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RESEARCH ARTICLE

Learner Engagement in Using Kahoot! within a University English Proficiency Course

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ABSTRACT

Background/purpose – Game-based learning is becoming increasingly popular among educators in higher institutions. However, it can be a daunting task for educators to ascertain which of the currently available game-based learning platforms best suits their learners' needs. This study explored the suitability of Kahoot! as one of the most commonly used game-based learning platforms in education. The aim of study was to determine whether Kahoot! can be used to engage learners and reinforce learning for academic purposes in higher education institutions.

Materials/methods – Data were collected among 80 science and technology undergraduate students enrolled to an "English for Academic Communication" course, which is compulsory for English language proficiency at the participant university. The students were exposed to the use of Kahoot! through several predetermined quizzes conducted during their lessons over a single 14-week semester. The study employed a two-part, 24-item, Likert-type scale administered via Google Forms. The questionnaire was assessed using Cronbach alpha reliability analysis, which yielded a score of .97, confirming the questionnaire to be a reliable instrument.

Results – The study's findings revealed that the participant students found Kahoot! to be fun, enjoyable, engaging, and interesting to use.

Conclusion – The participant students also believed that Kahoot! was able to consolidate and reinforce learning in academic courses, which is integral to the higher education context in terms of creating better classroom dynamics.

Keywords – Kahoot!, learner engagement, game-based learning, English for academic purposes, higher education

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1. INTRODUCTION

Gamification in teaching and learning has become part of the new norm. Experts acknowledge that the concept of gamified teaching and learning can be applied in various disciplines with the aim of promoting and encouraging certain aspects of human behavior (Wood & Reiners, 2015). Central to the core discipline of gamification is classroom dynamics. This shift has led to the wider use of educational spaces (Ruhil Amal et al., 2020) and as such many educators have opted to utilize gamification to reinforce classroom learning. Gamification is believed to render positive results for students, with learning content presented in such a way that impacts teaching and learning on a whole new level. One of the many benefits that educators realize from gamification is its ability to enhance the learning process and motivate students (Lopez & Tucker, 2019). Gamification, therefore, is seen to encourage student learning as a supportive aid tool.

As the world is constantly evolving and adapting to the greater use of technology in teaching and learning processes, the application of web-based games such as Kahoot! became inevitable. Kahoot! has been recognized as one of the leading learning applications based on gamification, which was purposely designed to improve conventional learning through offering a more exciting user experience that can be accessed using various types of device. Kahoot! has in excess of 30 million users due to its freely available, real-time application, and has become widely accepted on a global scale (Chiang, 2020). It allows instructors to create interesting game-based quizzes, surveys, and other learning-based content in which students can compete against each other.

Gamification in the higher education context allows for a more fun approach for students involved in courses with an otherwise academic focus. For example, a study among Universiti Sains Malaysia communication students found that the application of Kahoot! encouraged both intrinsic and extrinsic motivation, as well as actively supported learning during lectures (Tan et al., 2018). The aim of that particular study was to examine the effects of using Kahoot! amongst the undergraduate student population in Malaysia. Similarly, Licorish et al. (2018) found Kahoot! to be effective when used as a learning tool in the classroom environment, with gamification assisting teachers to minimize improper classroom behaviors through its activities.

However, with many options available in game-based learning, it can be a daunting task for today's instructors to evaluate whether Kahoot! is truly suitable for their learners' needs. What is not yet clear is the impact of using Kahoot! to reinforce learning in the Malaysian higher education context. Hence, the current study aims to identify the suitability of Kahoot! to consolidate and reinforce learning for academic purposes among undergraduate students in Malaysia. The study sought answers to the following research questions:

- Does a significant difference exist between genders in terms of students' attitudes and perceptions toward the application of Kahoot! for academic purposes?
- In what ways is Kahoot! suitable for teaching and learning of academic courses at the university level?

2. LITERATURE REVIEW

Game-based learning platforms are commonly used since it is believed that they help to engage learners, and also to increase their motivation, enjoyment, and concentration. Experts have argued that using games in learning helps to integrate several traits such as introducing learning theories, skills, and languages (Prensky, 2005). In addition, researchers

have claimed that well-constructed learning games had been known to improve students' interaction among themselves as well as their motivation toward learning itself (Tan et al., 2018). The underlying premise is that gamification allows the learning process to take place wherein students naturally acquire new knowledge and skills.

In addition, gamification can be defined from the engagement process driven by certain variables. Groh (2012) defined gamification as a process involving users taking part in activities with features that aim to motivate. Another definition of gamification is a process governed by rules, with individual's self-engaging or with others within an artificial skirmish that produces a measurable outcome (Salen et al., 2004). Looking at these concepts, gamification is about the use of game-based elements and features applied within different settings. The process of gamification mainly requires people to restructure target work processes with game instruments aimed at adding an element of entertainment and to provide a pleasant user experience for learners (Wood & Reiners, 2015). In brief, we can say that gamification is a mixture of multiple parts that push individual skills to build certain aspects of behavior with the aim of supporting certain processes (Werbach & Hunter, 2020). Hence, gamification helps transform established activities with the injection of certain enjoyable elements in order to boost motivation and promote greater user engagement.

Kahoot! is one of many game-based applications currently used in teaching and learning. It is an application that focuses on a game-based student response system aimed at transforming the traditional classroom into a game show format (Boden & Hart, 2018). The application works on various platforms, either via personal computers or through a mobile device. Educators can set questions or polls on Kahoot! for their students to answer simultaneously using their preferred type of device. There are also predetermined quizzes that educators can select and edit based on the relevant personal learning objectives. Kahoot! provides multiple functionalities that are all widely considered user-friendly.

Kahoot! offers four different mode selections which are teacher, student, workplace, and social. Each mode presents a completely different set of structures in order to cater for the respective different needs. For example, in the "teacher" mode, users can control the game duration such as the timing of the questions, and users can create different sets of questions with different sets of answers. There are also options for students to respond to multiple-choice questions or yes/no questions. Additionally, Kahoot! allows students to participate under a pseudonym, affording a level of anonymity for those with low self-esteem issues or perhaps shy about the visibility of their responses (Boden & Hart, 2018). This function encourages learning without users feeling unnecessarily discriminated or victimized; for example, if their performance falls below that of the average standard.

A considerable amount of literature has been published on the impact of using Kahoot! in the teaching and learning context. In a study by Tan et al. (2018), the use of Kahoot! was shown to assist teachers in being more creative, leading to the improved motivation of students, and concluded that students became more engaged in learning. Supporting the usefulness of the Kahoot! platform, Licorish et al. (2018) claimed that its use by students in New Zealand helped to increase their enthusiasm, engagement, and understanding toward learning course content, as Kahoot! introduces a level of fun to in-class tasks. Several studies have examined the impact of using Kahoot! on classroom interaction, and have shown that Kahoot! can facilitate students to be more motivated and more engaged in learning content in the classroom environment (Ismail & Mohammad, 2017). In addition, Wang and Tahir (2020) stated that 33 studies have been conducted in which it was claimed that Kahoot!

enhanced the classroom atmosphere. Hence, it may be said that Kahoot! has been proven to be a very useful application that aids both teachers as well as students.

Recent research has suggested that Kahoot! should be implemented in the classroom environment since it can impact on student learning in various ways. Licorish et al. (2018) holds the view that Kahoot!'s impact is broad and that it can significantly enhance the classroom dynamic, improve students' engagement in learning, as well as to help inspire students in their knowledge acquisition. Their study explored 14 respondents using a qualitative approach to examine the usage of Kahoot! in a course, and found that students became more motivated and more focused in the classroom. Also, students were found to be more willing to take part in the activities, which resulted in a better learning environment with improved interaction among students and also with their teachers. Kahoot! was shown to create a positive learning environment that encourages students to feel comfortable when learning and communicating with each other.

One key aspect of using Kahoot! is that it increases user engagement in learning. For example, Tan et al. (2018) found that Kahoot! helps to advance the metacognitive aptitudes, empathy, and teamwork skills of students. The various features of the Kahoot! application assists teachers in developing the ability of students to collaborate and cooperate among themselves when solving quizzes or questions they are assigned. Besides, students have been shown to think critically when completing tasks on Kahoot! as instructed by their teachers. Licorish et al. (2018) stated that adopting a gamification approach to learning, such as Kahoot!, can prove useful in helping students. In a study by Novak (2010), the premise was that in using Kahoot!, teachers were able to apply a meaningful learning approach that highlights the constructive integration of thinking, emotion, and action that leads to empowerment for commitment and duty toward the learning process. Learners' performance and their engagement among themselves, as reported by Bawa (2018), to significantly improve when Kahoot! was introduced into the classroom environment, with students found to be more excited to answer quizzes using Kahoot!, thus lowering their anxiety in learning. Furthermore, using the features of Kahoot!, quizzes can be assigned to pairs or small groups of students which fosters student discussion in a competitive yet fun manner.

In addition to elevating the learning process, the effectiveness of gamification depends on whether or not students perceive the games to be appealing, accessible, useful, and of a sufficiently high quality. These are integral elements required to support learning, especially in the context of the COVID-19 pandemic where learning required massive amounts of time spent online through distance learning (Ruhil Amal et al., 2020). Kalayci and Humiston (2015) contended that students' belief and attitudes toward the use of web-based education such as gamification was one of the essential elements that would determine its success. It was found that students rated gamification-based applications as more interesting and more valued as useful educational tools compared to other educational applications (Papastergiou, 2009). The study also found that students who continued to use gamification-based applications throughout the semester stated positive impacts on their learning and engagement.

Recent developments in the field of gamification have led to renewed interest in using Kahoot! for educational purposes. Wang and Tahir (2020) claimed that 48 studies have investigated the use of Kahoot! in education. One key finding highlighted that Kahoot! was found to improve students' test results, and that interaction among students increased

when used in the classroom environment. It was also found that students had a positive perception toward the use of Kahoot! in the classroom, thus producing a positive effect on students' attention, self-confidence, motivation, and engagement (Wang & Tahir, 2020). With regards to learners' age, Kahoot! was proven as suitable for the creation of interactive teacher-learner situations in the classroom setting through knowledge-based games whilst embedding the subject knowledge (Tan et al., 2018).

A considerable amount of literature has suggested that Kahoot! is regarded as one of the best free-to-use learning tools that utilizes web-based technology. It has been proven to create a more interactive classroom environment that improves the motivation of learners. Recent studies examining students' and teachers' beliefs about Kahoot! have reported positive attitudes about its use in the classroom, regardless of students' age or proficiency level. On the negative side, significant issues with this kind of application have been reported as Internet connectivity and time. Students have reported that with the requirement to maintain an active Internet connection, there have been delays experienced which may have demotivated some from using Kahoot! (Chiang, 2020). Teachers also need to emphasize the color and font selections when applying Kahoot! in the learning environment in order to ensure that the questions presented are suitable and visually appropriate for their students. As such, the current small-scale study aims to investigate the perceived effectiveness of using Kahoot! at the university level to promote student engagement and to reinforce learning on academic courses.

3. METHODOLOGY

The focus of this study was to explore the suitability of using Kahoot! as a game-based learning platform to engage and reinforce learning within a higher education context. The study was conducted within a compulsory Level-1 English language proficiency course at a public university in Malaysia. A mixed-method approach was utilized as the research design, and the first section of data analysis is reported descriptively.

This study adopted purposeful sampling among 80 students enrolled to the "English for Academic Communication" course at the university during the first semester of the 2020-2021 academic year. The participants were from various ethnicities and were enrolled to various science and technology programs of study at Universiti Malaysia Pahang.

The students were invited to answer a Likert-type scale survey that was posted online using Google Forms following their use of Kahoot! in their course for a period of one semester (14 weeks). During the COVID-19 pandemic, all courses were conducted online; hence, learners received no face-to-face teaching throughout the entire semester that the current study took place. Table 1 presents the demographic information of the study's participants.

Table 1. Participants' demographic information

Profile	Categories	Frequency (*f*)	Percentage (%)
Gender	Female	56	70.00
	Male	24	30.00
Age	20 years	3	3.80
	21 years	21	26.30
	22 years	26	32.50
	23 years or above	30	37.50

Profile	Categories	Frequency (f)	Percentage (%)
Faculty / Centre	Faculty of Industrial Sciences & Technology	13	16.25
	Faculty of Chemical & Process Engineering Technology	6	7.50
	Faculty of Civil Engineering Technology	12	15.00
	Faculty of Electrical & Electronics Engineering Technology	3	3.75
	Faculty of Mechanical & Automotive Engineering Technology	4	5.00
	Faculty of Industrial Management	8	10.00
	College of Engineering	34	42.50
Education entry into UMP	Matriculation	28	35.00
	STPM/ A LEVEL / Foundation	13	16.25
	Diploma	34	42.50
	Other (overseas qualification)	5	6.25
Ethnicity	Malay	59	73.80
	Chinese	10	12.50
	Indian	7	8.80
	Other: (Kadazan, Bidayuh, Sikh)	1	1.30
	Other: Overseas	3	3.80
Home town	Urban	27	33.80
	Semi Urban	40	50.00
	Rural	13	16.30

From Table 1, it can be seen that the students were studying under various science and technology programs, that 70% ($n = 56$) were female and 30% ($n = 24$) male, and that the participant students were aged between 19 and 24 years old. Most of the students were Malay (74%), while the rest were Chinese (12%), Indian (8%), and 6% other.

A 24-item, Likert-type scale was used to collect the study's data. The applied survey was adapted from Tan et al.'s (2017) study which conducted reliability analysis using the SAS 9.4 software. From their analysis, the Cronbach alpha value obtained was .97, which represented an excellent level of reliability (George & Mallery, 2003). The two-part survey was administered online via Google Forms, and the participant students took on average 15 minutes to answer the survey at the end of the semester.

There were three pre-determined Kahoot! quizzes conducted over the 14-week semester in order to consolidate and reinforce the main topics covered. These quizzes were selected from the Kahoot! database, but were adapted in order to meet the specific objectives of the course. For example, after providing input on reading strategies and completing several reading comprehension exercises, a Kahoot! quiz session was applied so as to reinforce the lesson on reading strategies.

A total of 90 students from three classes were invited to take part in the study; however, the researchers only received 80 Google Form responses. Data collection was performed at the end of the semester after the students had used Kahoot! in their lessons.

4. FINDINGS

Most of the students showed positive attitudes towards the use of Kahoot! in learning. An average mean score of 4.57 was revealed related to the participants' attitudes toward Kahoot! The highest mean score was 4.74, which was from three statements, "I find Kahoot! fun," "I enjoy playing Kahoot!," and "I respond to each item or question in each Kahoot! session." Only six statements recorded below-average mean scores with, "I get annoyed when I can't connect to Kahoot!" ($M = 4.06$), "I am eager to learn via Kahoot!" ($M = 4.38$), "I pay more attention during lectures because I hope to win in the Kahoot! sessions" ($M = 4.38$), "I respond as accurately as possible to each item or question in each Kahoot! session" ($M = 4.43$), "I respond as quickly as possible to each item or question in each Kahoot! session" ($M = 4.44$), and "I feel positive when playing Kahoot!" ($M = 4.56$). Table 2 presents the participants' attitudes toward using the Kahoot! application for academic purposes in a higher education context.

Table 2. Attitude toward Kahoot!

No	Statement	M	SD
1	I look forward to playing Kahoot!	4.59	.54
2	I find Kahoot! interesting.	4.73	.62
3	I find Kahoot! fun.	4.74	.59
4	I get annoyed when I can't connect to Kahoot!	4.06	.88
5	I feel excited when playing Kahoot!	4.70	.49
6	I enjoy playing Kahoot!	4.74	.52
7	I feel positive when playing Kahoot!	4.56	.65
8	I focus on the items or questions in each Kahoot! session.	4.64	.56
9	I respond to each item or question in each Kahoot! session.	4.74	.44
10	I respond as quickly as possible to each item or question in each Kahoot! session.	4.44	.81
11	I respond as accurately as possible to each item or question in each Kahoot! session	4.43	.67
12	I like the competitiveness in our Kahoot! sessions.	4.71	.56
13	I am motivated by the prospect of winning in these Kahoot! sessions.	4.63	.62
14	I pay more attention during lectures because I hope to win in the Kahoot! sessions.	4.38	.72
15	I am eager to learn via Kahoot!	4.38	.75
16	There is value in using Kahoot! for teaching and learning purposes.	4.61	.61
17	Kahoot! should be used in higher education	4.59	.71

Table 2 provides sufficient evidence for instructors to include game-based learning platforms such as Kahoot! into academic courses. Overall, the data revealed that students' attitudes toward using Kahoot! indicated the need to encourage an interesting, exciting, and competitive environment for learning at the tertiary level. The participant students believed Kahoot! to be fun and enjoyable, and that it made them more responsive as learners, which is significantly important as it can motivate students to continue with their learning (Licorish et al., 2018).

Furthermore, an independent *t*-test was conducted in order to investigate gender differences in the participants' attitudes and perceptions of using the Kahoot! application for academic purposes. From the findings, there was no significant difference found in terms of gender (*t* (78) = -.859, *p* = .22) with regards to the students' attitude toward using Kahoot! in an academic context.

The study also found no significant gender-based difference between the perceptions of male students (*M* = 4.42, *SD* = .45) and female students (*M* = 4.55, *SD* = .48) toward using the Kahoot! application (*t* (78) = -1.13, *p* = .37).

The participants of the study seemed to strongly agree that their Kahoot! sessions helped them to learn the gist of English language academic communication concepts that they may have missed during lectures (*M* = 4.64). In addition, the participants expressed positive perceptions toward Kahoot! in terms of it helping them to learn the gist of the English language academic communication course's features or devices (*M* = 4.60), motivating them to learn more (*M* = 4.59), helping them to learn the gist of writing techniques for English language academic communication (*M* = 4.49), and helping to reinforce their learning of English language academic communication features or devices (*M* = 4.48). Moreover, the students agreed that Kahoot! helped them to reinforce their learning of English language academic communication writing techniques (*M* = 4.43), and also to consolidate their learning of concepts related to English language academic communication (*M* = 4.39). Table 3 presents the findings of the participants' perceptions toward using Kahoot! for academic purposes.

Table 3. Perceptions toward using Kahoot!

No	Statement	M	SD
1	Our Kahoot! sessions motivate me to learn more.	4.59	.59
2	Our Kahoot! sessions help me learn the gist of English for Academic Communication concepts that I might have missed during lectures.	4.64	.51
3	Our Kahoot! sessions help me learn the gist of English for Academic Communication language features or devices that I might have missed during lectures.	4.60	.52
4	Our Kahoot! sessions help me learn the gist of English for Academic Communication writing techniques that I might have missed during lectures.	4.49	.60
5	Our Kahoot! sessions help reinforce (consolidate) my English for Academic Communication learning of concepts.	4.39	.61
6	Our Kahoot! sessions help reinforce (consolidate) my learning of English for Academic Communication language features or devices.	4.48	.57
7	Our Kahoot! sessions help reinforce (consolidate) my learning of English for Academic Communication writing techniques.	4.43	.65

Table 3 shows that positive perceptions were revealed toward the students use of Kahoot! to reinforce learning in their "English for Academic Communication" course. The students believed that using Kahoot! allowed them to reinforce what they had learned over

the semester. Moreover, they believed that Kahoot! provided them with the gist of the topic of study which is important in learning academic materials at a higher education level. Hence, these findings prove that the utilization of knowledge games in teaching practices can enable students to learn the required subject matter (Tan et al., 2018).

The final item in the questionnaire was open-ended, enabling the respondents to provide comments based on their overall experience as users of the Kahoot! application in their course. Table 4 presents excerpts from the respondents' transcripts, categorized according to three main themes.

Table 4. Participants' open-ended comments

Theme	Transcript excerpts
Interesting learning tool	I felt excited when playing Kahoot!
	It was very interesting and fun to answer the quiz.
	Nice platform.
	I found Kahoot! sessions really exciting.
	Interesting
	Kahoot! is great.
	Nice platform.
	I enjoyed playing Kahoot!
	Such an enjoyable session.
	Kahoot! is fun
	Very knowledgeable and fun.
	Fun and interesting to learn.
Helps to foster learning	It is good because Kahoot! helps me recall the things we learned in class.
	Gave me more confidence in class.
	Kahoot! really helped me to become faster and more confident.
	It has an influence on my learning process.
	I find Kahoot! made learning experience fun, enjoyable, and stress-free.
	It is a fun way of learning and I can test whether I can remember things that I learned in class.
	I think it is relevant and we should use Kahoot! in our English classes since it really helped me a lot, especially when a lecture is explained further using questions and answers. I enjoy Kahoot! sessions every time.
	It is suitable for our English course.
Motivates to learn & stay focused	Kahoot! also can help release my stress.
	Kahoot! helped me to feel more relaxed to learn, and it also boosted my mood a bit.
	Learning became more fun.
	I focus better in class and don't fall asleep.
	It made me pay more attention in class because I'm trying to win during every Kahoot! session.

Theme	Transcript excerpts
	In addition, Kahoot! helped me to be more focused in order to find the correct answer. Kahoot! is very interesting because it shows whether or not students focus well during the class.
	I found it fun to use Kahoot! and I can easily remember every detail taught by the lecturer.

The three major themes categorized were Interesting learning tool, Helps to foster learning, and Motivates to learn and stay focused. Overall, most of the respondents agreed that Kahoot! is considered as an interesting tool that can be used in learning as it provides a different classroom dynamic.

However, the participant students also highlighted several drawbacks related to the use of Kahoot! in learning, including "I feel annoyed and nervous when I lose [Internet] connection during the session," "Kahoot! cannot be used if you have an Internet connection problem," "It gives me anxiety," "I hope the question is in the same place as the answer. It is hard to look for both the question and answer," and "Nice, but needs a good [Internet] connection." This illustrates the need for educators to consider these potential drawbacks in making decisions on an appropriate time or task to be set when using Kahoot! in lessons.

5. DISCUSSION

The objective of this study was to explore Kahoot!'s suitability for academic application in the higher education setting. The findings strongly showed that the study's participants held a positive perception regarding the effectiveness of using Kahoot! for academic purposes within a higher education context. It was found that most of the respondents showed strong positive attitudes toward the application of Kahoot! for academic purposes, with the following being the three most positive attitude statements; "I find Kahoot! fun," "I enjoy playing Kahoot!," and "I respond to each item or question in each Kahoot! session." These statements show that the participant students agreed on the implementation of gamification for academic purposes in higher institutions as they perceived that it made their learning more enjoyable and increased their motivation. In addition, several of the students commented that, "I find that Kahoot! sessions are really exciting," "Kahoot! really helps me to become faster and more confident," "Kahoot! helps me to be more focused in finding the correct answer," and "This Kahoot! game is very interesting because it shows whether or not students focus well during classes."

The study's findings corroborate with those of Tan et al. (2018), in which participants showed strong positive attitudes toward the use of Kahoot! as it can enable tertiary students to increase their intrinsic and extrinsic motivation. The current study's findings also support the study of Licorish et al. (2018), which revealed that students enjoyed using Kahoot!, preferred to use it in class because of its features, and that it even helped students to overcome some of the challenges they experienced with learning in an online environment.

In addition, the current study's findings also strongly suggested that respondents perceived that Kahoot! helped them to learn the gist of an English language course's concepts for academic communication that they may have missed during lectures. In supporting this, one student pointed out that, "I think it is relevant and we should use Kahoot! in our English classes since it really helped me a lot, especially when a lecture is explained further using questions and answers. I enjoy Kahoot! sessions every time," whilst another student stated that "Its suitable for our English course." This confirmed that Kahoot!

helps to foster and reinforce students' learning, a finding found to be congruent with a study by Licorish et al. (2018) who claimed that participants showed positive reference towards Kahoot! supporting their learning as it helped them to recall previously covered learning materials, further developed their comprehension, gave new insight, and eventually helped to expand their knowledge. Similarly, An (2021) stated that gamified learning such as using the Kahoot! platform was relevant to student learning.

The results from a *t*-test strongly suggested that no significant difference was established between the genders in terms of the students' attitudes and perceptions toward the application of Kahoot! for academic purposes in a higher education setting. This finding is similar to that reported by Chiang (2020), who found that college students showed similar perceptions regarding learning with Kahoot! regardless of their gender. One possible reason behind this finding is that both male and female students strongly agreed that Kahoot! application in the higher education academic context helps enable the learning process to be more interesting and fun, increases student motivation, and promotes better student engagement both inside and outside of the classroom environment. However, the finding also contradicts with that reported by Ismail and Mohammad (2017), who stated that male tertiary students perceived to be more motivated to use Kahoot! as a tool for formative evaluation and to assist them in knowledge retention when compared to their female peers.

In addition, several students in the current study highlighted certain disadvantages to the use of Kahoot! in higher education. Most of the problems reported were due to issues of Internet connectivity, whereby students were unable to actively participate in using Kahoot! smoothly or effectively and thus affected their ability to respond to online quizzes. This perceived drawback is similar to that reported in the findings of Tan et al. (2018), in which it was highlighted that unstable Internet connections delayed students' responses to quiz items. Similarly, Chiang (2020) found that Internet connectivity and time were the main causes of setbacks in using Kahoot!

However, the benefits that Kahoot! brought in learning outweigh its drawbacks, with most students having agreed that their motivation to learn increased significantly as a result of using Kahoot! and they showed positive attitudes toward using Kahoot! in their classroom sessions.

6. CONCLUSION

The current research presents one of only a few studies that has examined game-based learning in higher education for academic purposes in Malaysia. The study's findings revealed that game-based learning is important to motivate learners and promote better student engagement. The findings in this study revealed the participant tertiary students to hold a positive attitude toward the use of Kahoot! for academic purposes, and were in strong agreement that it enhanced their learning development as it reinforced their knowledge on topics previously learned. With regards to student gender, the study showed that no significant difference was found in terms of the tertiary students' attitude or perceptions towards the use of Kahoot! The study also provided valuable insight on the use of Kahoot! for academic purposes in which it can provide a practical, low-cost learning application that lecturers and teachers can utilize so as to engage better with their students, whilst at the same time reinforcing their learning.

It is worth noting that although the findings in the current study revealed an interesting understanding on the effectiveness of using Kahoot! in learning sessions, the findings cannot, however, be generalized to other tertiary student populations in Malaysia

or elsewhere. Furthermore, the participant students' perceptions and motivation towards the use of Kahoot! as a gamified learning tool may also depend on their past experience and personality (An, 2021). As such, future research could examine the relationship between such variables.

7. SUGGESTIONS

A need exists for future research to investigate the effectiveness of using Kahoot! within other higher education courses such as for the teaching of writing skills or content-based courses. Educators, students, and policymakers need to collaborate in creating better tertiary education environments with a focus on optimizing learning using technological tools such as Kahoot!

DECLARATIONS

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