IMPLEMENTING PERSONALIZED GAMIFICATION IN E-LEARNING TO INCREASE STUDENT ENGAGEMENT

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Abstract

Digital transformation in higher education has driven the widespread use of e-learning. However, although e-learning offers flexibility in time and place, the main challenge still faced is the low level of student engagement. Many students feel that e-learning is passive and unable to maintain focus and motivation to learn in the long term in one semester of lectures. This low engagement has an impact on low active participation, learning outcomes, and mastery and understanding of certain materials. The main problem raised is whether personalization of gamification elements can significantly increase student engagement compared to conventional e-learning approaches without personalization. To answer this question, this study uses a quasi-experimental method with a posttest design on one group, namely the experimental group using the gamification system. The instruments used include a three-dimensional student engagement questionnaire including behavioral, emotional, cognitive. With the gamification learning approach, it is able to adjust the level of challenge, type of reward, and learning path based on individual preferences and performance, which has a positive impact on student motivation and active participation. The conclusion of this study shows that as much as 83.13% of the use of gamification-based learning systems not only increases active participation, but also strengthens the emotional aspects and learning strategies of students positively. With a personalized gamification approach, it can be an innovative solution to improve the online learning experience that is more adaptive and interesting, especially for new students.

Keywords: Personalized Gamification; E-Learning; Student Engagement;

INTRODUCTION

The digital transformation in higher education has driven the widespread use of e-learning. This has brought about fundamental changes in the methods of lectures, the way lecturers teach and students learn. Advances in information technology, especially in the fields of internet networks, mobile devices, and Learning Management Systems (LMS), have enabled distance education and online learning to develop rapidly (Wanasinghe, 2025). Universities are no longer fixated on conventional face-to-face learning models, but have begun to adopt e-learning as the main strategy in distributing materials, facilitating discussions, and conducting evaluations (Mutia & Leonard, 2013). Evaluation is also an important part of learning and is suitable to be included as part of e-learning (Hidayad et al., 2020). E-learning is considered more flexible because it allows students to access materials anytime and anywhere, providing opportunities for more independent and personalized learning (Saehu et al., 2022). However, although this flexibility is a major advantage, the level of student engagement in e-learning remains a major challenge, especially due to the lack of direct interaction and weak motivational drive in a system that is too static.

One of the higher education institutions in Indonesia that has fully adopted the online learning model is Universitas Terbuka (UT). UT is a state university that specifically implements an open and distance education system (PTTJJ) (Zuhairi et al., 2010). In its implementation, UT uses various online learning media, one of which is the Online Tutorial (Tuton). Tuton is a form of LMS-based learning service that allows students to interact with tutors and fellow students asynchronously. Through Tuton, students receive academic guidance, participate in discussions, and work on assignments as part of the evaluation. This system is designed to replace direct interaction in the classroom, so it relies heavily on student motivation and independence in following the learning flow.

However, considering the very diverse characteristics of UT students, including age, educational background, busyness in the world of work, and motivation to achieve a degree, the challenge of engagement becomes very crucial to conduct research. Many students find it difficult to maintain learning consistency because the e-learning system is often considered less interesting, monotonous, and unable to adjust to individual preferences. This is where approaches such as personalized gamification learning have great potential to be applied, because they are able to provide a more interactive and adaptive

learning experience to students' personal needs. Therefore, Universitas Terbuka can be a very relevant subject or context in this study, because it provides a broad and diverse online learning ecosystem, and is already accustomed to non-face-to-face learning.

Although e-learning offers flexibility in time and place, the main challenge still faced is the low level of student engagement. Many students feel that e-learning is passive and unable to maintain focus and motivation to learn in the long term. This low engagement has an impact on low active participation, learning outcomes, and material retention. Therefore, there needs to be a pedagogical and technological approach that can change the online learning experience to be more dynamic, interesting, and in accordance with the individual needs of students.

One promising strategy to increase engagement is gamification (Qudsi, 2024), which is the application of game elements in non-game contexts, such as learning (Fitriati et al., 2021, 2022; Fitriati & Purnamasari, 2023). Gamification has been shown to increase learning motivation, healthy competition, and a sense of achievement (Gunawan, 2023). However, many gamification implementations are generic and do not take into account the unique characteristics of each student (Duterte, 2024). As a result, some students feel helped, but others feel burdened or irrelevant. This is a gap that can be bridged through a personalization approach.

Through this personalized gamification learning approach, the system can adjust gamification elements such as challenge types, difficulty levels, rewards, and communication styles automatically (Rodrigues et al., 2022). This personalized gamification can create a more relevant, adaptive, and enjoyable learning experience, especially for beginner students who are building motivation and learning independence (Ibisu, 2024).

The application of personalized gamification in e-learning is very relevant for first-year students who are generally still adapting to the rhythm and demands of learning in college. With a more contextual learning experience that suits their preferences, students are expected to be more engaged cognitively, affectively, and behaviorally. In addition, this system also allows lecturers or system developers to gain deeper insight into the effectiveness of certain elements in increasing student engagement.

METHOD

This type of research is quasi-experimental research, because the researcher does not fully control the placement of subjects in groups, but still compares two different conditions to measure the effect of treatment. A quantitative approach is used to measure changes in student engagement before and after treatment. Quasi-experimental quantitative research is conducted with a pretest-posttest approach with a control group.

The design used is a non-equivalent control group design, with two groups: 1) Experimental group: using e-learning with personalized gamification learning features. 2) Control group: using regular e-learning (without gamification). Each group will be given a pretest and posttest to measure the level of student engagement.

The subjects of the study were 2nd semester students of Informatics Logic class at an open university that organizes online learning. The number of samples was determined by purposive sampling or convenience sampling techniques, totaling 26 students.

Several variables in this study include: 1) Independent variable: Personalized gamification. 2) Dependent variable: Student involvement (behavioral, emotional, cognitive).

The research instrument used a questionnaire to measure student involvement, with a Likert scale of 1-5, based on 3 dimensions of assessment including: behavioral, emotional, and cognitive. The Likert scale has values with categories: Value 1 means Strongly Disagree, Value 2 means Disagree, Value 3 means Neutral, Value 4 means Agree, Value 5 means Strongly Agree.

Behavioral Engagement, some of the things surveyed include:

1) Routinely accessing the e-learning platform according to schedule.

2) Completing assignments and learning activities on time.

3) Actively participating in discussion forums available on the platform.

4) Exploring the features on the platform independently.

5) Taking quizzes, challenges, or learning missions given.

6) Using the e-learning platform more than once a week.

7) Taking notes or copying important materials while studying on the platform.

Emotional Engagement, some of the things surveyed include:

1) Feeling happy when using the e-learning platform.

2) Feeling enthusiastic every time I complete a challenge or mission.

3) Feeling excited when the tutor gives higher points when I answer questions faster

4) Feeling more appreciated when receiving responses from the tutor

5) Feeling proud when I see my learning progress increasing.

6) Feeling challenged by the level or tier system provided.

7) Feeling more comfortable learning on this platform than the usual method.

Cognitive Engagement, some of the things surveyed include:

1) Thinking about the best way to complete weekly missions or targets (reading materials, filling in attendance, responding to discussions and uploading assignment answers)

2) Trying to understand the concepts taught in depth.

3) Feeling excited when the tutor gives higher points when I answer questions faster

4) Re-evaluating my mistakes when I fail a task.

5) Looking for additional materials to support my understanding.

6) Feeling that the learning system adapts to my abilities.

7) Motivated to continue learning even after completing the main task.

FINDINGS AND DISCUSSION

A survey was conducted by distributing questionnaires to one class of second semester students taking the Informatics Logic course, and 26 active student respondents were obtained who used e-learning as an online learning platform.

Table 1. Involvement in Platform Activities

No	Statement	Average	Conclution
1	Routinely accessing the platform	4,22	Students are very accustomed to accessing the platform according to schedule.

2	Completing assignments on time	3,96	Generally, students are disciplined in completing assignments.
3	Active in discussion forums	4,31	The level of activity in the forum is very high
4	Exploring independent features	4,36	Students are quite explorative of existing features
5	Taking quizzes/missions	4,16	Participation in additional activities is quite good.
6	Using the platform >1x per week	4,40	The frequency of platform use is quite intense
7	Taking notes while studying	3,87	The habit of taking notes is still quite varied
Total Average		4,18	
Percentage		83,6 %	

The first table shows the level of student engagement in learning platform activities. Most students routinely access the platform, complete assignments on time, and actively participate in discussion forums. The high average value in this aspect (4,18) indicates discipline and consistency in participating in online learning.

Table 2. Emotional and Motivational Aspects

No	Statement	Average	Conclution
1	Feeling happy while using the platform	3,78	Students generally feel comfortable when learning on the platform.
2	Enthusiastic about completing challenges	4,11	Challenges encourage positive learning motivation.

3	Excited about getting high points	4,40	Gamification greatly increases learning enthusiasm.
4	Feeling appreciated when tutors respond	4,56	Tutor responses have a big positive effect.
5	Proud of learning progress	4,51	Students are satisfied with their learning achievements.
6	Challenged by the level system	4,16	The level system encourages active involvement.
7	More comfortable than the usual method	3,62	Preferences for the platform are quite positive, but not yet dominant.
	Total Average	4,16	
	Percentage	83,2 %	

The second table illustrates the emotional and motivational aspects of students while using the platform. With the highest average among the three aspects (4,16), it is seen that gamification features such as points, levels, and tutor responses have a positive impact on students' enthusiasm and feelings of being appreciated, which ultimately strengthens their learning motivation.

Table 3. Cognitive and Learning Strategies

No	Statement	Average	Conclution
1	Thinking about how to complete the mission	4,22	Students actively design strategies to complete targets.
2	Trying to understand the concept in depth	4,29	Efforts to understand the material are very high.
3	Developing a learning strategy	4,07	Learning planning is carried out by the majority of students.
4	Evaluating mistakes	4,22	Students are quite reflective about mistakes.

5	Searching for additional materials	4,20	Enthusiasm in finding additional sources is quite high.
6	System according to ability	3,89	There is still room for improvement for system personalization.
7	Motivated to learn even after the task is completed	4,00	The motivation for further learning after assignments still varies.
	Total Average	4,13	
	Percentage	82,6 %	

The third table contains data on students' cognitive engagement and learning strategies. The average score of 4,13 indicates that most students have been actively designing learning strategies, evaluating errors, and seeking additional materials. However, this value is slightly lower than the other two aspects, indicating that there is still potential for strengthening in terms of developing reflective abilities and learning independence.
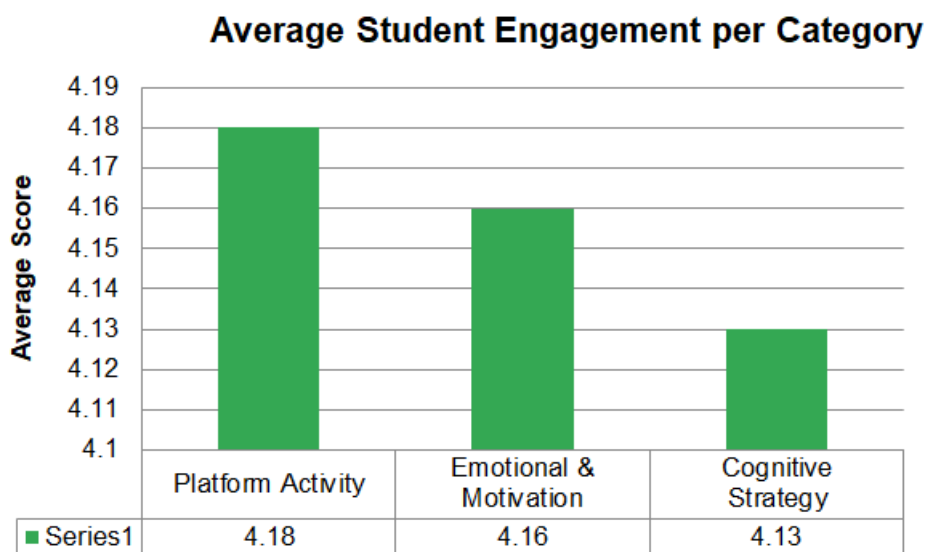

Figure 1. Student involvement in 3 dimensions of assessment

The graph shows the average student engagement in three main aspects: activity on the platform, emotional and motivational, and cognitive strategies.

The Emotional & Motivation category has the highest average score of 4,18, indicating that students feel motivated, happy, and appreciated while using the learning platform. Followed by Platform Activity with a score of 4,16, reflecting that students are quite consistent and active in accessing and participating in activities on the platform. Meanwhile, Cognitive Strategy scored 4,13, indicating that students are quite active in developing learning strategies and understanding the material, although there is still room for improvement in the aspects of reflection and independent learning.

CONCLUSION

The results of the measurements carried out on 3 aspects of the assessment including behavioral, emotional, cognitive, concluded: in the aspect of high student involvement reaching 83.6%, especially in forum activity, assignment submission, and platform use. while the positive emotional aspect reaches 83.2% especially if the platform is supported by a point system, level, and tutor response. And in the aspect of cognitive involvement and learning strategies reaching 82,6% indicates that students are quite reflective and independent, although there are opportunities to further personalize the learning experience. For the average of the three aspects, it reaches 83.13%. This shows that the use of a gamification-based learning system not only increases active participation, but also strengthens the emotional aspects and learning strategies of students positively.

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