Factors Affecting Students' Willingness to Use Gamification in University Settings

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***Abstract*—This study aims to investigate the factors affecting students' willingness to use gamification. To achieve this objective, a quantitative research method was used, and data were collected employing the survey technique. The sample of the study consisted of 105 university students in Jordan. The survey was structured to take into consideration the inclusion of students from different colleges and majors. The results indicated that perceived usefulness, normative beliefs and task-technology fit are the factors that have the most significant effect on students' willingness to use gamification as a learning technique. Hopefully, the results of this study will help in formulating policies and in introducing a new technique to be used by both instructors and students, especially in the classroom setting. The study will also help determine the effectiveness of the technology apps used by university staff in Jordan.**

***Index Terms*—Gamification, university, students, willingness, Jordan**

I. Introduction

Educational institutions and educators often face major problems related to students' lack of motivation and low learning interest [1]. Over the years, the development of technology and the use of the Internet have drastically transformed the learning environment and the educational scene. Recent developments in digital technology have led to the creation of learning and teaching alternatives [2, 3]. Advancements in digital technology have also enabled students to access online information and education. Furthermore, digital technology has spread to wide geographical areas over a short period of time [4]. Hence, it is high time for educational institutions to shift from traditional educational environments to more contemporary ones that include gamification-based educational learning as suggested by Aldahash and Alenezi [2]. Aldahash and Alenezi [2] further explain that gamification-based education is among the top trends in instructional technology as it encourages the learner to continuously interact with the educational material and other learners in a stimulating setting. Gamification also assists in the development of learners' communication skills through interaction in a learning environment that encourages the learner's ability to be creative and expressive. Studies on this topic have revealed the role of gamification in enhancing learners' freedom of expression in a framework that is socially acceptable and enjoyable [5–7]. In addition, studies have indicated that digital games can be effective tools in facilitating a digital environment owing to their ability to enhance motivation and learning and create socially interactive and constructive learning contexts [8–10]. Several studies referred to technology and gamification as techniques to enrich students' experiences and increase their willingness to learn [11, 12]. Some studies have found that perceived ease of use and attitudes toward the use of technology directly impact the intention to use technology [13].

Evidently, gamification has proven to be a promising tool, particularly in developing students' skills [2]. In this line of argument, successful gaming applications have led to gamification, which has had an extensive practical reach [14]. Numerous studies have focused on explaining the applications and elements of gamification that could be leveraged in both education and everyday life, as well as identifying game-based learning antecedents and outcomes [15]. Gamification can therefore provide innumerable benefits to educational institutions in terms of reducing costs and enhancing performance [13, 14, 16, 17].

In the context of Jordan, there are some limitations to the adoption of e-learning and gamification practices [18]. These limitations are related to the teaching methods used in teaching and learning activities, the belief that the use of e-learning reduces the significant role teachers play in the teaching and learning process and a lack of interest in using such technologies due to the inadequate technological skills of teachers and learners [18–20]. A study by Alsawaier [21] indicated that gamification was suitable for providing time for students to compete with others through gaining points as soon as possible. Another study found that gamification and its elements provided opportunities for students to discover new information and learn in a social context [22]. Although the literature supports the idea that gamification and video games activities can contribute to cognitive, social, motivational and emotional development [8–10, 23], the use of gamification in educational settings has not been widely researched. This is also true in the context of Jordan, therefore, there is a need to thoroughly examine the topic of implementing gamification in Jordan's education system. Thus, this study formulated the following objectives:

1) To investigate the relationships between perceived ease of use, perceived usefulness, social influence, task technology fit, and normative beliefs and students' willingness to use gamification.
2) Do perceived ease of use, perceived usefulness, social influence, task technology fit, and normative beliefs influence students' willingness to use gamification.

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Based on the discussion above, this study formulated the following research questions:

1) Are perceived ease of use, perceived usefulness, social influence, task technology fit, and normative beliefs correlated with students' willingness to use gamification?
2) Do perceived ease of use, perceived usefulness, social influence, task technology fit, and normative beliefs influence students' willingness to use gamification?

This study formulated the following research hypotheses:

1) There is a direct relationship between perceived usefulness, perceived ease of use, technology task fit, social influence and normative beliefs and students' willingness to use gamification.
2) Perceived usefulness positively affects students' willingness.
3) Normative beliefs positively affect students' willingness.
4) Social influence positively affects students' willingness.
5) Task-technology-fit positively affects students' willingness.
6) Ease of use positively affects students' willingness.

II. Literature Review

A. A Definition of Gamification

The introduction of technology in education has had some success in improving students' outcomes. However, the integration of gamification as an assistive technology that aims to enhance students learning is still a new topic education literature [24]. Deterding *et al.* [25] defined gamification as the use of game designs elements in non-game contexts such as education. Huotari *et al.* [26] also defined gamification as attempting to make an activity resemble play to increase the value perceived by users. Evidently, few studies have focused on the use of gamification for students [27]. In recent times, gamification has been introduced to play an important role in reducing students' boredom and increasing their active learning, engagement and motivation [28]. Additionally, using gamification leads to a higher level of student participation and collaboration, which makes students more motivated and interested in learning [29]. A thorough review of the literature on gamification in university settings reveals gamification's important role in supporting students' learning through increasing their motivation, commitment and engagement [30, 31]. Gamification may also be useful in improving the learning process for students in specific courses [27]. Studies have only recently begun to examine the potential of gamification as a technology tool, especially among university students, and to date, the number of studies that have investigated gamification's effectiveness in this context is still meager [32, 33].

B. Importance of Gamification in Higher Education

Gamification is a concept that has attracted different types of research and can be best described as the use of game elements in non-gaming activities [34, 35]. The users' ability to engage makes gamification quite popular in different industries [36, 37], with several application designs involved such as points, badges, leader boards and the like [37, 38]. Other studies on this topic showed that gamification can affect students' behavior, supporting several instructional processes such as engagement, learning and education [2, 38, 39]. More specifically, [40, 41] stated that various elements of gamification enhance educational results and make monotonous activities more enjoyable and learning assignments more engaging. Moreover, [41, 42] explained the importance of gamification in the field of education and its influence on improving students' motivation and engagement. Similarly, [42, 43] supported the influence of effective gamification on enhancing motivation and, ultimately, improving academic achievement among students. In [43, 44], the author provided evidence to prove that the use of gamification through digital applications assists learners in engaging with the learning process through heightened attraction, which facilitates learning in all situations. Furthermore, authors of [44, 45] found gamification to be effective in developing motivation and learning trends, while authors of [45, 46] indicated that gamification does indeed enhance learners' educational awareness and facilitate a learning environment that supports competition, increased productivity and continuous life learning. Gamification also helps teachers follow-up with learners' to track their achievements and progress. This in turn will allow teachers to provide more focused and constructive feedback. In contrast, other studies found evidence that using gamification with an experimental group resulted in the majority of the students in the experimental group failing a test [46, 47]. In a similar way, reported the same results. Moreover, Kalogiannakis and Papadakis *et al.* [48] revealed that control group students performed better and thus showed that gamification failed to contribute to English language skills development among secondary school students.

The growing interest in the gamification topic along with the inconsistent results of different studies further heightens the dire need to examine distinct education-related processes to determine their specific impact [49]. These, mixed results, the different implementations of gamification in the educational field, a lack of assessment tools and the ad hoc usage of gaming elements all make further research on the topic a necessity, especially as this literature gap has repeatedly been pointed out in various studies [50, 51]. Indeed, almost all studies dedicated to discussing gamification [2, 49] have called for more studies to investigate the influence of contextual, psychological and social factors in the learning environment. Studies have only recently begun to examine the potential of gamification as a technology tool, especially among university students, and to date, the number of studies that have investigated gamification's effectiveness in this context is still meager [32, 33]. To bridge some of the gaps and to enrich the existing literature, this study primarily focuses on identifying the factors affecting students' willingness to use gamification applications.

C. Factor Affecting Gamification in Higher Education

Studies have frequently adopted the Technology Acceptance Model (TAM) to predict individuals' acceptance of and behavioral intentions towards information technology IT usage [52]. Nevertheless, TAM has been criticized as inadequate and calls have been made to extend it to distinct

contexts and create additional variables [14]. In the context of gamification, there has been an extensive call to include specific variables like task technology fit and contextual, psychological and social factors [14, 53, 54]. In particular, Yang and Asaad *et al.* [14] has suggested integrating Task-Technology-Fit (TTF) into research on gamification. This suggestion has also been supported by other studies [55, 56], in order to improve the variations in technology usage beyond a single model. Hence, this study is a response to the call made in numerous studies to examine gamification in the learning environment, particularly with regard extended to the role of psychological, social and other factors (i.e., TTF) that affect students' inclination to use gamification. The TAM and TTF models are the underpinning models adopted by this study as shown Fig. 1.

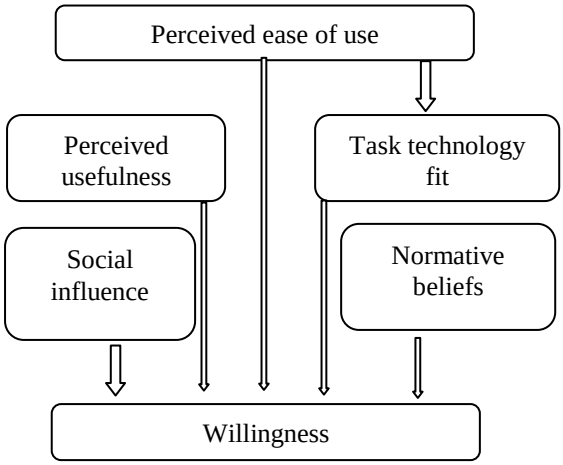

Fig. 1. Study model.

Furthermore, numerous studies have highlighted the advantages of incorporating gamification in educational fields as a coherent strategy with a promising potential, especially when supported by technological readiness and personal willingness [57]. The success of technology implementation in the learning environment is commonly paired with readiness although some studies highlight that willingness to adopt the technology is crucial for innovation success [58]. Only a few of the studies that focus on willingness have investigated the issue in relation to gamification [59]. Another crucial variable in terms motivation and participation is the perceived usefulness of gamification, which refers to the individual's subjective assessment of the gamification platform's usage [60]. In other words, if the gamification user believes that gamification will assist in meeting the objectives, this is a great driver of motivation [60]. Perceived usefulness is a contrast often mentioned when discussing technology applications, and therefore, this study included it in the model.

Another significant variable is the view of relevant others, which also influences the intentions of an individual to use a specific technology [14]. This takes the form of social influence – the influence of colleagues, instructors and family members on the individuals' participation in gamification. Social influence has been a crucial factor mentioned in many studies dedicated to IT acceptance and user behaviors [14, 61, 62]. Yet another variable worthy of consideration is ease of use. Despite the fact that Li [52] found its insignificant in influencing people's behavioral intentions or attitudes [14], ease of use was shown to be an important factor in gamification literature [63]. According to Yang and Asaad *et al.* [14], perceived ease of use is the degree to which an individual is convinced that gamification use will be effortless. Moving on to another important variable, normative beliefs refer to the individual beliefs about other people's opinion about using gamification applications in the learning process. The influencing factors of the user's abilities, the functionality of the technology and the task requirements are all explained under the TTF model [14, 62], the technology-task-fit needs to match to be accepted by the user. In relation to this, understanding the user attitude towards using technology is of utmost significance [62, 64].

III. Method

A. Design of the Study

In this research, the factors affecting the willingness to integrate innovative educational techniques (i.e., gamification) into the learning process, specifically in Jordanian universities, are investigated. The study adopts a quantitative research design, using a survey as the main collection instrument to determine the respondents' characteristics, attitudes, views, abilities, beliefs, thoughts and expectations [65–69].

B. The Study Sample

The study's targeted population sample is comprised of students, who are going to Jordanian universities. The students were selected based on their familiarity with current technology and involvement with gamification activities. Moreover, the selection of participants was based on the geographical location of a university that caters to a large number of students studying online courses. Specifically, 105 respondents, ranging in age from 18 to 22 participated in the study. Prior to the study, the researchers obtained the necessary approval from the Ethics Committee and the Dean of Scientific Research at Irbid National University for the survey questionnaire distribution. After receiving the ethical approval, the researchers contacted the faculties of various departments at Irbid National University to distribute the questionnaire in the form of a hyperlink. Furthermore, the researchers invited the students to participate on a voluntary basis. Verbal agreement from the students was witnessed by the university staff, and students were assured that the data would be used for research purposes only.

C. Study Measurements

Five variable scales were adopted from the relevant literature, namely [9, 45, 62, 70–72]. Following the selection of the initial study items, the scales were forwarded to experts to review in order to establish face validity and provide feedback. Several items were covered under each scale, measured on a 5-point Likert scale ranging from 1 denoting strongly disagree, to 5 denoting strongly agree. The study employed five reliable scales. The TAM model [9] was used, with minor adaptations, to measure perceived usefulness and

ease of use. A task-technology fit scale [45] was used to measure the appropriate gamification system tasks in learning. A willingness scale [71] was used to identify students' willingness to use gamification in their learning. A social influence scale [72] and a normative beliefs scale [62] were used to identify other people's influence on students regarding gamification in learning. Items contained in the study variables were adapted from previous studies, minor modifications were made to clarify the context of the statements to ensure students understood the items. The first section of the instrument requested that respondents provide demographic information, including age, gender and computer experience. This was followed by the second section, within which scaled-response items were provided to determine the respondents' opinions on the factors influencing their inclination towards using gamification in teaching and learning.

D. Validity and Reliability

Lastly, the study tested the reliability and discriminant validity [73] by conducting a comparison between the construct's correlations. The results are shown in Table I. The internal reliability was established using Cronbach's alpha, which was found to be 0.83 for willingness, 0.80 for perceived usefulness, 0.68 for ease of use, 0.70 for normative beliefs, 0.88 for task-technology fit, and finally, 0.78 for social influence. Data from the questionnaire was encoded and entered into SPSS, after which descriptive statistics were used for data analysis and to provide the mean and standard deviation values. Lastly, the study used regression analysis to examine the formulated hypotheses.

TABLE I: DISCRIMINANTS VALIDITY

Perceived usefulness	using gamification system improve my learning
	using the gamification system increase my learning outcomes
	Gamification activities are useful in my learning
	Using the gamification activities produce desire learning results
Ease of use	The gamification system functionality and interface is clear and understandable
	I find the gamification system to be flexible to be used
	I find gamification activities are easy to use in learning
Task-technology fit	I think that using gamification would be well suited for the way I like to study tasks
	using gamification fit well for the way I like to study tasks
Willingness	I am ready to make a change in my learning by implementing gamification in my class
	I can implement the concept of gamification based on the topic
	I have the skills on steps to design the gamification clearly
Social Influence	people who influence my behavior, would think that I should use a gamification in my learning
	people who are important to me would think I should use a gamification in my learning
	people whose opinions I value, would prefer that I use a gamification in my learning
Normative beliefs	I am entirely capable of using technology in learning successfully
	I am certainly able to use gamification in learning if I want to use

IV. RESULTS

The study model representing the direct effects was evaluated through the testing of direct path effect coefficients and effect sizes as shown in Table II based on the suggestions in relevant studies [59]. The values of the path coefficients show the direct relationship and the strength of the relationship between the study variables, indicating partial support for the hypotheses. Three of the five study variables, namely perceived usefulness, normative beliefs, and task technology fit showed significant effects on students' willingness to adopt gamification (refer to Fig. 1). Only the variables ease of use and social influence had no significant effect. More specifically, the perceived usefulness path coefficient value obtained is 0.433, with a t-value of 6.812, indicating support for Hypothesis 1 ($p<0.05$). On the contrary, ease of use path coefficient value is 0.058, with a t-value of 1.162, indicating that Hypothesis 2 is rejected. In additions, the social influence path coefficient value is −0.115, with a t-value of 1.041, indicating that Hypothesis 3 is not supported. As for normative beliefs, the path coefficient value is 0.355, with a t-value of 2.939, indicating support for Hypothesis 4 (<0.05). Moving on to task-technology-fit, the path coefficient value is 0.867, with a t-value of 5.118, indicating support for Hypothesis 5 ($p<0.05$) as shown in Table III.

TABLE II: CORRELATION RESULTS

	Will	PU	EOU	SI	NB	TTF
Willingness	--					
Perceived Usefulness	0.69	--				
Ease of Use	0.24	0.31	--			
Social Influence	0.83	0.47	0.25	--		
Normative Beliefs	0.69	0.59	0.27	0.58	--	
Task Technology Fit	0.86	0.49	0.27	0.84	0.85	--

TABLE III: RESULTS OF THE MODEL

Hypotheses	Path coefficient	t-value	p-value	Results
H1. PU-WILL	0.433	6.812	0.000	Supported
H2. EOU-WILL	0.058	1.162	0.251	Not-Supported
H3. SI-WILL	0.115	1.041	0.303	Not-Supported
H4. NB-WILL	0.355	2.939	0.005	Supported
H5. TTF-WILL	0.867	5.118	0.000	Supported

V. DISCUSSION

An important finding of the current study is the significant influence of perceived usefulness on the willingness to adopt gamification technology. This finding aligns with the results of other studies [74], and thus, further emphasizes the fact that perceived usefulness ranks among the most significant determinants of willingness to adopt such technology. This result may be attributed to the fact that even though participants had not often used gamification as a learning tool, they had a high perception of its usefulness, making them more willing to use it in their learning. According to Hanus and Fox [75], students are more motivated and excited about new ways of learning, like gamification. Sánchez-Mena and Queiro-Ameijeiras *et al.* [76] revealed that perceived usefulness is among the most significant determinants of technology adoption since users will want to use technology to facilitate tasks completion. Thus, users who perceive IT as beneficial to them will show willingness towards its adoption. This was confirmed by Sánchez-Mena and Queiro-Ameijeiras

et al. [76], who revealed that perceived usefulness significantly affects the user's intention to use gamification, and by Yoo and Kwon *et al.* [77], who found that the perceived usefulness of a gamified smart tourism application was a predictor of the intention to use it, Abdel-Maksoud [78] also indicated that student's satisfaction with the use of a technology platform is influenced by the perceived usefulness of the platform. Moreover, perceived usefulness was found by Chen and Lin [79] to be the most important variable that had a positive effect on students' intention to use mobile games in their learning environment. Similarly, the perceived usefulness of educational computer games had an influence on students' acceptance of the proposed method of learning [80]. Thus, in this study, the findings supported the research hypothesis that the perceived usefulness predicts the respondents' willingness to adopt gamification technology.

In past studies, ease of use has been revealed as a significant factor in gamification adoption in the learning process. In this study, however, the result does not align with the earlier studies by authors of [79, 80]. This contrasting result may be attributed to a lack of information relating gamification to the learning process among instructors using new technology applications. Additionally, based on the researchers' observation, the respondents may have felt that using games for instruction was complicated, and therefore, doubted their readiness to use them. In this regard, training should be provided to teachers and students so that both parties will be prepared, confident and comfortable incorporating gamification in learning and teaching.

Moreover, this study, in line with other studies, found that normative beliefs significantly influence willingness to use technology applications. This result supported the significant influence of the students' normative beliefs on the integration of gamification into the learning process. The few studies that examine the role of normative beliefs in gamification adoption in the learning process have shown that it is one of the top predictors of technology integration in learning and teaching. Thus, this study's result supports the proposed hypothesis.

In addition, to the variables discussed above, this study found that social influence has an insignificant effect on the willingness to adopt gamification technology. The relationship between the two variables was insignificant and, therefore, the proposed hypothesis was rejected, as were the principles of the Unified Theory of Acceptance and Use of Technology (UTAUT). This result may be related to the new generation's adept use of new technology, leading to these individuals being notably less influenced by those around them such as family members, teachers, friends and colleagues when it comes to new technology usage. However, this result is inconsistent with Rapp and Hopfgartner *et al.* [50], who explained that friends and colleagues have a positive impact on an individual's decision to use new technology. The result is also not aligned with other empirical gamification studies that supported the direct influence of social influence on user behavior [61, 62].

With regards to the task-technology-fit variable, the result supported its positive influence on the willingness of the students to use gamification technology. Although, this study's result did not reveal the significant influence of ease of use on students' willingness to integrate gamification, students still gained some experience in using gamification to complete their learning tasks. Also, because task-technology-fit has not been extensively examined in gamification studies among students, more data is needed to validate the study results and justify the conclusion and generalization.

VI. Conclusion and Implications

This study primarily investigated the factors influencing students' willingness to use gamification in their learning environment. These factors included perceived usefulness, ease of use, normative beliefs, social influence and task-technology fit. Because there is a literature gap regarding the reasons for adopting gamification technology in the context of learning and teaching, this study aimed to contribute to the literature and propose a specific study model. Based on the results obtained from the examined variables, perceived usefulness, normative beliefs, and task-technology fit had significant effects on the willingness of students to use gamification in their learning process, while the variable ease of use and social influence did not.

This study makes multiple contributions to the theoretical aspects of gamification. The first contribution is that it assists in the development of a conceptual framework to examine the effects of specific variables on students' willingness to adopt gamification applications in their learning process and environment, elaborating on the relevant theories' assumptions. The combination of examined determinants as antecedents and predictors of willingness to adopt gamification has been under-examined in the literature, and the findings have been mixed. While several determinants have been explored individually in the literature, the study framework provides a comprehensive view of the topic and extends the theory of technology adoption. Moreover, this study confirms the relationships between the examined factors in the specific context of gamification for the first time. Support for the variables may provide deeper insights for academics and researchers interested in the field of gamification. Similarly, the TAM model considerations, the task-technology fit and social influence factors have been studied separately in the past, whereas the present study of gamification among students examines these variables in combination. Finally, this study contributes to scholarly production on gamification in education by examining specific combinations of factors in Jordan, a country where gamification in the education field has been understudied. Thus, the study's proposed conceptual framework and the results of its hypothesis testing can be viewed as a guide for scholars interested in investigating the topic of gamification. The results have significant implications for researchers, academics and decision-makers in higher education institutions, particularly for those whose focus lies on the adoption of new technology in the field of education.

Indubitably, this study offers meaningful and enriching results and implications, but as with other studies of its types, it has its limitations. The first limitation is that the sample was selected from a single university in Jordan, and thus, the

participants may not represent the general population. In this regard, future studies may adopt the study's design and framework but also include other Jordanian universities. Another notable limitation is the self-reporting method used for the quantitative data collection, participants might have manipulated the data to match what they thought would satisfy the researcher. Hence, this study suggests that future studies use a qualitative or mixed approach to gain deeper insight into the perceptions and views of students and lecturers in several universities. Lastly, the study focused on limited factors for investigation, whereas, future studies could consider including other technologically, environmental or personal factors to test their effects and confirm the validity of the model.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Yousef Alrashed and Abeer Rasheed conducted the literature and validated the the instruments. Mohamed Gohari, Najla Eltanahi, and Samah Ramzy conducted research instruments and key in the data. Walaa Saleh, Rania Abduljawad and Hoda Wahab conducted the data analysis. All authors had approved the final version.

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