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The Impact of Gamification on Creating Fun and Interactive Learning Processes

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Abstract
This study aims to examine the impact of implementing gamification on creating fun and interactive learning processes among students at Universitas Negeri Makassar. The research employed a one-group pretest–posttest design involving 42 students. Data were collected through tests, Likert-scale questionnaires, and observation sheets. The results indicate an improvement in students' average scores, increasing from 64.3 in the pretest to 81.6 in the posttest. In addition, 95.2% of the students reported that gamification-based learning was engaging, while observational data revealed higher levels of active participation, enthusiasm, and interaction throughout the learning process. These findings suggest that gamification has the potential to enhance the quality of learning by fostering a more interactive and meaningful learning environment in higher education.
Kata Kunci: *Gamification, Student Engagement, Interactive Learning.*

INTRODUCTION

Changes in the characteristics of learning in the modern education era are marked by a shift from teacher-centered approaches toward learning models that position students as the main subjects of the learning process. Learning is no longer understood merely as a process of knowledge transfer, but rather as a meaningful and contextual learning experience oriented toward the development of 21st-century competencies, such as critical thinking, collaboration, creativity, and digital literacy. In this context, the learning process is designed to support students in constructing understanding through active engagement, reflection, and meaningful social interaction. This approach aligns with the view that modern education should continuously foster students' competencies, values, and well-being in order to enable them to adapt to rapid social and technological changes (OECD, 2019). Furthermore, 21st-century learning demands flexible, interactive instructional designs that are closely connected to students' real-life experiences to enhance motivation and improve the overall quality of learning experiences (Redecker, 2017).

Low levels of student engagement and learning motivation remain a serious challenge in higher education, particularly in learning environments that are monotonous and offer limited interaction. Students tend to demonstrate passive participation when learning processes do not provide sufficient opportunities for exploration, collaboration, and learning experiences that are relevant to their needs and real-life contexts. This condition is further exacerbated by the continued use of conventional instructional methods that are less responsive to the characteristics of the digital generation, resulting in decreased learning interest and weaker emotional engagement in academic activities. Several studies have shown that student engagement is strongly influenced by instructional designs that effectively integrate cognitive, affective, and social dimensions in a balanced

manner (Fredricks, Reschly, & Christenson, 2019). In addition, students' learning motivation has been found to increase when learning is designed to be active and offers challenging, meaningful experiences that foster a sense of ownership over the learning process itself (Kahu & Nelson, 2018).

Gamification has emerged as an innovative approach in education designed to enhance students' engagement, motivation, and learning experiences through the integration of game elements into educational contexts. This approach incorporates components such as points, levels, challenges, instant feedback, and reward systems to create a more engaging and participatory learning environment. In practice, gamification does not aim to turn learning into a game for its own sake; rather, it seeks to encourage active student involvement through challenging and meaningful learning experiences. A growing body of research indicates that gamification can enhance intrinsic motivation and promote higher levels of learning engagement, particularly when game elements are carefully aligned with instructional objectives (Dichev & Dicheva, 2017). Furthermore, gamification has been shown to foster more dynamic interactions between students and learning materials, thereby contributing positively to a fun, student-centered learning atmosphere (Sailer & Homner, 2020).

The relevance of gamification to the characteristics of today's university students has become increasingly evident alongside shifts in learning preferences among generations raised in fast-paced, digitally rich, and visually stimulating environments. Contemporary students tend to favor learning experiences that are interactive, challenging, and supported by immediate feedback; consequently, conventional one-way instructional approaches often struggle to sustain their attention and engagement. Gamification addresses these needs by offering more contextual and participatory learning experiences through structured mechanisms of challenges, achievements, and measurable progress. This approach aligns with students' appreciation for learning autonomy, recognition of effort, and learning experiences that feel closely connected to real-world contexts (Buckley & Doyle, 2016). Moreover, gamification has been found to be effective in creating more enjoyable and healthy competitive learning environments, which can foster sustained engagement and a stronger sense of ownership over the learning process (Subhash & Cudney, 2018).

A wide range of studies over the past decade has demonstrated that gamification contributes significantly to improving student engagement and learning motivation, particularly in higher education contexts. The implementation of game elements such as badges, leaderboards, and reward systems has been shown to encourage active student participation while creating learning experiences that are both enjoyable and challenging (Hamari, Koivisto, & Sarsa, 2014). In addition, gamification plays a role in enhancing students' focus and persistence in completing learning tasks, especially when it is combined with clear learning objectives and collaborative activities (Kapp, 2016). Accordingly, gamification is viewed as a relevant pedagogical approach for addressing the challenges of modern education, particularly in fostering learning processes that are more interactive, meaningful, and student-centered (Toda et al., 2019). Furthermore, the integration of gamification in alignment with student-centered learning approaches can significantly

enhance cognitive and affective engagement, thereby supporting the creation of more interactive and meaningful learning experiences (Zainuddin et al., 2020).

Empirical studies on the implementation of gamification indicate that this approach affects not only the enjoyment of learning but also leads to tangible improvements in students' engagement and participation throughout the learning process. Through the structured design of game-based activities, gamification can encourage students to become more active, responsive, and involved in learning interactions. These findings reinforce the view that gamification has the potential to serve as an effective pedagogical strategy when it is designed contextually and aligned with instructional objectives (H et al., 2025). Moreover, field-based empirical investigations are essential to avoid superficial implementations of gamification that merely add game elements without a strong connection to learning goals. Empirical research enables educators and educational institutions to identify best practices in gamification while also recognizing its potential limitations and long-term impacts on students' learning processes (Seaborn & Fels, 2015). Therefore, the development of gamification in education should be grounded in robust empirical evidence to ensure that its implementation is not only visually appealing but also pedagogically meaningful.

This study aims to analyze the impact of implementing gamification in the learning process on the creation of a fun and interactive learning atmosphere. Specifically, the study focuses on how the integration of game elements into instructional activities can enhance student engagement, encourage active participation, and foster more dynamic interactions between lecturers and students as well as among students themselves. By positioning gamification as a pedagogical strategy, this research is expected to provide empirical insights into the effectiveness of this approach in supporting learning processes that are not only oriented toward academic achievement but also toward positive and meaningful learning experiences for students.

METHOD

Participants

This study involved 42 students from Universitas Negeri Makassar as participants. All participants were enrolled in the same class and took part in a course that implemented a gamification-based learning approach. Accordingly, the population of the study also served as the research sample. Participants were selected using an intact group technique, in which an existing class was used without randomization, as the study focused on observing the impact of gamification within a naturally occurring learning context. The relatively homogeneous characteristics of the participants in terms of academic background and learning experiences enabled the researchers to obtain a more comprehensive understanding of students' responses to learning designs that emphasize fun and interactive learning environments.

Instruments

The research instruments used in this study consisted of a questionnaire and an observation sheet. The questionnaire was designed to measure students' perceptions of the implementation of gamification in the learning process, particularly in relation to their

levels of enjoyment, engagement, and interaction during learning activities. A Likert-scale format with multiple response options was employed to capture students' attitudinal tendencies in a more objective manner. In addition, the observation sheet was used to document students' behaviors throughout the learning sessions, such as active participation, enthusiasm, and interactions among students as well as between students and the lecturer. The use of these two instruments was intended to obtain complementary data, allowing the impact of gamification on the learning process to be analyzed in a more comprehensive manner. Before data collection, the questionnaire was tested for validity and reliability. Content validity was evaluated by two experts in educational technology and instructional design, who reviewed the relevance and clarity of each item. Revisions were made based on their suggestions. Construct validity was examined using item-total correlation, and only items meeting the acceptable criteria were retained. Reliability was measured using Cronbach's Alpha, which indicated satisfactory internal consistency. These results confirm that the questionnaire was appropriate for measuring students' perceptions of gamified learning.

Data analysis procedures

Data analysis in this study was conducted to examine the impact of gamification on the creation of a fun and interactive learning process. Quantitative data were obtained from students' pre-test and post-test results and analyzed descriptively by comparing scores before and after the intervention to identify trends in learning outcomes. In addition, questionnaire data were analyzed by calculating percentages and mean scores for each indicator related to students' enjoyment, interaction, and engagement in learning activities. Qualitative data from open-ended questions were analyzed thematically to identify patterns in students' experiences and perceptions of the implementation of gamification. The combination of quantitative and qualitative analyses was employed to provide a comprehensive understanding of the effectiveness of gamification in supporting more active and meaningful learning processes.

To determine whether there was a significant difference between students' pre-test and post-test scores, a paired-sample t-test was conducted. This test was used to compare students' learning outcomes before and after the implementation of gamification. Prior to the analysis, the required statistical assumptions were checked to ensure the accuracy of the results. In addition to examining statistical significance, effect size (Cohen's d) was calculated to measure the strength of the impact of gamification on students' learning outcomes and engagement. A significance level of 0.05 was applied in the analysis.

Implementation of Gamification

The gamification approach was applied across several class meetings by integrating simple game elements into regular learning activities. Instead of changing the course content, the learning process was redesigned to feel more engaging and interactive. Elements such as points, leaderboards, badges, time-based challenges, and group missions were introduced to create a more enjoyable atmosphere. Students worked in small groups and completed tasks related to the course material. Although there was a sense of competition, collaboration remained the main focus. Points were given for completing

tasks, participating actively, solving problems correctly, and submitting work on time. At the end of each session, the leaderboard was displayed to motivate students and encourage healthy competition. In addition, interactive digital quizzes were used to help students review and strengthen their understanding in a more enjoyable way. Each session ended with a short reflection, where students were invited to share their experiences and impressions of the learning activities. Through this approach, the classroom environment gradually shifted from a conventional lecture setting to a more lively, student-centered, and engaging learning space.

RESULT AND DISCUSSION

Result

The observation results indicate that the implementation of gamification had a positive impact on classroom learning dynamics. Most students appeared to be more actively involved in learning activities, as reflected in increased participation in discussions, a greater willingness to respond to questions, and active engagement in game-based activities designed by the lecturer. Students' enthusiasm was also evident through positive expressions, more focused attention, and prompt responses to instructional cues. In addition, interactions among students became more intensive and collaborative, while communication between students and the lecturer developed into a more fluid and dialogic exchange. Overall, these observational findings suggest that gamification is effective in creating a more vibrant, interactive learning environment and in encouraging active student engagement throughout the learning process.

Based on the questionnaire results, students demonstrated a highly positive attitude toward the implementation of gamification in the learning process. The majority of respondents agreed or strongly agreed that gamification made the learning process more enjoyable, with the highest mean score reaching 4.24. In addition, aspects related to student engagement and learning motivation also received predominantly positive responses in the agree and strongly agree categories, with mean scores of 4.14 and 4.23, respectively. These findings indicate that gamification is capable of creating a more dynamic learning atmosphere and encouraging active student participation. Although a small number of respondents expressed neutral attitudes, the overall questionnaire results suggest that gamification is perceived as an effective approach for enhancing interaction, motivation, and students' understanding within the learning process.

Table 1. Students' Perceptions Questionnaire on the Implementation of Gamification

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
Gamification makes learning more enjoyable	0 (0%)	1 (2,4%)	4 (9,5%)	21 (50%)	16 (38,1%)	4,24
Gamification increases my engagement during learning	0 (0%)	2 (4,8%)	5 (11,9%)	20 (47,6%)	15 (35,7%)	4,14
Gamification activities encourage me to participate more actively	1 (2,4%)	2 (4,8%)	6 (14,3%)	18 (42,9%)	15 (35,6%)	4,04
Gamification activities promote active interaction during learning	0 (0%)	3 (7,1%)	7 (16,7%)	19 (45,2%)	13 (31,0%)	4,00
Gamification helps me understand the learning material	0 (0%)	1 (2,4%)	6 (14,3%)	17 (40,5%)	18 (42,8%)	4,23

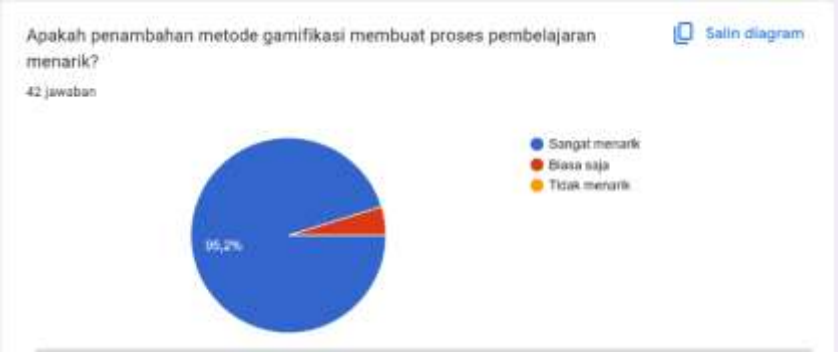

Figure 1. Percentage of Students' Responses to the Attractiveness of Gamification-Based Learning

Based on the questionnaire results involving 42 students, 95.2% of respondents stated that the implementation of gamification made the learning process more engaging, while 4.8% perceived the learning activities as ordinary. These findings indicate that nearly all students responded positively to the use of gamification in the learning process. The high percentage suggests that gamification is effective in creating a more enjoyable learning atmosphere, enhancing students' attention, and encouraging active engagement throughout learning activities. Meanwhile, the small proportion of students who provided neutral responses suggests that the effectiveness of gamification may still be influenced by individual learning preferences and the way it is implemented in the classroom.

The pre-test and post-test results obtained from 42 students revealed a noticeable change following the implementation of gamification in the learning process. During the pre-test stage, most students demonstrated varying levels of initial understanding, with a general tendency toward less optimal mastery of the learning material. After gamification-based instruction was implemented, the post-test results showed an improvement in learning achievement among the majority of students. Post-test scores were generally higher than pre-test scores, indicating that students not only gained a better understanding of the material but were also more engaged throughout the learning process. This improvement reflects that a more enjoyable, interactive, and challenging learning atmosphere created through gamification can encourage students to become more active, focused, and motivated in learning activities. Overall, the comparison between pre-test and post-test results strengthens the finding that the implementation of gamification has a positive impact on both the learning process and students' learning outcomes.

Table 2. Students' Pre-test and Post-test Results (n = 42)

Assessment Aspect	Pre-test (Mean)	Post-test (Mean)	Description
Minimum score	48	68	Improvement in the lowest score
Maximum score	82	95	Increase in the highest achievement
Mean score	64,3	81,6	Significant improvement
Number of students achieving mastery	18	36	Mastery criterion ≥ 75
Mastery percentage	42,9%	85,7%	Nearly doubled

Based on the pre-test and post-test results presented in the table, there is a clear improvement in students' learning achievement following the implementation of

gamification in the learning process. In the pre-test stage, the students' mean score was 64.3, with a minimum score of 48 and a maximum score of 82, indicating that most students had not yet met the learning mastery criteria. At this stage, only 18 students, or approximately 42.9%, were categorized as achieving mastery. After the intervention, the post-test results showed a substantial improvement. The mean score increased to 81.6, with the minimum and maximum scores rising to 68 and 95, respectively. In addition, the number of students who achieved learning mastery increased to 36 students, or 85.7%. This improvement indicates that the implementation of gamification contributed positively to the creation of a more effective, enjoyable, and interactive learning process, which in turn had a positive impact on students' learning outcomes.

In addition to the quantitative results, qualitative data from students' reflections and short interviews further supported the findings. Many students shared that the gamified activities made the class feel more enjoyable and less tense. One student explained: "Usually I just sit and listen in class, but when there were points and group challenges, I felt happy to join in." Another student commented: "Seeing the leaderboard made me want to do my best. But because we worked in groups, it didn't feel stressful. We supported each other." These responses suggest that gamification not only encouraged students to participate more actively, but also created a supportive and motivating classroom atmosphere.

Discussion

Based on the research findings, the implementation of gamification was shown to have a positive impact on the creation of a more enjoyable and interactive learning process, as reflected in the improvement of post-test scores compared to pre-test results and the high level of positive student responses. The increase in student engagement is consistent with previous findings suggesting that gamification can promote both behavioral and cognitive engagement through more active and meaningful learning activities (Huang et al., 2019). In addition, the use of game elements such as challenges, points, and feedback contributes to enhanced intrinsic motivation and learning performance, particularly when these elements are designed in an appropriate and balanced manner (Mekler et al., 2017). The questionnaire results indicating that 95.2% of students perceived gamification-based learning as engaging, along with observational findings showing increased participation and enthusiasm during learning activities, further reinforce the role of gamification in creating a more dynamic learning environment. Nevertheless, the presence of a small proportion of students who perceived the learning experience as ordinary suggests that the effectiveness of gamification is also influenced by individual differences in learning preferences and characteristics. Therefore, the implementation of gamification should be designed in an adaptive and contextual manner to accommodate student diversity and maximize its pedagogical impact.

The findings show that gamification helps create a more fun and interactive learning environment. However, its effectiveness depends on several factors, such as students' motivation, classroom culture, and the lecturer's ability to design meaningful learning activities. If not carefully planned, gamification may focus too much on rewards and lose

its impact on deeper learning. Based on these results, a simple conceptual model is proposed. Gamification elements such as points, badges, leaderboards, and challenges act as motivational triggers that increase students' engagement and interaction. Higher engagement then leads to a more enjoyable learning experience and improved learning outcomes. In this model, engagement plays a key role in connecting gamification design with learning effectiveness. The positive impact of gamification on students' motivation can be explained through Self-Determination Theory, which states that intrinsic motivation develops when learners experience autonomy, competence, and relatedness (Deci & Ryan, 2000; Ryan & Deci, 2020). In this study, challenges and points enhanced students' sense of competence, group missions supported relatedness, and interactive tasks provided a sense of autonomy in learning. These elements may explain why students reported higher engagement and enjoyment during gamified sessions. Previous research also suggests that well-designed gamification can support intrinsic motivation when it fulfills these basic psychological needs (Sailer et al., 2017).

CONCLUSION

Based on the research findings and discussion, it can be concluded that the implementation of gamification has a positive impact on the learning process, particularly in creating a more enjoyable and interactive learning environment. The improvement in students' learning outcomes, as indicated by the comparison of pre-test and post-test scores, suggests that gamification not only increases students' interest but also contributes to a more optimal understanding of the learning material. In addition, the high level of positive student responses toward gamification-based learning, supported by observational findings of increased participation, enthusiasm, and interaction during learning activities, indicates that game elements are effective in fostering both cognitive and emotional engagement among students. Nevertheless, variations in students' responses highlight that the effectiveness of gamification largely depends on the contextual and adaptive design of learning activities that consider students' characteristics. Therefore, gamification can be regarded as a promising learning approach in higher education, provided that it is implemented thoughtfully to ensure that it effectively and sustainably supports instructional goals.

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