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NSES TOWARD THE TECHNOLOGY INTEGRATINON BY GAMIFIED LEARNING EXPERIENCE IN HIGHER EDUCATION

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Abstract

This study investigates the responses of students towards the integration of technology through gamified learning experiences in educational settings. With the development of digital technologies, educators are increasingly exploring innovative methods to enhance student engagement and learning outcomes. Gamification, the application of game elements in non-game contexts, has emerged as a promising approach to achieve these objectives. Through a mixed-methods research design, this study examines the impact of gamified learning experiences on student motivation, engagement, and academic performance. Quantitative data is collected through surveys to measure students' perceptions and attitudes towards gamified learning activities, while qualitative data is gathered through interviews to explore in-depth insights into students' experiences. The findings of this study showed the effectiveness of gamification in promoting active learning, encouraging intrinsic motivation, and facilitating deeper engagement with course content. The implications of these findings for educational practice and future research are discussed, highlighting the potential of integrating technology through gamified learning experiences to enrich the teaching and learning process in diverse educational contexts.

Keywords – Gamified learning, Technology integration, Student responses

Introduction

The integration of technology through gamified learning experiences in higher education has attracted significant attention in educational research. Gamification has been recognized as a motivational tool for students (Buckley & Doyle, 2014), providing a unique approach to engage learners through online interventions (Buckley & Doyle, 2014). According to Alshammari (2020), gamified learning is the integration of game elements and mechanics into educational settings to enhance motivation, engagement, and learning outcomes. This approach aims to increase learners' motivation to engage in learning activities and promote desired learning behaviors (Dicheva et al., 2019). The theory of gamified learning emphasizes the use of game attributes outside the context of a game to influence learning-related behaviors and attitudes (Landers, 2014). This approach is increasingly recognized as a potential method to enhance student outcomes and experiences across various educational settings (Song et al., 2022). It is said that gamification can boost learning performance by modifying learners' behavior and attitude towards achieving intended outcomes ("Handbook of Research on the Influence and Effectiveness of Gamification in Education", 2022). To conclude, gamification involves applying elements of game design and mechanics to non-game contexts, such as education. In the context of learning, gamification aims to make educational activities more

engaging, motivating, and enjoyable to influence learning-related behaviors and attitudes.

Research indicates that gamified educational interventions can improve learning outcomes. It can be done by clarifying the mechanisms underlying the interventions and exploring relevant theories (Gaalen et al., 2020). Additionally, the potential of gamification in education lies in its ability to support and motivate students, leading to enhanced learning processes and outcomes (Alhammad & Moreno, 2018). Effective gamified learning experiences are designed based on considerations such as meaning, user-centered design, challenges, personalization, feedback, choices, autonomy, social interaction, competition, cooperation, and viewing failure as an opportunity to learn (An, 2020).

Furthermore, gamified learning applications have shown promise in increasing student participation and improving learning in various subjects, including science and mathematics (Hürsen & Bas, 2019). Gamification is also known to stimulate motivation, commitment, and social influence among students, making it an appealing approach in educational settings (Peláez & Solano, 2023). Overall, gamified learning offers an immersive and interactive experience that contrasts with traditional passive teaching methods, leading to improved learning outcomes (Mi et al., 2023).

Although the integration of technology in higher education especially in the realm of gamified learning experiences has gained significant interest, it still needs tobe studied deeper. However, the effectiveness and implications of technology integration through gamified learning experiences in higher education are multifaceted and necessitate thorough consideration (Blackmon, 2023). Educators need to know their students' response toward it. Understanding students' attitudes towards the integration of information technology in higher education is crucial, as it can impact the effectiveness of educational initiatives (Ramdhony et al., 2020). Furthermore, student satisfaction with technology integration significantly influences teaching and learning outcomes in higher education settings (Semente, 2017). In addition, understanding students' perceptions, attitudes, and confidence levels towards learning technologies is crucial for educators planning to integrate technology into their teaching practices (Staddon, 2023).

Therefore, it can be concluded that the integration of technology through gamified learning experiences in higher education presents both opportunities and challenges. Some elements such as students'perception and attitudes can clearly affect the result of this approach.

Moreover, students' attitudes towards the integration of information technology in higher education significantly influence the success of gamified learning initiatives (Ramdhony et al., 2020). This favorable perception underscores the potential of gamified learning experiences to resonate with students and contribute to their overall educational development (Ramdhony et al., 2020).

With the opportunities and challenges provided by the integration of technology through gamification experience, the researcher conducted a case study in Chemical Engineering department of ITN Malang, East Java to know the students' response toward it. It is expected that the result of this study can enrich the teaching and learning process in diverse educational contexts, especially in Engineering class of EFL context.

Methodology

This study was conducted in Institut Teknologi National Malang on JL. Raya Karanglo KM. 2, Tasikmadu, Lowokwaru Sub-District, Malang City, East Java, 65153. 20 students of Chemical Engineering department who took English class were appointed as the subjects of the study.

The researcher used mixed-method for this study since she wanted to examines the impact of gamified learning experiences on student motivation, engagement, and academic performance. Survey and interview were used to collect data.

The quantitative data is collected through surveys to measure students' perceptions and attitudes towards gamified learning activities, while qualitative data is gathered through interviews to explore in-depth insights into students' experiences.

The survey was being structured to gather comprehensive data on students' acceptance, readiness, attitudes, and experiences with technology-enhanced learning. The survey aimed to capture students' perceptions, preferences, and challenges related to gamified learning environments.

Finding and Discussion

The data of this study is collected from survey and interview.

First, the researcher collected the students' basic demographic data such as age, gender, and the year of study. All of the participants are between 18 and 19 years old. 8 students are females and 12 students are male. All of the participants are in their second semester of study.

In the survey, the researcher found some data:

1. students' perceptions related to gamified learning environments.

The result of the survey showed that the students' perception toward the gamification of technology was positive.

First related to their engagement and motivation, the researcher asked to fill this survey (questionnaire).

Table 1. Students' engagement and motivation

Questions	**Score**				
	1	**2**	**3**	**4**	**5**
The use of technology in a form of game is easy			**10**	**10**	**10**
Compared to traditional learning methods, you find gamified learning activities make you engage to the English learning process.				4	16
Gamified learning make you feel about participating in English class activities.				12	8
Gamified learning is impactful on your motivation to learn English.					20
You feel happy when you earn points, badges, or rewards in gamified learning activities.					20
You like to compete with friends in gamification				5	15
You like to cooperation with friends in gamification				2	18
When given the choice between a gamified learning activity and a traditional learning activity, you prefer a gamified learning activity.				4	16

You enjoy the integration of technology using gamification	20	

Note: 5 : Very agree, 4: Agree, 3: Fair, 2: Disagree, 1: very disagree

The first data showed that the students saw the integration of technology in a form of game is easy. Half of the participants agree and the rest are very agree with that statement.

Furthermore, the students seemed to accept the integration of technology using gamification experience very well. It was shown by the data that 4 students agreed and 16 students very agreed that compared to traditional learning methods, they find gamified learning activities make them engage with the English learning process.

It is very important for educators to make sure that the students have acceptance with the approach to make the learning process smoother. Denden et al. (2022) found that perceived usefulness was the most influential factor towards the intention to use gamified learning environments.

The next data showed that the integration of technology using gamification experience can improve the students' engagement in the English class. 12 students agreed and 8 students very agreed to the statement of Gamified learning make them feel about participating in English class activities. Buckley & Doyle (2014) also suggested that gamified learning interventions have the potential to increase student engagement and enhance learning outcomes.

In an interview with her 2 students (female and male students), the researcher asked "do you find gamified learning activities more engaging than traditional learning methods? Why or why not?"

Female student: "Yes miss. In gamification, whether I want it or not, I was a part of the activity, so I must join it. However, I enjoy taking a role in the game. It was fun."

Male student: "Playing game is always enjoyable for me, miss. I can do the task together with my friend to be the winner while I am learning in English. Cool experience!"

From the students' answers, gamification in the use of technology integration in the education setting is good to improve the students' engagement. The most important is the gamification must be acceptable and fun for the students. The educators need to adjust the type of gamification with the level of their students. It is in line with Oluwajana et al. (2019) who highlighted that factors like perceived usefulness, ease of use, enjoyment, and control significantly influence student's acceptance and intention to use gamified learning environments.

The next question about whether or not gamified learning is impactful on the students' motivation to learn English showed that all the participant were very agree with this. The deeper insight was taken from the interview process. The students said that they felt motivated while doing the learning through game unconsiously. Tsay et al. (2018) demonstrated that users' prior experience and attitudes towards game-based learning influenced their motivation in participating in gamified systems.

There were many reasons in the improvement of student' motivation in gamified learning. However, theall the participants of this study felt happy when they earned points, badges, or rewards in gamified learning activities. Similarly, Davis et al. (2018) found that students' preferences for different gamified

elements varied, with the desire to collect badges being a strong driver of participation in gamified learning activities.

Being asked for their preference in competing and cooperation with their friend in doing gamification activities, the students showed high agreement for that point. 5 students agree and another 15 students very agree that they like to compete with their friends in gamification. Meanwhile, 2 students agree and another 18 students very agree that they like to cooperate with their friends in gamification.

In the interview, the students said:

Female student: *"I like to do the task together with my friends, miss. So, when I made a mistake I did not feel embarrased alone. Hehe…"*

Another student said:

Male student: "*I like to be in group with X because he was smart, his English is good. We used to win all the game when we worked together, miss."*

From the data, it is shown that gamification can increase the students' interaction with their peers in the class. Santos et al. (2018) found that gamified educational systems can positively influence students' learning behaviors and study-related habits. They can encourage students to spend more time using educational systems and interacting with peers, leading to improved learning experiences. Further, Chong (2019) indicated that gamified education was perceived as motivating by students, satisfying their competence and social needs and enhancing their self-efficacy.

In addition, it should be noted that the group division also takes a role in the gamification for the students to enjoy and participate.

In the last question, the students said that when given the choice between a gamified learning activity and a traditional learning activity, all of them prefer a gamified learning activity. According to Qiao et al. (2022), gamified learning experiences can positively affect cognitive and motivational outcomes compared to traditional face-to-face instruction.

In conclusion, gamified learning environments have the potential to positively impact students' perceptions, motivation, engagement, and learning outcomes. Understanding the factors influencing students' acceptance and engagement with gamified learning is crucial for designing effective and engaging educational experiences in higher education settings.

2. students' preferences related to gamified learning environments.

The researcher gives some questions related to students' preferences related to gamified learning environments as following:

1. When given the option to choose between traditional and gamified learning environments, which would you prefer? a) Gamified learning environments exclusively b) Mostly gamified learning environments, but with occasional traditional methods c) No preference between gamified and traditional learning environments d) Mostly traditional learning environments, but with occasional gamified methods e) Traditional learning environments exclusively

   The data showed that option B got the highest respondents which was 18 students since another 2 students chose option A. It showed that the students prefer gamification experience to the traditional learning.

Studies such as Zainuddin et al. (2020) and Buckley & Doyle (2014) have highlighted that gamified learning interventions can positively influence students' engagement and motivation, potentially increasing their preference for gamified learning environments. The systematic review conducted by Zainuddin et al. (2020) provides empirical evidence of the impact of gamification on learning and instruction, emphasizing its potential benefits in enhancing student preferences for gamified approaches.

2. How do you feel about the level of interactivity in gamified learning environments compared to traditional ones? a) Much prefer the higher level of interactivity in gamified environments b) Prefer the higher interactivity, but not exclusively c) Neutral, the level of interactivity doesn't impact my preference d) Prefer the lower interactivity of traditional environments e) Much prefer the lower interactivity of traditional environments

   The answers showed that the 18 students chose option B, while another 2 students chose option A.

3. Which aspect of gamified learning environments do you find most appealing? a) The competitive elements (e.g., leaderboards, point scoring) b) The use of storytelling and narratives to engage learners c) The opportunity for customization and personalization d) The immediate feedback provided during activities e) The collaborative nature of many gamified activities

   The answer of this question was varied. Option A was chosen by 6 students. Option B was chosen by 2 students. Option C was chosen by 4 students. Option D was chosen by 4 students. The last, option E was chosen by 4 students.

   The data showed that the students' preference toward the integration of technology by gamification was influenced by various reasons. Ibáñez et al. (2014) and Acosta-Medina et al. (2021) has indicated that students' preferences for gamified activities are influenced by factors such as academic milestones, utility, enjoyment, and knowledge improvement. Understanding these factors is crucial for designing gamified tools that align with students' preferences and enhance their learning experiences.

4. When participating in gamified learning environments, what motivates you the most? a) The opportunity to earn rewards b) The desire to outperform my peers and climb leaderboards c) Engaging with the storyline or theme of the gamified activity d) The challenge presented by tasks and obstacles e) The chance to collaborate and work with classmates

   The data showed that 13 students chose option A. When the researcher asked kind of rewards they expected to get, mostly they like additional scores for their academic achievement. Option D was chosen by 3 students. While option E was chosen by 4 students.

   In the interview, the lecturer also asked the students chose collaborative nature and found out that they were extroverted-type persons. That is why they like to do some collaboration and some interactive activity during the teaching activitiy. Studies like Smiderle et al. (2020) have explored

the relationship between students' personality traits and their preferences for gamified elements. Extroverted and introverted students may respond differently to gamification strategies, with factors like ranking and badges impacting their preferences for gamified learning activities.

5. How important is it for gamified learning environments to align with your personal interests and hobbies? a) Extremely important; I'm more motivated when learning aligns with my interests b) Somewhat important; it enhances my engagement but isn't essential c) Neutral; my interests don't significantly impact my preference for gamified learning d) Not very important; I'm motivated by the learning content itself, regardless of interests e) Not important at all; my interests have no impact on my preference for learning environments

   The result showed that all participant like to do activity related to theor interest or hobby. Since gamification is close to their interest, they like to do it in the class and felt motivated in doing it.

   In the interview when they have to chose offline and online gamification, most of them chose the online one because it can boost their motivation. Hussein et al. (2022) have shown that students exhibit a high level of interest in participating in gamified online assessments, indicating a positive impact on their preferences for gamified learning tools. Gamified assessments can make learning more enjoyable and engaging, influencing students' preferences for gamified educational experiences.

6. Which factor would influence your decision to engage with a particular gamified learning activity the most? a) The complexity and challenge level of the tasks b) The presence of clear goals and objectives c) The variety of rewards and incentives offered d) The opportunity for social interaction and collaboration e) The relevance of the activity to my academic or personal goals

   The answer for this question was various; option B was chosen by 7 students; option C was chosen by 8 students, option D was chosen by 2 students, and option E was chosen by 3.

   It needs to be a consideration for the educators that using gamification must be connected with the goals and objectives of the teaching and learning process. They must make gamification of technology integration as a medium to help the teaching process, not to replace their job. Research by An (2020) has identified key design considerations for creating effective gamified learning experiences, including personalization, challenges, feedback, social interaction, and the balance between competition and cooperation. Incorporating these design principles can enhance students' preferences for gamified learning environments.

In conclusion, the technology integration by gamification experience have the potential to positively influence students' preferences. By considering factors such as academic milestones, utility, enjoyment, personality traits, and effective design principles, educators and developers can create gamified learning experiences that cater to students' preferences and enhance their overall learning outcomes.

3. students' challenges related to gamified learning environments.

To know the students' challenge related to gamification experince, the researcher conveyed some questions as follows:

1. What challenges do you face when navigating gamified learning platforms? a) Difficulty understanding how to use the platform's features b) Technical issues such as slow loading times or glitches c) Unclear instructions or lack of guidance on how to proceed d) None, I find navigating gamified platforms easy

   Talking about the challenges faced during the integration of technology by gamification experience, 15 students answer the option B, 4 students answer the option C, and 1 student anwer the option A.

2. What obstacles do you encounter when participating in gamified learning activities? a) Feeling overwhelmed by the complexity of tasks or objectives b) Difficulty staying focused or motivated during activities c) Struggling to understand the connection between the game elements and learning objectives d) None, I find participating in gamified activities straightforward

   For this question, 11 students chose option A; 5 students chose option B, and 4 students chose option C.

   From this data, the educator must take some notes. The gamification used cannot be too complicated for the students to do because it can affect their focus and motivation in doing the activity. Research by suggests that the complexity of gamified activities, particularly related to teachers' gaming experience, use of digital tools, and risk-taking, can present challenges in the implementation of gamification (Araújo & Carvalho, 2022). In Addition, although gamification can be fun for the students, the educator cannot ignore the learning objectives. As explained by (Tsay et al., 2019) that emphasize the importance of integrating gamified learning design with pedagogical principles to achieve a "meaningful gamification" experience.

   While gamified learning interventions can enhance engagement and learning, challenges may arise in ensuring that gamification aligns with learners' psychological needs for competence, autonomy, and relatedness (Tsay et al., 2019).

3. What challenges do you face when collaborating with peers in gamified learning environments? a) Difficulty communicating and coordinating with team members b) Confusion about each team member's role and responsibilities c) Unequal participation or contribution from team members d) None, I find collaborating with peers in gamified environments easy

   The answers of this question are 10 students chose option A, 5 students chose option B, and another 5 chose option C.

   From the data, it can be seen that the group division can be a challenge in the gamification. Social interaction can affect the result very much. According to An (2020), the importance of

considering design principles such as personalization, challenges, feedback, social interaction, and the balance between competition and cooperation in gamified learning environments is pretty big.

4. What difficulties do you encounter in understanding feedback provided in gamifing learning activities? a) Feedback is too vague or ambiguous to be helpful b) Feedback is overwhelming or too frequent c) Difficulty interpreting how feedback relates to my performance d) None, I find feedback in gamified activities is clear and useful

   The data showed that 6 students chose option B and 12 students chose option C. From this result, it can be concluded that as an adut learners, higher education students wanted to have more control in their learning experience. They felt a little uncomfortable to get overwhelming or too frequent feedback. Students-center learning is the best choice for them.

   To help this situation, the gamification must be manufactured in a very clear instruction. Jesus et al. (2020) indicate that building gamified platforms can be complex and challenging, particularly in defining game mechanics and dynamics. Yet, a good structure will help both the educators and the students a lot.

To conclude, gamified learning environments offer opportunities to enhance student engagement and motivation, challenges related to integration with pedagogical principles, complexity of activities, design considerations, individual learning tendencies, and platform development complexity need to be carefully addressed to maximize the effectiveness of gamified learning experiences.

Conclusions

Gamification involves applying elements of game design and mechanics to non-game contexts, such as education. In the context of learning, gamification aims to make educational activities more engaging, motivating, and enjoyable to influence learning-related behaviours and attitudes. Although the integration of technology in higher education especially in the realm of gamified learning experiences has gained significant interest, it still needs to be studied deeper. From the results of the study, it can be concluded that the integration of technology by technology gamification in education setting was effective since it could convey positif response from the students. Gamified learning environments have the potential to positively impact students' perceptions, motivation, engagement, and learning outcomes. Understanding the factors influencing students' acceptance and engagement with gamified learning is crucial for designing effective and engaging educational experiences in higher education settings. In addition, the technology integration by gamification experience has the potential to positively influence students' preferences. By considering factors such as academic milestones, utility, enjoyment, personality traits, and effective design principles, educators and developers can create gamified learning experiences that cater to students' preferences and enhance their overall learning outcomes. The last, gamified learning environments offer opportunities to enhance student engagement and motivation, challenges related to integration with pedagogical principles, complexity of activities, design considerations, individual learning tendencies, and platforms development

complexity that need to be carefully addressed to maximize the effectiveness of gamified learning experiences.

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