



Student perception of usefulness and ease using Kahoot, a free web-based tool in a tertiary education setting

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ABSTRACT. Kahoot is a free web-based application, which allows tertiary educators to incorporate gamified learning environments in tertiary teaching and learning. However, there is a shortage of literature on student acceptance and effective use in a learning environment. Therefore, this paper added system interactivity, task-technology and learning-game conflict factor into the Technology Acceptance Model to investigate students intention and usage of Kahoot. Structural Equation Modelling SEM using LISREL was employed to analyze data collected from 250 randomly selected university students. The questionnaires were carried out at the end of the semester, after their final examinations. The results revealed that system interactivity has positive influence ($\beta = 0.311$, $p = 0.000$) on perceived usefulness of Kahoot, while task-technology fit has influence ($\beta = 0.173$, $p = 0.001$) on Kahoot usage. Furthermore, findings show that learning-game conflict has ($\beta = 0.096$, $p = 0.031$) positive influence on student behavioral intention. The findings serve as a guide for planning, designing and implementing Kahoot to foster university students' knowledge acquisition. Discussion and conclusion were provided.

Keywords: Kahoot; system interactivity; task-technology fit; learning-game conflict; technology acceptance model.

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Introduction

In recent years, the instructional game-based learning environment is gaining acceptance in the classroom (Yükseltürk, Altıok, & Başer, 2018; Taub, Azevedo, Bradbury, Millar, & Lester, 2018). Many universities are planning to integrate game-based learning platform in their instructional curriculum (Ke, Shute, Clark, & Erlebacher, 2018). Kahoot is a current game-based learning that can be used as vitality, student engagement and supports university education with a limited effort of instructors or student training (Plump & LaRosa, 2017). It is a free online learning environment, gaining worldwide acceptance with more than 30 million users (Palma, Tobías, Prieto, León, & Ruiz, 2018; Plump & LaRosa, 2017).

Kahoot is a current digital game-based learning platform employed in classrooms to engage students through pre-made quizzes, discussions and surveys (Dellos, 2015; Johns, 2015). Also, Kahoot promotes an interactive learning platform and trials students in the process of learning (Muhridza, Rosli, Sirri, & Samad, 2018). Instructors utilize sufficient functions on the platform and enable students to become the master of their quizzes to promote a sense of empowerment among them (Dellos, 2015). Also, Kahoot monitors the progress of students by diagnosing the challenges during the learning process. Despite its benefits, it appears that no study has examined the effective use of Kahoot for promoting student learning in a game-based learning environment.

Some studies have examined the use of Kahoot. For example, Muhridza et al. (2018) tested the level of learning engagement among students using it. The findings suggest that Kahoot is useful in initiating and fostering students' engagement. Bawa (2018) investigated the effect of using Kahoot. The findings indicated that students learned using it. In support of it, a study revealed that students learning using Kahoot have positive learning experience (Iwamoto, Hargis, Taitano, & Vuong, 2017). However, from keen observation, it seems there is no empirical investigation on the factors that influence students' intention to use Kahoot. Therefore, this study investigated the effect of system interactivity, task-technology fit and learning-game conflict on students' behavioral intention to use Kahoot.

Contribution to existing knowledge

This current research identifies factors, which could influence on the university students' intention and actual usage of Kahoot. The information about these factors would determine the actions that should be required to enhance the use of Kahoot. Moreover, some empirical studies for example (Johns, 2015; Ismail & Mohammad, 2017; Bawa, 2018; Plump & LaRosa, 2017; Chotimah & Rafi, 2018). However, there is a lack of literature about the influence of the system interactivity, task-technology fit and learning-game conflict on using Kahoot. Besides, the research findings could serve as a guide for planning, designing and implementing Kahoot as game-based for universities students.

Literature review

The literature section proposes a research framework, the relevant theory and the different constructs adopted in the study, and hypothesizing relationships among these variables.

Technology Acceptance Model

The Technology Acceptance Model (TAM) is considered as the most cited and significant models for predicting the intention to use technology and has acknowledged more support from other empirical studies, for example (Venkatesh, Morris, Davis, & Davis, 2003). Davis (1989) originally proposed that Technology Acceptance Model and indicated that technology success is firmly established by the user intention or acceptance of the technology that is assessed by perceived ease of use, perceived usefulness and behavioral intention towards the use of technology.

Davis (1989) clarifies that the usefulness of technology is the degree to which a user is sure about the its usage that enhances his or her performance. Then, the perceived ease of use as the degree to which an individual user is convinced about using a particular technology that is not difficult to use. Furthermore, user attitude towards the use of a specific technology as the degree to which individual users investigate and associate a particular technology to his or her work. Also, behavioral intention is the degree of user intention ability to respond to a specific behavior. Some external variables, such as institutional training, is another factor that could influence on perceived usefulness and ease of use. Further, Davis (1989) indicated that behavioral intention to use the system is influenced by user attitude and perceived usefulness.

Davis and Venkatesh (1996) later on, introduced a modified TAM model removing attitude variable. They believed that attitude played an irrelevant role of individual use of technology. The attitude factor was replaced by the introduction of behavioral intention and actual usage of technology as the dependent variable of the TAM model (Wu & Wang, 2005; Smarkola, 2008). The present study was based on the Technology Acceptance Model. This model seems to be the most widely applied theoretical model to examine technology acceptance empirical studies (Essel & Apeanti, 2017).

Technology Acceptance Model offers a better description for user's intention to accept the use of a particular technology as compared to other similar models (Wu & Chen, 2017), in support, Technology Acceptance Model is a stable theoretical model, which can be used to examine students' intention towards the use of technology. Therefore, the Technology Acceptance Model is measured as useful for clarifying students' acceptance of technology (Escobar-Rodriguez & Monge-Lozano, 2012).

Material and methods

The study is based on the Technology Acceptance Model (TAM) and added system interactivity and learning-game conflict as other factors that influence students' attention to use Kahoot. Figure 1 displayed the relationship between the factors of the proposed research model.

Task-Technology Fit (TTF)

The model of Task-technology model employed to assess how the use of particular technology fit students learning task (Wu & Chen, 2017). The TTF model revealed that technology acceptance by the user is based on the condition that if the technology fit the task, students performance improves. For instance, how the Kahoot game-based learning fit students learning task requirements fit Kahoot competencies.

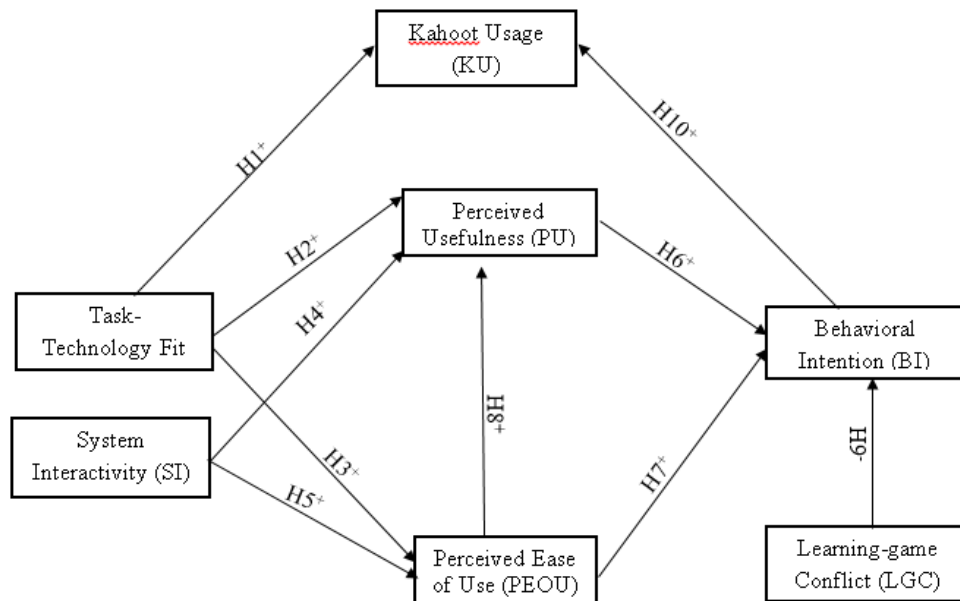


Figure 1. Proposed research model.

The perceived usefulness and perceived ease of use of technology are influenced by task-technology model (Dishaw & Strong, 1999). The intention and acceptance of a particular technology are not determined only by understanding and behavioral intention toward technology, but the fitness between the task and technology must be considered as significant (Zhou, Lu, & Wang, 2010). For this reason, the following hypotheses are proposed:

H1: Task-technology fit has a positive influence on students' Kahoot usage;

H2: Task-technology fit has a positive influence on perceived usefulness;

H3: Task-technology fit has a positive influence on perceived ease of use.

System interactivity

Interactivity played a significant role in the teaching and learning process among students, teachers and learning materials (Wei, Peng, & Chou, 2015). The learning interactivity assumed to take place in both formal and informal education (Ke, 2013). In this present study, system interactivity is defined as the extent to which students use Kahoot (game-based learning environment) base on its instructiveness (students are more likely to use a technology if they understand how to use it or how it works).

The results of previous studies suggested that learning system interactivity is a significant factor that influence the perceived usefulness of technology. For instance, Wei et al. (2015) investigated whether more interactivity can enhance learning achievement among college students. The finding suggested that more system interactivity influences on students' usefulness of online course. Ke, Sun, Yang, and Sun (2012) stressed that lack of system interactivity would have a negative impact on students intention to accept and use it. Baleghi-Zadeh, Ayub, Mahmud, and Daud (2017) examined how the interactivity of course-management system influences on students' usage and their learning performance. The result of the study revealed that system interactivity has a significant influence on perceived usefulness.

In addition, there were some previous studies on examining the impact of system interactivity on students' perceived ease of use. For example, Ke et al. (2012) investigated the effect of system interactivity on web-based classroom system. The finding revealed that system interactivity has a positive influence on their perceived ease. Therefore, the following hypotheses were proposed:

H4: System interactivity has a positive influence on perceived usefulness;

H5: System interactivity has a positive influence on perceived ease of use.

Perceived usefulness

Perceived Usefulness is defined as "[...] the degree to which a person believes that using a particular system would enhance his or her performance" (Davis, 1989, p. 320). In the perspective of this study, perceived usefulness is described as the degree to which a student is sure that using Kahoot would enhance their learning performance.

Previous studies have suggested that Perceived usefulness have a positive and significant influence on behavioral intention to use a system. For instance, Abdullah, Ward, and Ahmed (2016) investigated the impact of perceived usefulness students' behavioral intention to use the system for learning.

The findings revealed that perceived usefulness has a significant positive influence on students' behavior intention to use e-portfolios to learn. In the perspective of mobile video calling usage, Zhou and Feng (2017) discovered that perceived usefulness positively predict individual behavioral intention to use mobile video calling. Therefore, the following research hypothesis is proposed:

H6: Perceived usefulness has a positive influence on behavioral intention to use Kahoot.

Perceived ease of use

Perceived Usefulness is defined as “[...] the degree to which a person believes that using a particular system would be free from effort” (Davis, 1989, p. 320). In this study, Perceived ease of use refers to the degree to which a student is sure that using the Kahoot will be free of effort.

Several studies revealed that the perceived ease of use has a positive influence on user behavior intention to use the system. For example, social media perspective, previous studies, for instance, (Akar & Mardikyan, 2014; Suksa-ngiam & Chaiyasoonthorn, 2015) suggested that perceived system ease of use has a positive influence on students' behavioral intention towards the use of social media.

Also, Chang, Hajiyev, and Su (2017) asserted that perceived ease of use has a positive influence on perceived usefulness towards the use of electronic learning. In addition, Lee, Cheung, and Chen (2005) investigated that university students' acceptance to use Internet-based learning medium. The result of the study revealed that perceived ease of use predicts perceived usefulness of Internet-based learning medium.

Suksa-ngiam & Chaiyasoonthorn, (2015) examined university student's adoption of social media. The results showed that perceived usefulness was influenced by perceived ease of use. In the context of MOOCs, for example, perceived ease of use has a positive impact on the perceived usefulness of MOOCs (Wu & Chen, 2017). Therefore, perceived ease of use could affect Kahoot usefulness directly or indirectly. From this logic, the following hypotheses were proposed:

H7: Perceived ease of use has a positive influence on behavioral intention;

H8: Perceived ease of use has a positive influence on perceived usefulness.

Learning-game conflict

In this study, learning-game conflict is defined as the degree to which the game aspect of Kahoot impede and interfere in students attention to perform the learning activity. In a game-based learning environment, there should be a balance between the learning goals and the playing of a game to achieve the entire purpose of learning (Kiili, 2005).

One of the significant challenges of game-based learning is that students focus more on playing the game than performing a learning task (Barzilai & Blau, 2014). According to Iten and Petko (2014), there is a conflicted relationship between an individual playing the games and performing learning activities. From this perspective, it is expected that student's behavioral intention may negatively be influenced by learning-game conflict. Therefore, it can be proposed that:

H9: Learning-game conflict has a negative influence on students behavioral intention.

Behavioral intention and Kahoot usage

Behavioral intention is defined as “[...] a measure of the strength of one's intention to perform a specified behavior” (Fishbein & Ajzen, 1975, p. 288). In support, several empirical studies have indicated that behavioral intention is a strong predictor of system usage. For instance, studies Barzilai and Blau (2014); Dieck and Jung (2018) asserted behavioral intention has a significant influence on LMS use.

In e-learning via Facebook perspective, Moghavvemi & Janatabadi (2018) pointed out that behavioral intention has a positive impact on the extent of using e-learning via Facebook. In view of this, the following hypothesis was proposed:

H10: Behavioral intention has a significant positive influence on Kahoot usage.

Questionnaire development

The questionnaire survey was designed in two parts to test the research model and formulated research questions. The first section of the questionnaire survey involves demographics about the participating

students. Whereas the second section includes questions measuring the six constructs or latent variable and nineteen (19) items or observed variables adapted from previous studies.

Thus, perceived usefulness (Sánchez & Hueros, 2010), perceived ease of use (Liu, Chen, Sun, Wible, & Kuo, 2010; Sánchez & Hueros, 2010), behavioral Intention (Wang, Wu, & Wang, 2009; Venkatesh, Thong, & Xu, 2016), Kahoot use (Pituch & Lee, 2006; Baleghi-Zadeh et al., 2017), system interactivity (Pituch & Lee, 2006; Baleghi-Zadeh et al., 2017), task-fit technology (Lee & Lehto, 2013), learning-game conflict (Adams & Jex, 1999). The seven-point Likert scale was used to measure all items with a rating scale from Strongly Disagree (SD = 1) to Strongly Agree (SA = 7) and Never (N = 1) to Always (Al = 7).

Results and discussion

Data collection

The target participating students of this study were those with experience with Kahoot. The students were purposely selected from introduction to technology first-year classes of 280 students in Cyprus International University Lefkosa.

The class was selected because of the large number and ability to integrate such a tool at the beginning of university education. Kahoot game was introduced after the midterm exams. The exercise lasted for four weeks, with quizzes on Kahoot every week at the end of each chapter. The question formats include multiple-choice with picture descriptions.

We used the team mode 'Team vs Team shared Devices' where the class was divided into 20 teams of 14 students using a mobile device. The purpose was to improve their knowledge of educational technology, create interest and made them engaged with the game-based environment. Kahoot exposed the student to real-life issues, create critical – thinking skills, participate, motivate and collaborate with others.

The questionnaire survey was purposively given to the students after their last quiz for the semester. A total of 300 students were registered for the course at the beginning of the semester, 280 were returned to the author(s), where 250 (89.29%) of the questionnaires were fully completed. 30 (10.17%) of the survey questionnaire were removed from the analysis because of empty responses. 250 students were employed for the study. 135 (54.0%) of the students were male and 115 (46.0%) female. The summary of the demographic category are displayed in Table 1.

Data analysis

The data collected from the students were analyzed using SPSS version 23.0 and LISREL 9.30 version. According to Lee et al. (2005), LISREL is one of the most used statistical tool for structural equation modelling (SEM) to test the research hypothesis. It is flexible and fit to predict the effect of latent and observe variable in the particular research model.

Two-step model approach suggested by Anderson & Gerbing (1988) was employed to analyze the proposed research hypothesis. First, exploratory factor analysis (internal consistency, content, convergent and discriminant validities) used to check the appropriateness and fitness of the students responded data. After, confirmatory factor analysis was done to investigate the goodness fit of the research model and examine the research hypotheses.

Content validity

Two approaches were employed to investigate the content validity of the survey questionnaire instrument. First, the survey questionnaire items were adopted from previous studies, which has been validated and used. Second, to ensure content validity, specialists or experts in the research area under study crosschecked draft of the survey questionnaire instrument.

Table 1. Demographic distribution (n = 250).

Demographic category	Frequency	Percentage
Gender		
Male	135	54.0
Female	115	46.0
Age		
15-18	58	23.2
19-21	167	66.8
22-25	25	10.0

Internal consistency

The internal consistency of the construct was tested using Cronbach's alpha (α). The acceptance of reliability or internal consistency of each construct should exceed or be equal to 0.70 (Hair, Black, Babin, & Anderson, 2014; Wu & Chen, 2017).

As shown in Table 2, all the model construct have high-reliability value or high internal consistency with Cronbach's alpha (α) values ranging from 0.804 to 0.946. Furthermore, results in Table 3 displayed first to last components extracted of eigenvalues ranged from 8.904 to 1.097, and the percentage of total variance explained ranged from 15.787 to 87.229%. It is recommended that both skewness and kurtosis indices should not exceed |2.3| for normality test (Lei & Lomax, 2005).

In Table 3, the indices for skewness and kurtosis all the items fall within the acceptable normality range; therefore, the students responded data for this study is regarded as suitable for the confirmatory factor analysis to proceed. Also, Kaiser–Meyer–Olkin (KMO) and Bartlett's test of sphericity was used to measure sampling adequacy. The results show significant statistics of $\chi^2(231) = 5138.009$ ($p = 0.000 < 0.05$) and the KMO measure = 0.877 < 0.500, therefore, the data received was suitable for further analysis.

Convergent validity

Composite Reliability (CR), Average Variance Extracted (AVE), and factor loadings (ρ) were tested to measure the convergent validity. According to Hair et al. (2014) suggested that the AVE value for each model construct should exceed 0.50 while the CR values should be greater than 0.70 for convergent validity to be accepted.

Table 2. Results of reliability analysis.

Construct	Number of items	Cronbach Alpha (α)	Types
KU	4	0.935	Excellent
SI	4	0.930	Excellent
LGC	2	0.933	Excellent
BI	3	0.932	Excellent
PEOU	3	0.921	Excellent
PU	3	0.804	Very Good
TTF	3	0.946	Excellent

Table 3. Summary of Exploration Factor Analysis (EFA) results.

Construct	Measurement	Factor loading (ρ)	Skewness	Kurtosis
Kahoot-Game-Based learning	AVE = 0.780, CR = 0.934, E = 8.904 and CVE = 15.787			
KU1	I send messages to my classmates/ lecturers through Kahoot	0.893	-1.250	.669
KU2	I use Kahoot to download course materials uploaded by my lecturers	0.885	-1.131	.457
KU3	I use Kahoot to discuss topics of my studies with my classmates	0.903	-1.206	.858
KU4	I use Kahoot to take quizzes	0.850	-1.169	.503
System Interaction	AVE = 0.709, CR = 0.906, E = 2.559 and CVE = 31.248			
SI1	I can see the features of collaborative learning (e.g. group work) in Kahoot	0.874	-.806	-.535
SI2	The communication tools (email, forum, chat-room, etc.) in Kahoot are effective	0.881	-.692	-.657
SI3	Kahoot enables interactive communication among students	0.841	-.757	-.486
SI4	I can share my knowledge with my classmates through Kahoot	0.766	-.879	-.278
Learning-Game Conflict	AVE = 0.900, CR = 0.947, E = 2.027 and CVE = 43.786			
LGC1	How often does the game interfere in your learning task	0.946	-.959	-.429
LGC2	How often does the game keep you spending the amount of time you would like to spend on learning?	0.951	-.912	-.493
Behavioral Intention	AVE = 0.748, CR = 0.899, E = 1.765 and CVE = 55.761			
BI1	I intend to use Kahoot regularly next semester	0.842	-1.260	.695
BI2	I intend to use Kahoot next semester to assist me to prepare projects, papers, and assignments	0.875	-1.112	.503
BI3	I intend to use Kahoot frequently next semester	0.877	-1.214	.807
Perceived Ease of Use	AVE = 0.728, CR = 0.889, E = 1.565 and CVE = 67.694			
PEOU1	Instructions for using Kahoot will be hard to follow	0.784	-1.186	.313
PEOU2	It will be difficult to learn how to use Kahoot	0.881	-1.145	.343
PEOU3	It will be easy to operate Kahoot	0.891	-1.184	.454
Perceived Usefulness	AVE = 0.644, CR = 0.844, E = 1.275 and CVE = 78.587			
PU1	Kahoot is beneficial for my learning.	0.775	-.980	-.433
PU2	Using Kahoot improves my academic achievement	0.854	-1.043	-.162
PU3	Kahoot makes it easier for me to learn at university.	0.776	-1.147	.079
Task-Technology Fit	AVE = 0.808, CR = 0.926, E = 1.097 and CVE = 87.229			
TTF1	I think that using Kahoot would be well suited for the way I like to learn tasks	0.886	-1.367	.878
TTF2	Kahoot would be a good medium to provide the way I like to learn tasks	0.910	-1.312	.613
TTF3	Using Kahoot would fit well for the way I like to learn tasks	0.900	-1.422	.803

α : Cronbach Alpha, AVE: Average Variance Extracted = $\sum \rho^2/n$; CR: Composite Reliability = $(\sum \rho)^2/(\sum \rho)^2 + (\sum b)$, $b = 1 - \rho^2$; E: Eigenvalues. CVE cumulative variance explained were obtained from extraction sums of squared loading. Factor Loadings < 0.600 are omitted. Varimax with Kaiser Normalization.

Factor loading (ρ) used for measuring the convergent validity of all the constructs were above 0.60, suggesting a significant level (Chen & Phou, 2013). Table 3 displays the values of AVE, CR and factor loading of the entire construct in this research model fall within the acceptable level.

Discriminant validity

The testing of discriminant validity was done by comparing the square root of the Average Variance Extracted of each construct and the correlation between the construct. The square root of Average Variance Extracted should be higher than the value of construct correlation (Chin, 1998; Hair et al., 2014). Table 4 shows that the square root of Average Variance Extracted is higher than inter-correlation values, indicating adequate satisfactory of discriminant validity.

Table 5 indicates the overall summary of the model fit of the research model. The values of Chi-square/degree of freedom($\chi^2/d.f.$), P-value, the Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), the Normed Fit Index (NFI), the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI) and the Standardized Root Mean Square Residual (SRMR) fall within recommended range (Joreskog & Sorbom, 1989; Browne & Cudeck, 1992; Kurfalı, Arifoğlu, Tokdemir, & Paçin, 2017; Wu & Chen, 2017), demonstrating good model fit for this research model.

Hypotheses tests

The results of this research hypotheses are shown in Figure 2 and Table 6. From the results, hypotheses H1, H2, H3 and H4 are supported. That is, Task-Technology Fit has positive influence on Kahoot Usage ($\beta = 0.173, p = 0.001$), Perceived Useful ($\beta = 0.251, p = 0.000$) and Perceived Ease of Use ($\beta = 0.142, p = 0.011$). Furthermore, System Interactivity has positive influence on Perceived Useful ($\beta = 0.311, p = 0.000$) and Perceived Ease of Use ($\beta = 0.402, p = 0.000$).

This suggests that the fitness of Kahoot Game-Based Learning and students learning task improve their perceived usefulness and ease of use. On the other hand, the interactivity of Kahoot Game-based Learning played a significant role in the students' perceived usefulness and ease of use.

Hypotheses H6, H7 and H9 were also supported. Thus, student's Behavioral intention is influenced by Perceived usefulness ($\beta = 0.246, p = 0.000$), Perceived Ease of Use ($\beta = 0.300, p = 0.000$) and Learning-Game Conflict ($\beta = 0.096, p = 0.031$). This means that Perceived Usefulness, Perceived Ease of Use and Learning-Game Conflict of this research model are found to be important factors in predicting students' behavioral Intention.

Furthermore, hypotheses H8 and H10 were supported. This indicates that: (1) Perceived Ease of Use has positive influence on Perceived Usefulness ($\beta = 0.354, p = 0.000$) and (2) Kahoot Game-based learning usage is positively influenced by Behavioral Intention ($\beta = 0.329, p = 0.000$).

Table 4. Correlation Matrix of the Constructs.

Construct	KU	SI	LGC	BI	PEOU	PU	TTF
KU	(0.883)						
SI	0.301	(0.842)					
LGC	0.120	0.273	(0.949)				
BI	0.391	0.422	0.217	(0.865)			
PEOU	0.277	0.481	0.153	0.480	(0.853)		
PU	0.422	0.542	0.188	0.471	0.536	(0.802)	
TTF	0.294	0.415	0.211	0.293	0.327	0.467	(0.899)

Note: Diagonal elements in the parenthesis are square roots of AVE.

Table 5. Model fit summary of the research model.

Fit index	Recommended value	Research model
Chi-square/degree of freedom($\chi^2/d.f.$)	≤ 3.0	2.421
P-value	< 0.05	0.013
Goodness of Fit Index (GFI)	≥ 0.80	0.979
Adjusted Goodness of Fit Index (AGFI)	≥ 0.80	0.926
Normed Fit Index (NFI)	≥ 0.90	0.957
Root mean square error of approximation (RMSEA)	≤ 0.08	0.075
Comparative Fit Index (CFI)	≥ 0.90	0.974
Standardized root mean square residual (SRMR)	≤ 0.05	0.044

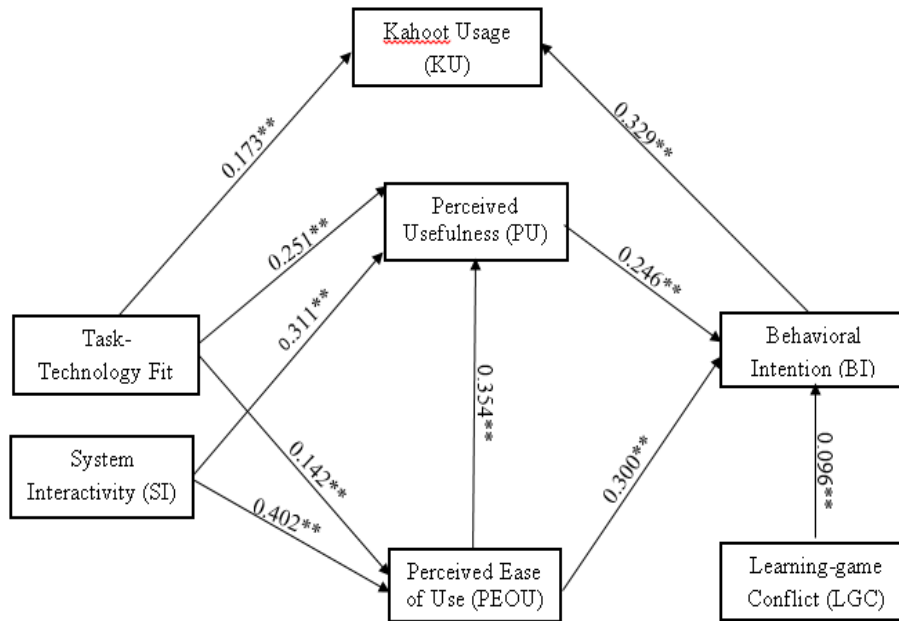


Figure 2. The result of hypothesis testing.

Table 6. Summary of the hypothesis testing.

Hypothesis	Path coefficient	P-value	Decision
H1: TTF → KU	0.173	0.001**	Supported
H2: TTF → PU	0.251	0.000**	Supported
H3: TTF → PEOU	0.142	0.011**	Supported
H4: SI → PU	0.311	0.000**	Supported
H5: SI → PEOU	0.402	0.000**	Supported
H6: PU → BI	0.246	0.000**	Supported
H7: PEOU → BI	0.300	0.000**	Supported
H8: PEOU → PU	0.354	0.000**	Supported
H9: LGC → BI	0.096	0.031**	Supported
H10: BI → KU	0.329	0.000**	Supported

Note: supported or significant at **p < 0.05.

Educational implications and discussions

This study investigated system interactivity, task-technology fit and learning-game conflict on students’ behavioral intention to use Kahoot game-based learning based on the proposed research model presented in Figure 1.

The data of the study were collected from the introduction to technology first-year students registered for the course. The result from this current empirical analysis provides support for all the ten-research hypotheses.

Educational implication for system interactivity

The findings revealed that system interactivity influences on the usefulness of Kahoot game-based learning. That is, the more students find the interactions of Kahoot game-based learning, the more positively students’ are likely to use Kahoot game-based learning. This finding is consistent with a previous study (Plump & LaRosa, 2017).

The results of this study suggest that the designers and developers of Kahoot game-based learning platform should increase the Instructiveness of the system to improve students’ usage and activity levels during learning. The research findings hold valuable implications for universities using Kahoot game-based learning and designers of educational technology to plan strategically and improve the instructiveness of Kahoot game-based learning.

Educational implications for Task-Technology Fit

This present study integrated task-technology fit into TAM model to investigate students influence on perceived usefulness, perceived ease of use and Kahoot game-based learning usage. As reported in the

previous section, that is, the students believe Kahoot game-based learning is easy to use and useful to them when performing their required learning task.

Therefore, universities should integrate the use of Kahoot game-based learning platform in their curriculum. This is because students profoundly perceived Kahoot more useful than other e-learning platforms.

Educational implication for learning-game conflict

This research model also considered learning-game conflict that negatively influences on students' behavioral intention to use Kahoot game-based learning environment. The research finding indicates students' behavioral intention is negatively impacted by learning-game conflict.

That can be interpreted as a game-based learning platform with a balanced game, and learning activities may result in less game-learning conflict. This finding is unique in the context of using Kahoot game-based learning. Also, this finding provides valuable implications for the design and implementation of Kahoot to enhance game-based learning.

Conclusion

The main aim of the study was to examine the effect of system interactivity task-technology fit and learning-game conflict on students' behavioral intention to use Kahoot game-based learning. As the research model, the TAM model was integrated with system interactivity, task-technology fit and learning-game conflicts factors to examine students' behavioral intention to use Kahoot game-based learning platform.

This study suggested the assertion by the TAM model that perceived usefulness, perceived ease of use influence on individual behavioral intention. TAM model with the inclusion of system instructiveness, task-technology fit and learning-game conflict factors predict and explain university students use of Kahoot as a game-based learning platform. That is, increasing the usefulness, instructiveness, and reducing learning-game conflict, would intensify students' behavioral intention and actual usage of Kahoot in universities. Therefore, instructors in the university must consider these factors when implementing Kahoot game-based learning. Designers and implementers of Kahoot application should increase the usefulness, user-friendliness and the instructiveness of Kahoot.

These study findings serve as a guide for planning, designing and implementing Kahoot for universities. Consequently, the quality of learning in real-time and administer quizzes, discussions, irrespective of location or time, could be achieved. Findings have demonstrated that technology is positively transforming the face of education, learning and society, so there is a need to adapt to this changing development promptly.

To give learning space for all, thus stimulating accessibility, value, and the future of education should indeed be open, flexible and smart. There is also the need for stakeholders to work with others across the world for understanding and offering proper techniques in this regard.

Limitation and future research

The study limitations need to be addressed. First, the population of this study was based on university students in one institution. Therefore, the findings resulting from this study could not adequately reveal the actual students' behavioral intention and the use of Kahoot.

Nevertheless, the employed study sample seems to fit for the field under study. However, this study provides useful factors including system interactivity, task-technology fit and learning-game conflict differences, which were interesting.

For future research, we would suggest an evaluation of teaching-learning factors and how it affects learning in other learning environments, preferably non-university students. Experiments should be performed with new datasets in secondary schools and training institutes.

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