.

Gamification in higher education brings in the fun element for students involved in academic programmes. Tools such as Kahoot! display good potential for application in teaching and learning at the tertiary level as it can potentially induce motivation as well as engagement, and promote learning and knowledge reinforcement. It is possible that educational transformation with the use of tools like Kahoot! may eventually make methods like rote-learning entirely obsolete.

METHODS

The present study implemented the survey approach, and reports results using a descriptive design based on quantitative and qualitative data. The researchers designed and utilised a comprehensive questionnaire comprising close-ended (five-point Likert scale) and open-ended items. According to Nelson (2008), in her work on survey research methods, such measures in a survey instrument enable researchers to investigate both quantitative and qualitative empirical premises.

However, the subjective nature of survey measures can present a problem – reliability. The researchers therefore, sought to remedy this problem by conducting a reliability analysis. The questionnaire consists of 33 items (four for demographic data) measuring different constructs, as reflected in the research questions presented earlier. The reliability analysis was conducted using the SAS 9.4 software platform to measure the internal consistency of the instrument as a whole.

The study was conducted in Universiti Sains Malaysia and purposive procedures were adhered to, taking into account the researchers' knowledge of the population of interest as well as the aims of the study.

Undergraduates of English for the Media, a four-unit course which covers theoretical and practical dimensions, were invited to participate in the study and access to the online questionnaire was via a Google Forms key. The portal remained accessible for two weeks. There were 51 out of 54

possible participants of various ethnicities who completed the questionnaire after being exposed to the use of Kahoot! in their weekly lectures for one semester (14 weeks). Each Kahoot! session was conducted post-lecture, and comprised one interactive multiple-choice quiz with approximately 10 to 14 items or questions based solely on the day's lecture. Each Kahoot! session also lasted no more than 15 minutes to prevent the possibility of a wear-out effect.

RESULTS

Table 1
Result of reliability analysis

Construct Measured	Cronbach's Alpha (α)	Level of Internal Consistency (Reliability)
Kahoot! Questionnaire	.97	Excellent

As shown in Table 1, the reliability of the questionnaire as a whole is excellent, with $\alpha = .97$. Interpretation of the obtained value is based on the commonly accepted rule of thumb for interpreting Cronbach's alpha (α) readings (George & Mallery, 2003).

Table 2
Respondents' Age Range

Age (years)	Number of Respondents (n)	Percentage (%)
21	4	7.8
22	18	35.3
23	23	45.1
24	5	9.8
27	1	2
	51	100

The respondents selected for this study comprised a mixed age group as shown in Table 2. The majority (45.1%) were 23 years old while the second highest range were respondents aged 22 years old. A total of 5 respondents were 24 years old, 4 were 21 years old and 1 was 27 years old.

Table 3
Respondents' gender, race and hometown

Category	Group	Number of respondents (n)	Percentage (%)
Gender	Males	11	21.6
	Females	40	78.4
		51	100
Race	Malay	28	54.9
	Chinese	20	39.2
	Indians	2	3.9
	Foreigners	1	2
		51	100
Hometown	Urban	23	45.1
	Semi-urban	22	43.1
	Rural	6	11.8
		51	100

Table 3 highlights the respondents' gender, race and hometown. 78.4% (*n*=40) of the respondents were females and 21.6% (*n*=11) were males. This table also classifies the respondents' race breakdown. The majority (*n*=28) were Malays, followed by Chinese (*n*=20), two Indians, and one foreign respondent. The last section of Table 3 illustrates the respondents' background in terms of their hometown; there appears to be a near equal proportion of respondents originating from the urban (*n*=23) and semi-urban (*n*=22) areas. Only six respondents were from rural areas.

Table 4
Respondents' prior exposure to Kahoot!

Item	True (%)	False (%)
I have never played Kahoot! before this year.	78.4	21.6

A significant number (78.4%) of the respondents conveyed that they had never played Kahoot! or experienced such exposure prior to taking the English for the Media course. About 21.6% of the respondents indicated their prior exposure to Kahoot!.

Table 5
Respondents' attitudes towards Kahoot!

Item	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
1. *I look forward to playing Kahoot!*	2	0	5.9	27.5	64.7
2. *I find Kahoot! interesting.*	2	0	3.9	11.8	82.4
3. *I find Kahoot! fun.*	2	0	3.9	13.7	80.4
4. *I get annoyed when I can't connect to Kahoot!*	5.9	3.9	21.6	25.5	43.1
5. *I feel excited when playing Kahoot!*	2	2	3.9	31.4	60.8
6. *I enjoy playing Kahoot!*	0	2	5.9	27.5	64.7
7. *I feel positive when playing Kahoot!*	2	5.9	2	35.3	54.9
8. *I focus on the items or questions in each Kahoot! session.*	2	0	3.9	35.3	58.8
9. *I respond to each item or question in each Kahoot! session.*	2	2	3.9	29.4	62.7
10. *I respond as quickly as possible to each item or question in each Kahoot! session.*	0	2	2	35.3	60.8
11. *I respond as accurately as possible to each item or question in each Kahoot! session.*	0	0	15.7	41.2	43.1
12. *I like the competitiveness in our Kahoot! sessions.*	0	2	11.8	31.4	54.9
13. *I am motivated by the prospect of winning in these Kahoot! sessions.*	2	5.9	11.8	29.4	51
14. *I pay more attention during lectures because I hope to win in the Kahoot! sessions.*	3.9	9.8	13.7	37.3	35.3
15. *I am eager to learn via Kahoot!*	2	0	13.7	37.3	47.1
16. *There is value in using Kahoot! for teaching and learning purposes.*	0	2	5.9	27.5	64.7
17. *Kahoot! should be used in higher education.*	0	7.8	7.8	21.6	62.7

1: Strongly Disagree; 2: Disagree; 3: Slightly Agree; 4: Agree; 5: Strongly Agree

Table 5 reflects the respondents' attitudes towards Kahoot!. It is noteworthy that 100% of the students expressed their positive regard for the effectiveness of Kahoot! in the academic context. An insignificant proportion of 2% strongly disagreed to nearly all the items listed in Table 5. An interesting trend of 98% of similar responses was recorded for nine items which supplies evidence with regard to the popularity of Kahoot! among the respondents – students looking forward to the sessions; finding it interesting, fun and enjoyable; responding quickly to and focusing on each item or question eagerly; being fond of the competitiveness in each Kahoot! session; preferring to learn via Kahoot!; recognising the value of using Kahoot! for teaching and learning purposes, and in higher education. About 96% of the respondents also perceived Kahoot! as exciting and were thus motivated to make the effort to answer every item or question during each Kahoot! session. A total of 92% acknowledged their positivity towards playing Kahoot!, and were especially motivated by the prospect of winning.

Table 6

Respondents' perceptions of Kahoot! for learning and knowledge reinforcement

Item		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)
1.	*Our Kahoot! sessions help me learn the gist of: A) Theoretical frameworks that I might have missed during lectures.*	0	2	5.9	29.4	62.7
2.	*Our Kahoot! sessions help me learn the gist of: B) Analysis models that I might have missed during lectures.*	0	2	9.8	37.3	51
3.	*Our Kahoot! sessions help me learn the gist of: C) Media concepts that I might have missed during lectures.*	2	0	7.8	35.3	54.9
4.	*Our Kahoot! sessions help me learn the gist of: D) Media language features or devices that I might have missed during lectures.*	2	0	5.9	41.2	51
5.	*Our Kahoot! sessions help me learn the gist of: E) Media writing techniques that I might have missed during lectures.*	0	2	7.8	37.3	52.9
6.	*Our Kahoot! sessions help reinforce (consolidate) my learning of: A) Theoretical frameworks.*	0	2	7.8	47.1	43.1
7.	*Our Kahoot! sessions help reinforce (consolidate) my learning of: B) Analysis models.*	0	2	9.8	43.1	45.1
8.	*Our Kahoot! sessions help reinforce (consolidate) my learning of: C) Media concepts.*	0	2	9.8	47.1	41.2
9.	*Our Kahoot! sessions help reinforce (consolidate) my learning of: D) Media language features or devices.*	0	2	7.8	45.1	45.1
10.	*Our Kahoot! sessions help reinforce (consolidate) my learning of: E) Media writing techniques.*	0	5.9	9.8	47.1	37.3

1: Strongly Disagree; 2: Disagree; 3: Slightly Agree; 4: Agree; 5: Strongly Agree

According to Table 6, the respondents' perceptions of Kahoot! account for their learning and knowledge reinforcement. An interesting trend was again captured for the first five items with 98% of the students communicating that Kahoot! did help foster their learning. They indicated that the Kahoot! sessions assisted them in learning the gist of information that they had missed during lectures in terms of the following aspects – theoretical frameworks, analysis models, media concepts, media language features or devices, and media writing techniques.

A similar trend of 98% agreement was found for items 6 to 9 in Table 6, in relation to the students' positive affirmation of the Kahoot! sessions helping to reinforce their learning with regards to theoretical frameworks, analysis models, media concepts, and media language features or devices. A significant portion (94.1%) of the students affirmed that the Kahoot! sessions helped reinforce their knowledge of media writing techniques.

The final item of the questionnaire is open-ended, allowing the researchers to garner a diverse array of qualitative data. The final item is as follows: "Please provide a comment about your experience with Kahoot! in this course."

The students reiterated that they found Kahoot! to be intrinsically motivating: "One of a kind learning experience"; "fun learning experience"; "highly effective"; "increases interest in the course"; "nice and engaging experience"; "Damn fun"; "enjoyable"; "Awesome!". The following responses also demonstrate the inducement of extrinsic motivation in the students: "enjoy the competitiveness"; "really look forward to Kahoot!"; "Kahoot! makes me feel more motivated and focus"; "write more comprehensive notes based on the lectures in order to answer Kahoot! at the end"; "Subconsciously, it feels like a flash revision that makes me remember the lecture more, winning or losing the quiz".

Students also highlighted that the use of Kahoot! during lectures help foster and reinforce learning: "I am always enjoying the learning process by playing 'Kahoot!' as it gives me the chance to recall and to retain what I've learned during lectures"; "very interesting way to revise after the lecture"; "good recap session"; "It is useful as it refreshes my memory of whatever I learned in class and tells me where are the main points of the lecture to be focused on"; "Kahoot helps me recall all info that was learned during class"; "reinforce students' memory of the particular topic, very helpful for learning and also recapping the lecture and really helpful method to learn and also revise".

Nevertheless, the students did highlight the limitations of using Kahoot!: "The limitation of playing Kahoot! is only the internet. Means that if the internet is slow then it will be difficult for me to click on the answer. Hence, I lost the game"; "great app, but the wifi connection sometimes sucks and we can't connect into the app"; "just the internet connection affects my mood to play Kahoot"; "it would be better if Kahoot has more features to make it a little more

challenging (for example, able to pick more than one answer)"; "It would be better if we can get faster wifi connection"; "just need better internet connection and we're good".

DISCUSSION

This study is grounded in the theory of intrinsically motivating instructions (Malone, 1980). The first element (challenge) of Malone's theory is reflected in terms of the students being challenged to engage in the Kahoot! sessions despite certain limitations (such as no prior exposure to Kahoot!, Internet connectivity issues) and the fact that the outcome of each session was uncertain. The second element (fantasy) was met through the students' evident captivation with Kahoot!, as demonstrated by their motivation and engagement towards Kahoot! in the findings. Lastly, the element of curiosity was met through their interaction with Kahoot!'s graphics and embedded audio features; this third element was also realised when the students experienced learning and knowledge reinforcement via Kahoot! (see Table 6).

The purpose of this study was to examine the effectiveness of Kahoot! in terms of its ability to induce intrinsic and extrinsic motivation while determining if this form of gamification is able to foster and reinforce learning. The results of the present study provide evidence of Kahoot! as a gamification tool that is able to induce intrinsic and extrinsic motivation among tertiary students. These positive findings are in line with Wang et al.'s (2016) study, which concluded that Kahoot! advocates a new style of learning that promotes motivation and facilitates engagement. More importantly, Zarzyeka-Piskorz (2016) postulated that when learning incorporates any form of gamification, the learning process becomes more engaging as intrinsic motivation is induced. Indeed, 98% of the present study's students indicated their high level of intrinsic motivation when engaging with Kahoot!, affirming it as a tool that has enhanced their learning experience in the English for the Media course. In fact, one student pointed out that "Most lectures especially in theoretical-based courses will have less interactive lecture sessions, where students only read and write notes. Seldom are the lecture sessions interactive, due to attitudes from both lecturers and students. I find that this type of lecture tend to make me lose focus during the lecture. But Kahoot! makes me feel more motivated and focus … Thank you Dr. for using Kahoot! Love it!".

Interestingly, the results also showcased the high level of extrinsic motivation induced by Kahoot!. This aspect is reflected in terms of the students indicating high levels of competitiveness during their Kahoot! sessions, their motivation at the prospect of winning, and their eagerness to learn via this platform. This strongly suggests that Kahoot! should be integrated into the teaching and learning cycles in higher education courses. These findings are testimonies to Papastergiou's (2009) research in relation to the effectiveness of games in encouraging better learning outcomes and better motivation at grasping academic concepts, which further concurs

with Linehan et al. (2011) who highlighted gamification as a significant predictor of students' academic success.

The results of this study support the notion that Kahoot! is effective in terms of its ability to foster and reinforce learning, especially with regards to theoretical frameworks, analysis models, media concepts, media language features or devices, and media writing techniques. The present findings are in tandem with past studies (Rosas et al., 2003; Tüysüz, 2009) that emphasise the effectiveness of Kahoot! in the academic context. The key findings of this study explicate the students' intrinsic and extrinsic motivation in using Kahoot! as a platform to foster and reinforce their learning, with most of them affirming that the Kahoot! sessions had not only helped them learn whatever they might have missed during the lectures, but that the sessions had also helped them significantly in terms of knowledge reinforcement and retention.

However, the students did point out the limitations of using Kahoot!, particularly the issue of wi-fi connection. The lack of a stable Internet connection had apparently hindered their responses to the quiz items. The question therefore arises as to whether they were negatively affected by this, but the key findings downplay this limitation as almost all the students indicated that they were motivated and engaged, and experienced learning as well as knowledge consolidation through the Kahoot! sessions conducted. In fact, most of the students also resorted to the use of their own Internet data plans when they experienced wi-fi connection issues.

CONCLUSION

Although the findings of this study cannot be generalised to the entire population of tertiary students in Malaysia, partly due to the diverse nature of different tertiary courses, the key findings offer significant insights into the effectiveness of using Kahoot! in higher education, among adult learners. It is, however, recommended that future studies employ samples from other academic courses and also from other universities. To have a more thorough understanding of the benefits of using Kahoot!, it is further recommended that future research in this area be more qualitative. While such recommendations are made, it is incumbent on stakeholders to realise that educators, students and administrators all play equally important roles in the creation of teaching and learning environments that are conducive, contemporary and relevant to today's generation of learners.

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