Exploring University Students' Perceptions and Their Attitudes towards Gamified Learning

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***Abstract*—As a newly adopted innovative technology approach in the field of education, gamified learning appears to have the potential to enhance students' experiences and learning outcomes. However, little is known abo ut gamification, which is relatively underexplored in education literature. This study aims to identify students' perception and their attitudes towards the use of gamification in the learning process. A descriptive quantitative study was conducted among 210 university students who had engaged in gamified learning activities. A questionnaire survey was used to collect data, which was then analyzed using descriptive statistics and independent sample t-tests. The results indicated that students had moderately positive perceptions, and their attitudes were moderately positive. In addition, student perceptions and attitudes did not differ significantly based on gender and age. These findings provide insight into the dynamic interaction between students and gamified learning technology to enhance their perceptions and promote positive learning attitudes. This study also has implications for gamification, literacy education, and the pedagogically rich design of educational games to promote positive attitudes among students. Recommendations are made based on the findings obtained.**

***Keywords*—attitudes, gamified learning, perception, students**

I. Introduction

In recent times, the effects of modern technology and internet use everyday life and the learning environment in the field of education have become evident [1]. With the dynamic advancement of technology, educators have had to implement novel learning techniques such as augmented reality and gamified learning to improve the learning outcomes and perception of students [2–5]. However, although several techniques have been extensively explored in the learning environment, research on gamification remains in its infancy [6].

Gamified learning is relatively new, and evidence is lacking in the development trends of gamification, particularly regarding its integration into the learning environment in higher education. Gamification is described as using game thinking and mechanics to meet the needs of learning [7]. Notably, gamification is invaluable in promoting several skills related to education and society [3, 8]. According to Kalogiannakis *et al.* [9], gamification significantly increases students' learning motivation, engagement, and learning outcomes, as well as their social interaction. Additionally, prior studies have found that gamification enhances critical thinking and collaboration among students in the learning process [10, 11]. Other studies have supported that gamification enriches students learning experiences as well as their learning inclination [12]. In addition, Nadeem *et al.* [13–18] indicated that modern technology and gamification improve students' abilities and skills as well as the educational environment, where it improves productivity for both students and teachers.

Despite findings supporting the advantages of gamification in the field of education, no consensus has been achieved as to a universal one among studies. This is due to the weak connection between gamification knowledge basis and theoretical principles, as a result of which empirical findings concerning such theoretical principles are still lacking and require validation [6].

Literature on the topic supports the benefits of gamification learning methods in education, but it remains important to identify and tackle the challenges while leveraging the opportunities introduced by such methods. Only recently have studies begun to examine the potential of gamification as a technological tool in higher education, and the number of students examined regarding their perceptions and emotions in relation to the effectiveness of gamification towards gamification effectiveness remains low [19, 20]. The extent of universities' efforts to facilitate learning through gamified learning techniques is also unclear. These and other related issues are the impetus for this study, which aims to minimize the gap in literature and provide answers and recommendations that stakeholders in the learning environment can employ. Accordingly, this study focuses on identifying students' attitudes towards and perceptions of gamified applications.

The study aims to address students' knowledge gap by exploring their perceptions of gamification learning activities at university, which can promote students' positive attitudes towards learning in the university environment. This research

aimed at exploring students' attitudes and their perceptions of gamification learning as well as identifying individual factors that influence their perception and attitude, and as such, the study questions are as follows;

1) What is the attitude of university students towards the use of gamification in learning?
2) What is the perception of the students with the learning environment when participating in gamification activities?
3) Do males and females' students have the same attitudes and perception level toward gamification learning activities?
4) Do students' attitudes and their perception levels towards gamification differ based on their age?

II. Literature Review

The concept of gamification has been the focus of authors in various fields; it can best be described as the use of game elements in non-gaming applications [6, 7]. Folmar [7] referred to gamification as the employment of game thinking and mechanics to achieve non-game and learning outcomes [21, 22], and to provides a lesson in a way that such provision is developed based on the feedback provided by the player. However, several educational theories (e.g., constructivism, experiential, and flow) suggest that students learn better through experience and interaction [23–25].

Several studies [26–31] have supported the significant influence of gamification on students' perceptions and behaviors pertaining to learning and education. This influence arises because gamification applications affect behavior through psychological outcomes, such as motivation and encouragement to achieve external, utilitarian objectives by engaging in enjoyable hedonic experiences [32, 33]. According to [30], students' perception of gamification is influenced by several factors, including device convenience, access to the internet, and curriculum policies (external factors), as well as interest, attitude, awareness, and effectiveness regarding game-based learning (internal factors) [31]. Yen *et al*. [34] found that the majority of third-year students had positive perceptions of the gamified Plickers application, and Ali *et al*. [35] contended that the gamification method in learning a foreign language, namely Mandarin, positively influenced student attitudes. Lampropulos and Sidiropoulos [36] found that gamification method improved students learning outcomes and their achievement in comparison to the traditional method.

Studies have also validated that gamification contributes to student learning by developing their problem-solving and higher order thinking skills [37]. Additionally, Parsons *et al*. [38, 39] found that gamification elements enhance emotional skills, facilitating empathic learning as well as social skills among learners. Also, similar studies found [40, 41] that gamification promotes positive emotions, influences students' participation, and improved academic achievement. In addition, Tan *et al*. [39, 40] revealed that using gamification via digital applications promotes engagement in the learning process by heightening attraction and facilitating learning in various situations. Moreover, Mejia *et al*. [42, 43] revealed that gamification can motivate and promote learning, whereas Sauerland *et al*. [43, 44] showed that gamification enhances the educational awareness of learners and brings about a learning environment that facilitates healthy competition, productivity, and ongoing learning.

Although some previous studies have indicated the advantages of using gamification in learning activities, other studies have obtained negative results [44], and their impact on students' outcomes remains questionable [13, 45–47]. For instance, a study on student performance [9] revealed that students who did not use game-based activities scored higher than their peers. Due to inconsistent results and the increased interest of researchers in the topic of gamification, there is an urgent need for more research into education-related processes to identify their effects and fill the gap in the literature [3, 7, 48]. It is only recently that studies have been directed toward the potential of gamification as a technological tool, particularly among university students, and to date, studies on the effectiveness of gamification are still lacking [19, 20]. In summary, the literature review reveals that more studies are needed to determine students' perceptions of and learning engagement in gamification. Thus, this study aims to address the gap in the literature and extend the existing literature by exploring student perceptions of and engagement in game-based learning.

III. Method

A. Design of the Study

This study employs a descriptive quantitative approach to answer the research questions. A study with a descriptive quantitative survey research design aims to provide an in-depth examination of data and develop a thorough understanding of the research problem [49, 50].

B. The Study Sample and Procedures

The population in this study was university students. The sample was obtained via simple random sampling. Two hundred and ten students participated in this study voluntarily; of them, 100 were male students, while the remaining 110 were female students. The age of participants ranged from 18–22 years, as shown in Fig. 1. The respondents' ages were divided into two categories based on their skill and experiences with the technology used, such as gamified learning. The sample size is justified based on the participants' willingness to participate and their familiarity with gamification activities, as well as the suggested minimum observation-to-variable ration of 15–20 per indicator [51]. The procedure began with collecting data via an online questionnaire, which the teaching staff provided to students from March 11–April 7, in the second semester of the 2022–23 academic year. The procedures for human participants involved in this study are consistent with the ethical standards of the Ethics Committee of the Dean of Scientific Research at Irbid National University.

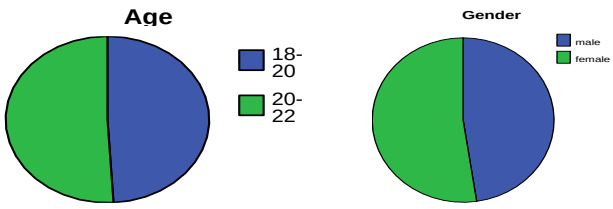

Fig. 1. Study sample.

C. Measurements

To investigate Jordanian students' perceptions of and their attitudes towards gamification, a multiple-item questionnaire was developed in which participants gave their answers on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The survey was based on two questionnaires from previously published research developed by [52–54] with a total of 20 items. Ten items were included to measure students' perceptions, such as "I feel comfortable with the idea of employing a game as a learning tool," "I believe that I will implement gamification learning in my current or future learning," "The use of gamification learning method can be time consuming". Another 10 items were included to measure students' attitudes such as "gamification makes me interested in the lesson,", "gamification motivate me to seek more knowledge about the lesson," "gamification makes me want to win challenges with my classmates". The questionnaire had two parts, in the first part of the instrument, respondent demographic information (e.g., age and gender) was obtained. The second part provided scaled-response items to determine students' perceptions and their attitudes towards gamification in learning. After selecting the study items, their validity was established to ensure that the research instruments measured what they were intended to. The scales were validated through several content and construct validity tests. The questionnaire was presented to a number of educational experts for feedback and to establish their validity. These experts verified the items, and some modifications were made based on their recommendations for reformulation. The Cronbach's alpha was (0.88 for student perceptions; and 0.91 for student attitudes). The questionnaire data was analyzed in SPSS version 23. The study applied descriptive and inferential statistics, such as mean and standard deviation, to determine students' perceptions of and their attitudes towards gamification. Furthermore, independents samples t-tests were used to explore the differences in the study variables based on students' gender and age.

IV. Results

Data was analyzed in SPSS to answer the research questions. More specifically, the first and second questions were answered by obtaining mean, standard deviation, and rank (see Figs. 2 and 3), while the third and fourth ones were answered using an independent sample t-test. Based on the obtained values of mean and standard deviation, the answer to the first part of the first question regarding the perceptions of students regarding using game-based learning was determined; moderate mean values were obtained, ranging from 2.54–3.31. The majority of respondents (67%) showed above-average perceptions toward learning efficiency using gamification, while 33% showed below-average ones. The total mean value for the level of perceptions toward using game-based learning based on the sample member estimates was 2.77 (SD = 0.779). The highest mean (3.31) was obtained by Item 9: "Game-based learning can improve my learning skills" (SD = 1.127). This was followed by Items 10 and 8: "The use of game-based learning method can be time consuming" and "Game-based learning can help students learn in a more cognitive and collaborative way"—with mean values of 3.14 (SD = 1.129) and 2.776 (SD = 1.081), respectively. Followed by items number 5, 6 and 7 "Game-based learning is simple to set up to help students learn in the classroom" and "Game-based learning is another way to keep students interested in learning" and "Personalized learning is possible with game-based learning"—with mean values of 2.70 (SD = 1.02) and 2.70 (SD = 1.02) and 2.70 (SD = 1.10), respectively. In contrast, the lowest mean 2.54 (SD = 1.10 was obtained by Item 4: "Students nowadays are more through digital media or new technology", and item number 3 "Students enjoy learning because it is hands-on motivating and engaging" with mean value of 2.56 (SD = 1.11).

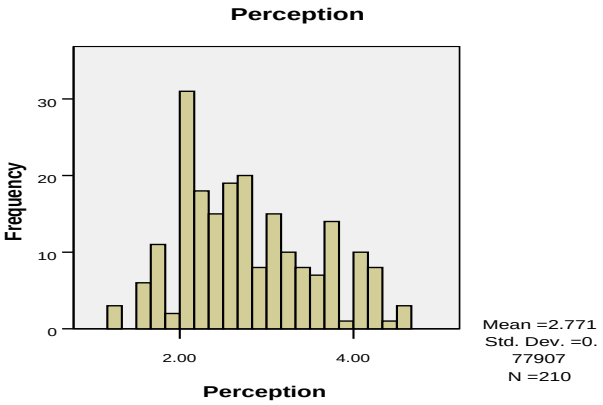

Fig. 2. Perception level.

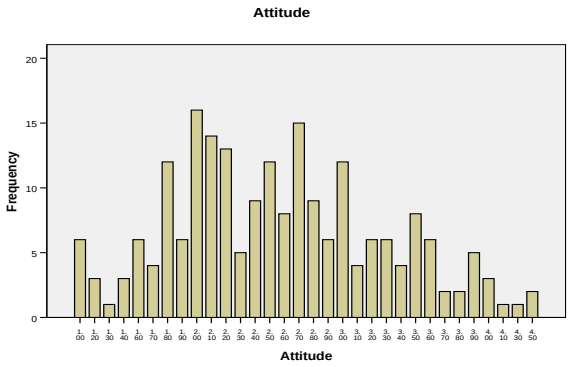

Fig. 3. Attitudes level.

The next part of the first question, concerning the learning attitude level of students through gamification learning was also answered through mean and standard deviation values. Mean values were moderate, ranging from 2.29–2.74. Based on the results, the majority of respondents (61%) agreed that learning using gamification techniques significantly incentivized them to participate in classroom activities, with only 29% disagreeing with the statement that integrating games in classrooms is effective in increasing student participation for better learning outcomes. The total score of the mean values of attitudes level in using gamification learning was 2.55 (*SD* = 0.741). The highest mean (2.74) was obtained for Item 14: "I like lesson that include gamification"—with a standard deviation (0.741), followed by Item 11: "gamification makes me interested in the lesson"—and Item 12: "gamification motivate me to seek more knowledge about the lesson" (2.72), and item 16: "Gamification makes me participate in group work" 2.66 (*SD* = 1.25), item 13 "Gamification makes me want to win

challenges with my classmates" 2.62 (*SD* = 1.36), and Item 15: "Gamification makes me feel confident" 2.53 (*SD* = 1.37), and item 20: "Gamification makes the classroom out of control" 2.40 (*SD* = 1.02), item 17 "Gamification gives me instant feedback" 2.39 (*SD* = 0.948). The lowest mean was obtained for Item 19: "Gamification brings joy to the classroom" 2.29 (*SD* = 2.29).

For the third research question, which determines whether significant differences exist in student perceptions and students' attitudes with gamification learning based on gender and age (see Tables 1 and 2), the results indicate no significant differences between the means concerning perception or attitudes level based on gender and age. More specifically, although insignificant results were obtained based on gender, Table 1 showed that male students obtained higher mean values in their perceptions (2.86; *SD* = 0.880), compared to their female counterparts (2.68; *SD* = 0.665). This is not similar for learning attitudes as the mean values for female students: 2.61 (*SD* = 0.685) higher than male students 2.48 (*SD* = 0.797). In terms of age in the sample, older participants obtained higher mean values in their perception (*M* = 2.773; *SD* = 0.770) compared to participants aged 18–20 years (*M* = 2.76; *SD* = 0.792; see Table 2). The same held true for mean values for learning attitudes, elder students obtained higher values (*M* = 2.62; *SD* = 0.743) than younger students (*M* = 2.47; *SD* = 0.736).

The significance of the statistical differences was demonstrated at the 0.05 level, using an independent sample t-test. Overall, no significant difference existed based on gender in light of perception or engagement ($t = 1.693$, $df = 208$, $p = 0.092$; $t = -1.21$, $df = 208$, $p = 0.224$). In addition, no significant difference was found based on age in light of perception and learning attitudes ($t = -0.054$, $df = 208$, $p = 0.957$; $t = -1.398$, $df = 208$, $p = 0.164$).

Table 1. Students' levels based on gender

Variable	Gender	M	SD	t	df	Sig.
Perception	Male	2.86	0.880	1.693	208	0.092
	Female	2.68	0.665			
Attitude	Male	3.088	0.621	−1.21	208	0.224
	Female	3.085	0.601			

Table 2. Students' levels based on age

Variable	Gender	M	SD	t	df	Sig.
Perception	18–20 years	2.76	0.792	0.054	208	0.957
	Above 20 years	2.773	0.770			
Attitude	18–20 years	2.47	0.736	−1.39	208	0.164
	Above 20 year	2.62	0.743			

V. Discussion

This study explored the perceptions and attitudes of Jordanian university students regarding gamification learning. The results indicated a general positive perception of using gamification in learning among university students; university students found gamification technology effective. According to the results, gamification learning can improve students' learning skills. In addition, many students reported that gamification activities helped them to positively engage with class materials and were beneficial to their overall learning. Using gamification learning activities enhances student interaction, which in turn helps them be more active in the learning activities and engage more in collaborative learning compared to traditional learning activities.

The results are consistent with previous studies that have reported positive effects on student perceptions when using gamification learning activities [55, 56], which support students' positive perceptions of using gamification tools in learning. Other relevant studies [55, 56] have also supported the positive effect of gamification on the motivation and behaviors of users. In this regard, [16, 57] claimed that individuals tended to focus on a topic within the appropriate game period and that a gamified competitive learning environment led to enhanced motivation in learners. In other words, studies concerning gamification have supported the technique's benefits in motivating and encouraging learners and in assisting them in their problem-solving in various fields and their communication with other groups [58]. Moreover, gamification also plays a key technological role in transforming human behavior [16, 57]. It also makes for an enjoyable learning experience because it boosts social interaction, improve motivation and engagement in educational activities [59].

In line with past studies [28], the findings of this study supported the positive attitudes of students toward a gamified learning course, with the major reasons behind students' positive perceptions being the enjoyable experience that the technique facilitates, the ability to keep track of learning progress, and the personalized nature of the learning experience. These cited reasons are consistent with existing theory that describes gamification's potential to support the learning process [60, 61]. According to [62], the popularity of gamification as a learning method from a student perspective stems from the opportunity it provides for self-monitoring and engagement in a competitive and enjoyable learning environment.

With regards to question three, both genders had positive perceptions of gamification in the learning process, with no significant differences between genders. The results are consistent with previous studies [63]. Some studies have also explored the effects of individual learner characteristics on the gamification experience. Based on these findings, there are no significant differences in terms of perceptions and attitudes towards gamification. Regardless of the stereotypes that depict male individuals as prototypical gamers [64], studies have found no significant male-female differences in terms of engagement and learning outcomes [64]. Past findings present evidence regarding the influence of individual characteristics on students' experiences of gamification.

Prior studies have also examined other learner characteristics such as age [65]. In this study, no significant difference in gamification perceptions or learning attitudes was found based on age, which may stem from students enhanced digital skills and course competence throughout their academic years, as well as from their similar perceptions, satisfaction levels, and awareness of gamification in their daily tasks and learning activities. Student views might not differ based on their knowledge, experiences, and technical skills in relation to using gamification in learning.

VI. Conclusion and Implications

This study examined university students' perceptions of and attitudes toward gamification in the learning process and determined the effects of certain factors on both. A survey

questionnaire was distributed to 210 participants to determine perceptions and attitudes regarding gamification at the university. Gamification learning techniques have become increasingly popular in the education field, and with their continued development, it has become necessary to determine students' perceptions of and attitudes towards using the technique in learning activities. The findings showed that students had moderately positive perceptions of and attitude toward using gamification in learning. This study's findings also indicated no significant differences in students' perceptions and attitudes related to gamification in learning based on gender and age.

This study makes several contributions to the literature. First, the study investigated the impact of gamification learning on student attitudes and their perceptions in learning. While digital education, including the use of technology in educational games, has attracted considerable attention in recent research, a need remains for a more comprehensive exploration of its effects on students' learning [66, 67]. This study revealed that students exposed to game activities exhibited moderate positive learning attitudes and perception. The study is one of the few Jordanian studies that provides findings from a well-designed and well-implemented investigation of student perceptions of technology implementation in the learning process. As such, the findings of this study provide unique insights that may increase efforts to effectively implement technology-based educational games in the learning process by understanding how students perceive game-based learning, both locally and internationally.

The study also has significant practical implications. Its contributions are based on a consideration of the limited empirical studies and original research on student attitudes towards and perceptions of using technological tools and gamification in learning in Jordan, the Arab world, and the Middle East. As such, to expand the scope of previous studies and bridge the gap in literature, this study has investigated student attitudes towards and perception of gamified learning activities. Another contribution of this study is that the individual factors explored, such as gender, have not been sufficiently investigated in previous research. Including the factors of gender in the current study provided a deeper understanding of the research problem and supported the interpretation of the results. Finally, the study revealed that students had a positive perception of game-based learning in the learning. As such, educational institutions, schools, and teachers should share their experiences and knowledge to adapt to the latest technological tools and applications for students. In conclusion, the study underscores the importance of incorporating digital educational games into learning and teaching activities to enrich student learning experiences and promote positive attitudes. The study also has a limitation, among the limitations of this study is the data collection method used, which was based on quantitative method. Future studies should use other methods such as qualitative and mixed methods to enrich our understanding of the phenomenon under study. Lastly, although Jordan has several universities, this study was limited to one university. Therefore, future studies might investigate other universities (e.g., private and public universities) and compare them in terms of gamification use in learning and teaching.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Introduction: Ashraf Kan'an, Malek Jdaitawi, Nahed Nasr, Reem Altaisan and Feras Talafha conducted introduction and literature review; Marwa Torki, Noha Hamoudah, Reema Aloqlah, Mona Soliman and Manal Ali conducted research methodology and collected the data; Malek Jdaitawi, Rasha Abd Alfattah, Mona Soliman and Hager Abdel Hadi contributed to the results and discussion sections; all authors had approved the final version.

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