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Analysis of Students' Perceptions and Learning Motivation towards Gamification-Based LMS

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Abstract

The use of Learning Management Systems (LMS) in lectures is increasing, but student motivation to learn often poses a challenge. This study aims to examine the effect of gamification in LMS on student motivation to learn and to analyze the relationship between students' perceptions of gamification and their motivation levels. The study uses a quantitative design with measurements taken before and after the implementation of gamification, as well as correlation analysis to examine the relationship between variables. The results show that there is no significant difference between motivation before and after the implementation of gamification. However, perceptions of gamification are positively related to autonomy, connectedness, and achievement, which contribute to increased learning motivation. These findings indicate that gamification has an indirect effect through the reinforcement of psychological aspects that support intrinsic motivation.

Keywords: Gamification; learning management system; learning motivation; self-determination; higher education

Abstrak

Penggunaan Learning Management System (LMS) dalam perkuliahan semakin meningkat, namun motivasi belajar mahasiswa sering menjadi tantangan. Penelitian ini bertujuan untuk menguji pengaruh penerapan gamifikasi dalam LMS terhadap motivasi belajar mahasiswa serta menganalisis hubungan antara persepsi mahasiswa terhadap gamifikasi dan tingkat motivasinya. Penelitian menggunakan desain kuantitatif dengan pengukuran sebelum dan sesudah penerapan gamifikasi, serta analisis korelasi untuk melihat keterkaitan antar variabel. Hasil menunjukkan bahwa tidak terdapat perbedaan signifikan antara motivasi sebelum dan sesudah penerapan gamifikasi. Meskipun demikian, persepsi terhadap gamifikasi berkaitan positif dengan rasa otonomi, keterhubungan, dan pencapaian, yang berkontribusi pada meningkatnya motivasi belajar. Temuan ini menunjukkan bahwa gamifikasi memberikan pengaruh tidak langsung melalui penguatan aspek psikologis yang mendukung motivasi intrinsik.

***Kata-kata kunci**: gamifikasi;* learning management system*; motivasi belajar;* self-determination*; pendidikan tinggi*

1. Introduction

Online learning has become an integral part of higher education systems, following the rapid development of information and communication technologies as digital learning platforms [1] [2]. One of the main challenges in online learning is maintaining and enhancing students' learning motivation [3]. Low learning motivation has been shown to reduce student engagement and negatively affect learning outcomes [4]. Learning Management Systems (LMS) play a crucial role in facilitating interaction, content delivery, and learning evaluation [5]. However, LMS features are often perceived as monotonous and less engaging, which leads students to be passive and underutilize the full potential of the platform [6]. This condition highlights the need for more interactive and motivating learning strategies.

Various studies have attempted to improve learning motivation through the development of interactive features in LMSs, such as discussion forums or chat functions [7], the use of interactive multimedia in the form of videos and animations [8] [9], and the implementation of automated feedback systems [10] [11]. One increasingly popular approach is gamification, which refers to the application of game elements—such as points, badges, leaderboards, and challenges—within a learning context to enhance participation and motivation [12] [13]. This approach has been proven to increase students' intrinsic motivation and engagement in online learning environments [14].

Although many studies have reported positive outcomes of gamification on learning motivation, most of this research focuses on LMSs that already incorporate gamification elements, without comparing conditions before and after their implementation. This research gap indicates the need for empirical studies that directly examine differences in students' learning motivation before and after the implementation of gamification within the same LMS. In addition, it is important to understand the relationship between students' perceptions of gamification elements and their level of learning motivation after these features are applied.

Based on these considerations, this study aims to examine and analyze the impact of gamification implementation in an LMS on students' learning motivation. This research focuses on two main objectives: (1) to determine whether there are differences in students' learning motivation levels before and after the implementation of gamification in the LMS, and (2) to analyze the relationship between students' perceptions of gamification and their learning motivation levels after the implementation of these features.

2. Method

This study employed a quantitative approach using a pretest–posttest design and correlational analysis to examine differences in students' learning motivation before and after the implementation of gamification in the LMS. The relationship between students' perceptions of gamification elements and their learning motivation was analyzed after the implementation of these features. This design was adopted to observe changes in motivation resulting from the intervention and to identify relationships among the studied variables.

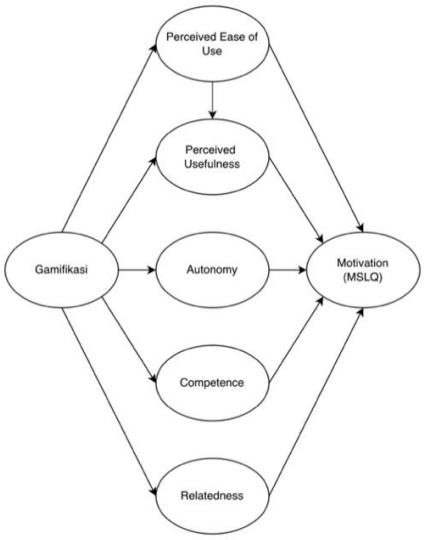

Figure 1. Konseptual Framework

The independent variable in this study was the implementation of gamification in the LMS, which was measured through mediating constructs. The first mediating variable adopted the Technology Acceptance Model (TAM), specifically the constructs of perceived usefulness and perceived ease of use **[15]**. The second mediating variable adopted the Self-Determination Theory (SDT), encompassing the constructs of autonomy, competence, and relatedness **[16].** The dependent variable, learning motivation, was measured using the Motivated Strategies for Learning Questionnaire (MSLQ) instrument **[17]**. All variables were measured using a 4-point Likert-scale questionnaire.

The study population consisted of students who used an LMS with gamification features. A total of 32 respondents were selected using purposive sampling, based on the criteria of active students who had used the LMS both before and after the implementation of gamification features. Data collection was conducted through several stages, including preparation, indicator development, and instrument pilot testing. Once the questionnaire was finalized, a pretest was

administered, followed by the implementation of gamification over a specific learning period, and subsequently a posttest was conducted. The preparation and indicator development stages resulted in 32 questionnaire items. The pretest was administered to measure students' learning motivation prior to the implementation of gamification. Gamification was implemented for one learning period within the LMS. The posttest was conducted to measure students' perceptions of gamification and their learning motivation after the intervention.

After data collection, the instrument was tested for validity and reliability using item–total correlation and Cronbach's Alpha, with a reliability threshold of $\alpha \geq 0.7$ **[18]**. All constructs met the criteria for validity and reliability. Data analysis was performed using Python with the SciPy library **[19]**. The Shapiro–Wilk test was employed to assess data normality due to the sample size being less than 100 **[18]**, resulting in a p-value of 0.0317, indicating that the data were not normally distributed. Consequently, differences between pretest and posttest scores were analyzed using the Wilcoxon Signed-Rank Test **[20]**. Spearman's rank correlation analysis was conducted to examine the relationships among variables **[18]**. All research procedures were carried out in accordance with research ethics and ensured the confidentiality of respondents' data.

3. Result and Discussion

The research results, as presented in the table, indicate that the implementation of gamification features in the LMS did not produce a statistically significant difference in students' cognitive achievement, as evidenced by the Wilcoxon Signed-Rank Test ($p = 0.2818$). The mean pretest score (3.246) and posttest score (3.188) remained within a relatively similar range. This finding is consistent with several previous studies reporting that improvements in academic performance do not always emerge in the short term following gamification interventions, as motivational effects tend to manifest earlier before influencing final learning outcomes. Furthermore, the mandatory use of the LMS in coursework may have led students to become accustomed to the basic learning mechanisms, such that changes in platform features did not immediately result in statistically significant changes in cognitive performance.

Tabel 1. Summary of Descriptive Statistics for Pretest and Posttest

Statistic	Pretest	Posttest
Avg	3.246	3.188
Median	3.125	3.125

Tabel 2. Results of the Wilcoxon Signed-Rank Test

Test Statistic	Result
Test Statistic (W)	93.500
p-value	0.2818
Result	Not significant ($p \geq 0.05$)
Conclusion	No significant difference between pretest and posttest

Although no statistically significant improvement in academic performance was observed, correlational analysis revealed important dynamics in the motivational domain. Gamification features showed significant positive relationships with the three basic psychological needs proposed by Self-Determination Theory (SDT), namely autonomy ($r = 0.403$, $p = 0.0201$), relatedness ($r = 0.412$, $p = 0.0173$), and competence ($r = 0.632$, $p = 0.0001$). These findings are consistent with SDT, which posits that learning experiences designed to foster a sense of control, social connectedness, and competence enhance students' intrinsic motivation. The relatively strong association between the competence construct and gamification further suggests that features such as points, progress indicators, and challenges successfully created clearer perceptions of achievement throughout the learning process.

Tabel 3. Relationship Between Gamification and the Three Basic Psychological Needs

Basic Psychological Need	r	p-value	Note
Gamification → Autonomy	0.403	0.0201	Significant
Gamification → Relatedness	0.412	0.0173	Significant
Gamification → Competence	0.632	0.0001	Highly significant

Another important finding is the strong relationship between the SDT dimensions and learning motivation. Autonomy ($r = 0.642$), relatedness ($r = 0.618$), and competence ($r = 0.692$) demonstrated significant contributions to motivation. These results reinforce previous studies emphasizing that learning motivation in online learning contexts is influenced by socially and personally meaningful learning experiences. Therefore, although gamification did not directly alter learning outcomes, it enhanced the quality of the learning experience, which plays a crucial role in sustaining student engagement over time.

Tabel 4. Relationship Between the Three Basic Psychological Needs and Learning Motivation

Dimensi Motivasi Dasar	r	p-value	Keterangan
Autonomy → Motivasi	0.642	0.0001	Significant
Relatedness → Motivasi	0.618	0.0001	Significant
Competence → Motivasi	0.692	0.0000	Significant

The relationship between gamification constructs and the Technology Acceptance Model (TAM) was also evident through positive correlations between gamification and perceived usefulness (PU = 0.497), as well as perceived ease of use (PEOU = 0.380). This indicates that gamification features led the LMS to be perceived as more useful while remaining easy to use. These findings support Davis's (1989) theory, which posits that perceived usefulness and perceived ease of use shape users' attitudes toward technology adoption. Furthermore, the correlations between PU and PEOU and motivational constructs further strengthen the linkage between technology perceptions and user motivation in online learning environments.

Table 5. Correlation Matrix of All Constructs

Construct	Gamification	*PU*	*PEOU*	*Autonomy*	*Related*	*Competence*	Motivation
Gamification	1.000	0.498	0.380	0.403	0.412	0.632	0.420
PU	0.498	1.000	0.549	0.754	0.619	0.633	0.582
PEOU	0.380	0.549	1.000	0.393	0.620	0.446	0.458
Autonomy	0.403	0.754	0.393	1.000	0.562	0.642	0.642
Relatedness	0.412	0.619	0.620	0.562	1.000	0.528	0.618
Competence	0.632	0.633	0.446	0.642	0.528	1.000	0.692
Motivation	0.420	0.582	0.458	0.642	0.618	0.692	1.000

Field observations revealed that the gamification intervention led to behavioral changes that were not fully captured by statistical analyses of learning outcomes. During the phase of LMS use without gamification, students tended to complete learning materials and quizzes primarily due to academic obligations. However, after the gamification features were activated, increased enthusiasm was observed, particularly in students' desire to achieve higher scores, complete challenges, and improve their positions on the leaderboard. Students accessed the LMS more frequently, voluntarily retook quizzes, and demonstrated greater effort in understanding the learning materials. This phenomenon is consistent with previous studies indicating that gamification enhances engagement and motivation, even when it does not immediately influence cognitive achievement.

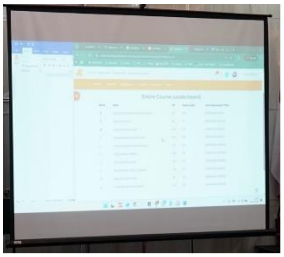

Figure 2. Ranking Results in Gamified Learning

When compared with previous studies, these findings are consistent with research on gamification in LMSs indicating that elements such as points, visual progress indicators, and challenges can enhance engagement, motivation, and perceived usefulness. However, as reported in several other studies, the effects on learning outcomes tend to be indirect and often emerge over a longer period. In the context of higher education in Indonesia, where LMS use is generally mandatory but often perceived as less engaging, the implementation of gamification may serve as a potential strategy to improve the quality of students' learning experiences.

Overall, these findings suggest that gamification is not primarily about achieving immediate improvements in academic performance, but rather about designing more motivating learning experiences that foster healthy competition and support students' basic psychological needs. Well-designed gamification interventions can become an important component in optimizing LMS utilization, particularly within increasingly dominant online and hybrid learning environments.

4. Conclusion

This study examined the impact of gamification implementation in an LMS on students' learning motivation, as well as the relationship between students' perceptions of gamification and motivation after its implementation. The Wilcoxon test results indicated no significant difference in motivation before and after the implementation of gamification. However, correlational analysis revealed that students' perceptions of gamification were strongly associated with psychological aspects such as autonomy, relatedness, and competence, each of which showed positive relationships with learning motivation.

Thus, gamification does not directly enhance motivation in the short term but contributes indirectly by strengthening psychological conditions that support intrinsic motivation. These

findings highlight the importance of gamification design that goes beyond decorative elements and effectively facilitates students' basic psychological needs.

This study contributes to the literature on gamification in education by demonstrating that its effects are indirect and more structural in nature. Future research is recommended to explore long-term effects and mediating mechanisms through more in-depth analytical approaches.

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