EDUTECH : Jurnal Inovasi Pendidikan Berbantuan Teknologi
Vol. 5 No. 4 Tahun 2025
e-ISSN : 2797-0140
p-ISSN : 2797-0590
Online Journal System : https://jurnalp4i.com/index.php/edutech

GAMIFICATION AND MICROLEARNING IN BUDDHIST EDUCATION: INNOVATIVE MEDIA TO ADDRESS STUDENT FATIGUE

Sima Novita Dewi[1], Susanto[2], Taridi[3], Komang Sutawan[4]
Buddhist Education Department, Jinarakkhita Buddhist College of Lampung, Indonesia[1,2,3,4]
e-mail: simanovitadewi@sekha.kemenag.go.id

ABSTRAK

Integrasi teknologi digital dalam pendidikan tinggi menghadirkan peluang sekaligus tantangan, termasuk risiko kelelahan mahasiswa akibat keterlibatan digital yang intensif. Penelitian ini bertujuan untuk menyelidiki dampak gamifikasi dan pembelajaran mikro dalam mengurangi kelelahan mahasiswa di lingkungan pendidikan Buddhis. Studi dilakukan di sebuah perguruan tinggi Buddhis swasta dengan populasi 132 mahasiswa, dari mana 99 responden dipilih sebagai sampel. Metode yang digunakan adalah survei kuantitatif eksplanatif, dengan data dikumpulkan melalui kuesioner skala Likert yang tervalidasi untuk menilai persepsi mahasiswa terhadap strategi pembelajaran digital dan tingkat kelelahan akademik mereka. Analisis regresi linier berganda menunjukkan bahwa gamifikasi dan pembelajaran mikro berkontribusi signifikan dalam mengurangi kelelahan, dengan pembelajaran mikro memberikan pengaruh yang lebih substansial. Temuan ini menekankan pentingnya strategi pembelajaran yang ringkas, interaktif, dan terfokus untuk mempertahankan energi mental, meningkatkan efisiensi kognitif, dan mendorong pengalaman belajar yang reflektif. Secara teoretis, studi ini memperkaya literatur tentang pedagogi digital dalam pendidikan tinggi keagamaan dengan menyoroti dampak komplementer gamifikasi dan pembelajaran mikro terhadap kesejahteraan mahasiswa. Secara praktis, hasil penelitian menunjukkan bahwa institusi dapat merancang model pembelajaran hibrida yang mengintegrasikan gamifikasi, pembelajaran mikro, dan analitik pembelajaran untuk membangun ekosistem yang adaptif dan berkelanjutan. Penelitian selanjutnya dapat mengeksplorasi penggunaan perangkat inovatif, seperti realitas virtual, untuk lebih meningkatkan pengalaman belajar dan mengurangi kelelahan akademik di berbagai konteks pendidikan.

Kata Kunci: *Gamifikasi, Pembelajaran Mikro, Kelelahan Siswa, Pendidikan Buddhis, Pedagogi Digital*

ABSTRACT

The integration of digital technology in higher education presents both opportunities and challenges, including the risk of student fatigue due to intensive digital engagement. This study aims to investigate the effects of gamification and microlearning on reducing student fatigue in a Buddhist higher education context. The study was conducted at a private Buddhist university with a population of 132 students, of which 99 respondents were selected as the sample. A quantitative explanatory survey method was employed, with data collected through a validated Likert-scale questionnaire to assess students' perceptions of digital learning strategies and their levels of academic fatigue. Multiple linear regression analysis indicated that both gamification and microlearning significantly contributed to reducing fatigue, with microlearning having a more substantial effect. The findings highlight the importance of concise, interactive, and focused learning strategies in maintaining mental energy, enhancing cognitive efficiency, and promoting reflective learning experiences. Theoretically, this study enriches the literature on digital pedagogy in religious higher education by emphasizing the complementary effects of gamification and microlearning on student well-being. Practically, the results suggest that institutions can design hybrid learning models integrating gamification, microlearning, and

learning analytics to build an adaptive and sustainable ecosystem. Future research could explore the use of innovative tools, such as virtual reality, to further enhance learning experiences and reduce academic fatigue across various educational contexts.
Keywords: *Gamification, Microlearning, Student Fatigue, Buddhist Education, Digital Pedagogy*

INTRODUCTION

The integration of digital technology in higher education has become a key feature of modern pedagogical practice. Over the past two decades, universities have increasingly adopted digital platforms and online learning systems to expand access, deliver academic content, and support flexible and personalized learning (Zhao, 2024). This transformation offers various benefits, such as rapid access to learning resources, opportunities for self-directed study, and cross-location collaboration. However, the acceleration of digitalization also introduces new challenges, including student learning fatigue characterized by cognitive, emotional, and physical exhaustion resulting from prolonged digital engagement (Lester et al., 2023).

Student learning fatigue may manifest through reduced attention, diminished motivation, and lower academic performance (Feng et al., 2025). This condition intensifies in learning environments that depend on long screen time, repetitive tasks, and limited meaningful interaction (Pérez-Juárez et al., 2023). Continuous exposure to online lectures, static readings, and monotonous teaching strategies can hinder participation, weaken intrinsic motivation, and reduce students' engagement. Empirical findings also show that students tend to lose engagement when pedagogy emphasizes passive memorization rather than student-centered interactive methods (Hernández-Chávez et al., 2025).

This issue is particularly relevant in religious education, especially in Buddhist education, where traditional pedagogical models remain dominant. Historically, Buddhist instruction emphasizes mastery of canonical texts, repetitive reading, and doctrinal memorization, which, although important for preserving the tradition, can heighten the risk of learning fatigue in digital contexts (Sadtyadi & Paramita, 2025). As a result, students may perceive Buddhist education as static, demanding, and disconnected from their lived experiences. This situation underscores the need for pedagogical innovation in Buddhist higher education.

To address these challenges, educators have begun exploring pedagogical innovations that integrate digital technology to enhance motivation and learning effectiveness. One prominent approach is gamification, which applies game elements such as points, levels, and leaderboards in educational contexts (Park & Kim, 2021). Gamification has been shown to promote active participation, increase retention, and create more enjoyable learning experiences (Subhash & Cudney, 2018). Microlearning complements this by delivering content in concise, easily digestible units (Marcelle & Brahim, 2023; Mostrady et al., 2024), thereby reducing cognitive load and aligning with the preferences of digital-native learners (Zhu et al., 2024). The integration of gamification and microlearning offers a relevant pedagogical framework for Buddhist education, as it can transform doctrinal concepts into interactive experiences while enabling gradual comprehension of complex philosophical ideas. Together, these approaches not only help minimize learning fatigue but also align the tradition of textual mastery with modern students' expectations for interactive, flexible, and meaningful learning.

Although literature on gamification and microlearning in higher education continues to grow, research on their combined application in religious education, particularly Buddhist education, remains very limited. Existing studies focus largely on secular fields such as business, engineering, and medicine (Wahyu & Gotama, 2024; Ismoyo et al., 2024), leaving a

EDUTECH : Jurnal Inovasi Pendidikan Berbantuan Teknologi
Vol. 5 No. 4 Tahun 2025
e-ISSN : 2797-0140
p-ISSN : 2797-0590
Online Journal System : https://jurnalp4i.com/index.php/edutech

gap in understanding how these digital innovations might reshape the learning of Buddhist doctrine. Moreover, although the individual benefits of each approach have been widely discussed, little is known about their synergistic effects in addressing student learning fatigue. This gap presents an important opportunity for theoretical development and practical innovation.

Given this context, this study aims to investigate the role of gamification and microlearning in reducing student learning fatigue in Buddhist higher education. It explores how these strategies can transform traditional text-based instruction into a more engaging and adaptive process, thereby addressing the unique challenges faced by contemporary learners. By positioning the analysis at the intersection of educational technology and Buddhist pedagogy, this study contributes to the discourse on technology-enhanced learning while offering practical implications for educators. The findings are expected to enrich the theoretical framework of digital pedagogy, expand research in religious education, and provide actionable insights for designing student-centered and responsive teaching models suited to the demands of the digital era.

METHOD

This study employs a quantitative approach with an explanatory survey design to investigate the impact of gamification and microlearning on student learning fatigue in the context of Buddhist Education in higher education. This approach was chosen because it enables researchers to identify and measure causal relationships between independent variables and dependent variables under natural conditions, without direct intervention. This study is designed to test three main hypotheses related to the contribution of each digital learning strategy to the level of student learning fatigue, either partially or simultaneously. The conceptual framework in Figure 1 shows the relationship between gamification and microlearning on student burnout levels.

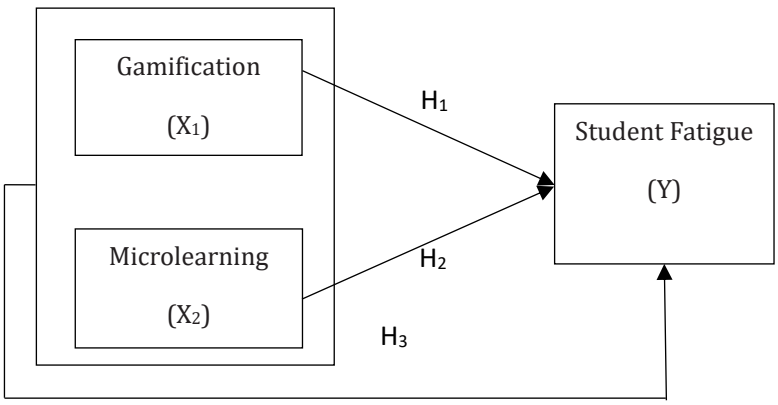

Figure 1. Conceptual framework

The population in this study consists of students participating in the Buddhist Education study program. Samples are taken through stratified random sampling to ensure proportional representation of students from various semesters and other characteristics. The sample size was determined using the Slovin formula with a 5% error rate, resulting in a total of 99 respondents representing the population. Data collection was carried out using a questionnaire instrument designed based on a 5-point Likert scale, which has undergone a validation process and reliability tests to ensure the accuracy and consistency of the measurements. The research instrument consisted of 15 items, with a Cronbach's Alpha value of 0.702, which indicated an

EDUTECH : Jurnal Inovasi Pendidikan Berbantuan Teknologi
Vol. 5 No. 4 Tahun 2025
e-ISSN : 2797-0140
p-ISSN : 2797-0590
Online Journal System : https://jurnalp4i.com/index.php/edutech

adequate and reliable level of internal consistency for further analysis. These results are in accordance with the data shown in Table 1.

Table 1. Reliability Test Results.

Reliability Statistics	
Cronbach's Alpha	N of Items
.702	15

Source: Research Data Management with SPSS, 2025

The collected data were analyzed using Pearson's Product-Moment Correlation Coefficient to assess the strength and direction of the relationship between Gamification, Microlearning, and Student Fatigue. Significance tests are performed to ensure that the relationships found are statistically significant and can provide valid empirical insights.

RESULT AND DISCUSSION

Results

The table below displays descriptive statistics depicting the main characteristics of the Gamification, Microlearning, and Student Fatigue variables in this study. The statistics displayed include the number of respondents (N), value range, minimum and maximum scores, total score, mean value, as well as standard deviation and variance that indicate the distribution of data in each variable. This information provides an initial overview of student perceptions of the use of gamification and microlearning, as well as the level of learning fatigue they experience before further analysis is conducted to test the relationship between the variables, as shown in Table 2.

Table 2. Descriptive Statistics

Descriptive Statistics

	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Sum Statistic	Mean Statistic	Mean Std. Error	Std. Deviation Statistic	Variance Statistic
Gamification	99	15	10	25	1849	18.68	.433	4.311	18.588
Microlearning	99	15	10	25	1931	19.51	.451	4.484	20.110
Student Fatigue	99	9	5	14	978	9.88	.240	2.387	5.699
Valid N (listwise)	99								

Source: Research Data Management with SPSS, 2025

Based on table 2, descriptive statistics from the research variables revealed that, among 99 respondents, students generally held a positive perception of gamification and microlearning, while experiencing moderate levels of fatigue. Gamification scores ranged from 10 to 25, with an average of 18.68 (SD = 4.31) and a variance of 18.59, reflecting moderate to high perceptions with moderate variation in responses. Similarly, microlearning scores ranged from 10 to 25, with a mean of 19.51 (SD = 4.48) and a variance of 20.11, indicating a generally positive perception with a moderate spread of responses. In contrast, student fatigue scores ranged from 5 to 14, with a mean of 9.88 (SD = 2.39) and a variance of 5.70, signalling moderate levels of fatigue with responses more concentrated around the average. The standard errors for gamification (0.433) and microlearning (0.451) show a fairly precise sample average estimate. Overall, these results provide a preliminary picture of student engagement and learning experience, suggesting a variation in perceptions that can be further analysed through

EDUTECH : Jurnal Inovasi Pendidikan Berbantuan Teknologi
Vol. 5 No. 4 Tahun 2025
e-ISSN : 2797-0140
p-ISSN : 2797-0590
Online Journal System : https://jurnalp4i.com/index.php/edutech

inferential analysis to explore the relationship between gamification, microlearning, and student burnout.

Table 3. Tests of Normality

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	.089	99	.051	.985	99	.327
a. Lilliefors Significance Correction						

Source: Research Data Management with SPSS, 2025

Table 3 shows unstandardized residual normality was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The Kolmogorov-Smirnov result yielded a statistic of 0.089 with a significance value of 0.051, whereas the Shapiro-Wilk test produced a statistic of 0.985 with a significance value of 0.327. Both tests showed that the residual did not deviate significantly from the normal distribution, as the p-value was greater than the conventional threshold of 0.05. This indicates that the residual normality assumption has been well met, supporting the feasibility of using parametric analyses, such as regression or ANOVA, in subsequent inferential procedures. Overall, these results confirm that the distribution of data does not violate the assumption of normality, which is crucial for ensuring the validity and reliability of statistical inference in research.

Table 4. Model Summary[b]

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.617[a]	.381	.368	1.898
a. Predictors: (Constant), Microlearning, Gamification				
b. Dependent Variable: Student Fatigue				

Source: Research Data Management with SPSS, 2025

Based on table 4, regression analysis reveals that the combination of gamification and microlearning collectively explains a significant proportion of student fatigue variance. The model produced an R value of 0.617, indicating a moderate positive relationship between predictors and student fatigue. An R^2 value of 0.381 suggests that approximately 38.1% of the variance in student fatigue can be explained by gamification and microlearning. An adjusted R^2 of 0.368, which takes into account the number of predictors and sample size, confirms the model's resilience. The standard error of 1.898 reflects the average deviation of the observation value from the predicted value. These results confirm that the combined influence of gamification and microlearning has a significant impact on student fatigue, providing a basis for further inferential analysis.

Table 5. ANOVA[a]

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	212.886	2	106.443	29.562	.000[b]
	Residual	345.660	96	3.601		
	Total	558.545	98			
a. Dependent Variable: Student Fatigue						
b. Predictors: (Constant), Microlearning, Gamification						

EDUTECH : Jurnal Inovasi Pendidikan Berbantuan Teknologi
Vol. 5 No. 4 Tahun 2025
e-ISSN : 2797-0140
p-ISSN : 2797-0590
Online Journal System : https://jurnalp4i.com/index.php/edutech

Source: Research Data Management with SPSS, 2025

Table 5 presents the ANOVA results, indicating that the regression model predicting student fatigue based on gamification and microlearning is statistically significant. The sum of the regression squares is 212,886 with 2 degrees of freedom, and the average square of the regression is 106,443. An F value of 29.562 with a significance level of 0.000 indicates that the regression model as a whole can reliably predict student fatigue. The residual sum of squares of 345,660, with 96 degrees of freedom, reflects the variance of student fatigue that the predictor does not explain. These findings confirm that the combination of gamification and microlearning has a significant influence on student fatigue, supporting the feasibility of the model for further inferential analysis.

Table 6. Coefficients[a]

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.157	.974		17.622	.000
	Gamification	-.148	.052	-.267	-2.840	.006
	Microlearning	-.232	.050	-.435	-4.635	.000

a. Dependent Variable: Student Fatigue

Source: Research Data Management with SPSS, 2025

Table 6 presents the regression coefficients, showing the contribution of each predictor variable to student fatigue. The constant (B = 17.157, $p < 0.001$) represents the estimated level of student fatigue when both predictors are zero. Gamification had a negative and significant effect on student fatigue (B = -0.148, β = -0.267, p = 0.006), suggesting that increased gamification was associated with a decrease in fatigue levels. Similarly, microlearning showed a significant negative influence (B = -0.232, β = -0.435, $p < 0.001$), indicating that higher engagement in microlearning further reduced student burnout. Standardized coefficients show that microlearning has a stronger influence than gamification in reducing fatigue. These results provide evidence that gamification and microlearning are effective strategies to reduce student burnout.

Discussion

Gamification to Reduce Student Fatigue

The results of this study indicate that students generally have a positive perception of gamification, with an average score of 18.68 (SD = 4.31) and a range of scores between 10 and 25. This indicates a difference in experience levels, although most respondents rated gamification as moderate to high. Gamification in the context of higher education serves as an instructional strategy that integrates game mechanics, such as awarding points, badge achievement, leaderboards, and interactive challenges, which are theoretically expected to increase students' intrinsic motivation. Regression analysis revealed a significant adverse effect of gamification on student academic fatigue (B = -0.148; $p < 0.01$), indicating that an increase in gamification levels may reduce student fatigue. Conceptually, these findings align with self-determination theory (Legault, 2017), which suggests that creating fun and meaningful learning experiences can increase internal motivation while reducing mental boredom and fatigue. These results are also consistent with previous research, which has shown that gamification increases cognitive and emotional engagement, facilitates a more enjoyable learning experience, and strengthens students' active participation in the learning process (Rohana, 2025; Pratama,

2025). Thus, gamification can be seen as a pedagogical strategy that is not only innovative but also capable of creating an adaptive, sustainable learning experience and reducing the risk of academic fatigue among students.

Microlearning to Reduce Student Fatigue

Microlearning obtained the highest average score in this study (19.51; SD = 4.48) and shows a very favourable student perception of the learning model presented in the form of short, dense, and focused modules. Regression analysis revealed that microlearning had a significant adverse effect on academic fatigue (B = -0.232; $p < 0.001$), which was even stronger than the effect of gamification ($\beta = -0.435$). This strategy aligns with the principles of Cognitive Load Theory, which emphasizes that learners have limited working memory capacity and that breaking complex content into smaller, focused segments helps reduce cognitive load, thereby facilitating deeper understanding and better retention of information (Susilana et al., 2022). Microlearning also supports learning flexibility, allowing students to set their own learning rhythm as needed and increasing autonomy in the learning process. International literature confirms that caning can minimize mental fatigue caused by excessive learning load and improve the effectiveness of distance learning and blended learning (Luo & Li, 2025; Balasundaram et al., 2024). Therefore, microlearning plays a role not only as an innovative instructional strategy but also as a protective mechanism that is empirically proven to reduce students' levels of academic fatigue and support the sustainability of learning motivation.

Gamification and Microlearning Integration to Reduce Student Fatigue

The findings of this study confirm that the combination of gamification and microlearning has a significant influence on student academic fatigue, with a regression model explaining 38.1% of the variance in fatigue. Gamification serves as a means of stimulating emotional engagement and intrinsic motivation through exciting mechanisms of competition, rewards, and challenges, while microlearning breaks down learning content into short modules that reduce cognitive load and facilitate students' mental energy management (Capatina et al., 2024; Monib et al., 2024). The integration of these two strategies yields pedagogical synergy, supporting active participation, more effective information processing, and a reduced risk of academic fatigue that can impact student motivation, engagement, and academic performance. Practically, this approach offers an adaptive and sustainable learning model, aligning with the demands of the digital era and the needs of students who require an interactive, efficient, and mentally engaging learning experience. These findings underscore the importance of implementing complementary instructional strategies that not only focus on academic outcomes but also prioritise the psychological well-being of students, thereby contributing to the overall improvement of higher education.

CONCLUSION

The results of this study indicate that gamification and microlearning significantly reduce student fatigue in Buddhist education. Gamification enhances intrinsic motivation and active engagement through structured game mechanisms, while microlearning more effectively alleviates fatigue by breaking content into short modules that reduce cognitive load and support knowledge retention. Combining these strategies creates a pedagogical synergy that optimizes mental energy, improves cognitive effectiveness, and promotes reflective learning. Educational institutions are thus encouraged to integrate gamification and microlearning into curriculum design, potentially supported by learning analytics to monitor fatigue, adjust learning rhythms, and provide personalized interventions. Theoretically, these findings enrich digital pedagogy

literature in religious education by highlighting strategies that support students' psychological well-being. Practically, they advocate for hybrid learning models that are adaptive, interactive, and sustainable, while also opening avenues for future research on long-term effects, student motivation, academic performance, and the integration of emerging technologies such as virtual or augmented reality to further minimize academic burnout.

REFERENCES

Balasundaram, S., Mathew, J., & Nair, S. (2024). Microlearning and Learning Performance in Higher Education: A Post-Test Control Group Study. *Journal of Learning for Development*, *11*(1), 1–14. https://doi.org/10.56059/jl4d.v11i1.752

Capatina, A., Juarez-Varon, D., Micu, A., & Micu, A. E. (2024). Levelling up in corporate training: Unveiling the power of gamification to enhance knowledge retention, knowledge sharing, and job performance. *Journal of Innovation and Knowledge*, *9*(3), 100530. https://doi.org/10.1016/j.jik.2024.100530

Feng, X., Ren, S., & Shi, P. (2025). The relationship and mechanism of screen time and academic performance among adolescents: an empirical study based on CEPS. *Frontiers in Public Health*, *13*(July), 1–15. https://doi.org/10.3389/fpubh.2025.1533327

Hernández-Chávez, A., Hamui-Sutton, L., Muñoz-Comonfort, A., & Sampieri-Cabrera, R. (2025). Effect of the Use of Electronic Media on the Cognitive Intelligence, Attention, and Academic Trajectory of Medical Students. *Cureus*, *17*(2). https://doi.org/10.7759/cureus.79513

Ismoyo, T., Gautama, S. A., & Anrtiyaningsih, A. (2024). Integration of Microlearning in Teaching Buddhism : Analysis of Potentials and Barriers. *Journal of Electrical Systems*, 7173–7181. https://journal.esrgroups.org/jes/article/view/6866

Legault, L. (2017). Self-Determination Theory. *Encyclopedia of Personality and Individual Differences*, *June*. https://doi.org/10.1007/978-3-319-28099-8

Lester, D., Fisher, D. P., Lang, A., Skulmoski2, G. J., Mehrotra, V., Lim, I., & Keogh, J. W. L. (2023). Drivers and barriers to the utilisation of gamification and game-based learning in universities: A systematic review of educators' perspectives. *British Journal of Educational Technology*, 1748–1770. https://doi.org/10.1111/bjet.13311

Luo, H., & Li, W. (2025). Impact of microlearning on developing soft skills of university students across disciplines. *Frontiers in Psychology*, *16*. https://doi.org/10.3389/fpsyg.2025.1491265

Marcelle, P., & Brahim, A. (2023). Microlearning. *EdTechnica*, *August*. https://doi.org/10.59668/371.8157

Monib, W. K., Qazi, A., Apong, R. A., & Mahmud, M. M. (2024). Investigating Learners' Perceptions of Microlearning: Factors Influencing Learning Outcomes. *IEEE Access*, *12*(January), 178251–178266. https://doi.org/10.1109/ACCESS.2024.3472113

Mostrady, A., Sanchez-Lopez, E., & Gonzalez-Sanchez, A. F. (2024). Microlearning and its Effectiveness in Modern Education: A Mini Review. *Acta Pedagogia Asiana*, *4*(1), 33–42. https://doi.org/10.53623/apga.v4i1.496

Park, S., & Kim, S. (2021). Is sustainable online learning possible with gamification?—the effect of gamified online learning on student learning. *Sustainability (Switzerland)*, *13*(8). https://doi.org/10.3390/su13084267

Pérez-Juárez, M. Á., González-Ortega, D., & Aguiar-Pérez, J. M. (2023). Digital Distractions from the Point of View of Higher Education Students. *Sustainability (Switzerland)*, *15*(7). https://doi.org/10.3390/su15076044

Pratama, S. (2025). Pengaruh Gamifikasi Berbasis Point System Terhadap Motivasi dan Keterlibatan Mahasiswa dalam Mata Kuliah Desain Grafis. *Indonesian Journal of Education and Computer Science*, *3*(1), 1–6. https://doi.org/10.60076/indotech.v3i1.1200

Rohana. (2025). Gamifikasi dalam Manajemen Kelas: Analisis Kepustakaan terhadap Efektivitas dan Keterlibatan Siswa. *Al-Zayn : Jurnal Ilmu Sosial & Hukum*, *3*(2), 926–933. https://doi.org/10.61104/alz.v3i2.1207

Sadtyadi, H., & Paramita, S. (2025). Digital Learning Transformation in Buddhist Higher Education: Analysis of Burnout, Motivation, Self-Efficacy, and Performance. *Journal of Information Systems Engineering and Management*, *10*(19s), 388–399. https://doi.org/10.52783/jisem.v10i19s.3043

Subhash, S., & Cudney, E. A. (2018). Gamified learning in higher education: A systematic review of the literature. *Computers in Human Behavior*, *87*, 192–206. https://doi.org/10.1016/j.chb.2018.05.028

Susilana, R., Dewi, L., Rullyana, G., Hadiapurwa, A., & Khaerunnisa, N. (2022). Can microlearning strategy assist students' online learning? *Cakrawala Pendidikan*, *41*(2), 437–451. https://doi.org/10.21831/cp.v41i2.43387

Wahyu, S., & Gotama, J. F. (2024). Pengembangan Game Edukasi Pendidikan Agama Buddha Berbasis Progressive Web Apps Dengan Model Gamifikasi Dan Gdlc. *SKANIKA: Sistem Komputer Dan Teknik Informatika*, *7*(1), 85–97. https://doi.org/10.36080/skanika.v7i1.3145

Zhao, H. (2024). Digital Platforms in Higher Education: Opportunities, Challenges, and Strategies. *Advances in Economics, Management and Political Sciences*, *116*(1), 118–122. https://doi.org/10.54254/2754-1169/116/20242447

Zhu, B., Chau, K. T., & Mokmin, N. A. M. (2024). Optimizing cognitive load and learning adaptability with adaptive microlearning for in-service personnel. *Scientific Reports*, *14*(1), 1–18. https://doi.org/10.1038/s41598-024-77122-1