

The Impact of Gamification on Student Engagement in Online Learning Platforms: The Moderating Role of Learning Motivation

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Abstract

The rapid development of online learning systems has made learner engagement a top priority. While the effectiveness of online education continues to be stifled by low engagement and high rates of dropout, gamification has gained traction as a solution. This work assesses the use of gamification in online learning systems and the correlating roles of learning motivation and student engagement. A quantitative, descriptive-analytical methodology was employed to capture primary data from 250 people, determined through purposive sampling, and who were active users of various online learning systems (i.e., Coursera, Udemy, Unacademy, BYJU'S, and upGrad). The analysis was performed via IBM SPSS Statistics and JASP and was comprised of Reliability Analysis, Confirmatory Factor Analysis (CFA), Pearson Correlation Analysis, and Simple Linear Regression. The analysis indicated high reliability for the three constructs (Cronbach's Alpha > 0.90), and the CFA indicated satisfactory construct validity for Gamification, Student Engagement, and Learning Motivation. Strong, positive, and statistically significant relationships among the three variables were confirmed ($p < 0.001$) and were reinforced by Learning Motivation and Student Engagement ($r = 0.804$). Gamification was positively and significantly ($p < 0.001$) associated with Student Engagement ($\beta = 0.807$, $R^2 = 0.652$). The results of the analysis indicated that Student Engagement is positively and significantly influenced by gamified features of online learning systems. This study provides practical recommendations for instructional designers and online learning system providers.

Keywords: Online Learning Platforms, Confirmatory Factor Analysis, Simple Linear Regression, Gamification, SPSS.

Introduction

The education industry is evolving rapidly. Advanced digital technologies have made the establishment of flexible and accessible online learning services possible. The convenience, cost-effectiveness, and wide range of course offerings available have all contributed to the increased popularity of online education amongst students and working professionals. The availability of online educational services such as Coursera, Udemy, Unacademy, BYJU'S, and upGrad has made it possible to learn at any time and from any place. One of the main challenges for all online education service providers is the maintenance of student engagement. The lack of participation, motivation, and interaction of many learners, leads to a significant reduction in course completion rates. In order to

combat this problem, a popular way to induce and/or maintain a high level of participation of learners is gamification. Gamification refers to the use of game elements in a context that is not a game. Elements of game design such as points, badges, leaderboards, rewards, progress, and challenges are all examples of gamification.

The popularity of gamification has been on the rise because of the high levels of engagement that it fosters, the enhancement of the learning experience, and the increased levels of motivation it brings to the participants. Gamification adds enjoyment and interactivity to the learning experience. As a result, it is important to understand gamification, student engagement, and learning motivation for the success of online education.

Objectives of the Study

- To examine the impact of gamification on student engagement in online learning platforms.
- To examine the relationship between gamification and student engagement in online learning platforms.
- To analyze the relationship between gamification and learning motivation among users of online learning platforms.
- To determine the relationship between learning motivation and student engagement in online learning platforms.
- To assess the impact of gamification on student engagement using regression analysis.
- To provide suggestions for enhancing student engagement in online learning platforms through effective gamification strategies.

Conceptual Framework and Review of Literature

This study proposes a framework based on three latent constructs (Gamification, Student Engagement, and Learning Motivation), each represented through eight indicator items. Gamification focuses on online learning with game-elements. Badges, points, leader boards, and challenges, as well as progress bars and feedback, are some of the game elements that could be part of an online learning environment. Student Engagement refers to the learner's active involvement and participation in learning. Learning Motivation is the drive that learners sustain to keep their interest and effort from waning. The framework assumes Gamification positively relates to Student Engagement and Learning Motivation and that the latter also positively relates to Student Engagement, thereby determining the overall engagement of learners on online learning platforms.

Review of Literature

Alsawaier (2018) investigated the influence of gamification on students' motivation and engagement. The study found that game elements such as badges, points, rewards, and leaderboards significantly improved learners' participation and interest in academic activities. Students became more involved in the learning process. The study concluded that gamification is an effective strategy for enhancing student engagement.

Huang (2018) examined a theory-driven gamification model in higher education flipped classrooms. The findings showed that students completed more learning tasks and demonstrated higher motivation through gamified activities. The use of game elements encouraged continuous participation and learning. The study concluded that gamification improves both engagement and learning outcomes.

Ryan (2020) examined the role of intrinsic and extrinsic motivation in education through Self-Determination Theory. The study found that students with higher intrinsic motivation demonstrated greater engagement, persistence, and academic achievement. Motivation was identified as a key determinant of learning behaviour. The study concluded that learning motivation plays a significant role in enhancing student engagement.

Oliveira (2021) explored the role of gamification in promoting learner engagement in online education. The study found that rewards, challenges, and feedback increased students' motivation, participation, and interaction. Gamified learning environments encouraged continuous learning and active involvement. The study concluded that gamification creates a more engaging e-learning experience.

Kalogiannakis (2021) investigated the application of gamification in digital learning environments. The findings revealed that gamified educational applications significantly improved learner motivation, participation, satisfaction, and academic achievement. Students responded positively to

interactive learning activities. The study concluded that gamification enhances the overall learning experience.

Ishaq (2023) reviewed the effectiveness of personalized gamification strategies in education. The findings indicated that adaptive game elements improved learner engagement, motivation, and academic performance more effectively than standard gamification approaches. Personalized learning created better educational experiences. The study concluded that customized gamification supports improved learning outcomes.

Ratinho (2023) examined the effectiveness of gamification in improving student motivation and engagement in higher education. The study found that gamification positively influenced participation, motivation, and academic performance when integrated into teaching. Effective instructional design was identified as an essential factor.

Chan (2024) reviewed empirical evidence on the impact of gamification in educational settings. The findings indicated that game elements significantly improved student motivation, classroom interaction, participation, and academic performance. Gamification created a more engaging and enjoyable learning environment. The study concluded that gamification enhances teaching effectiveness and student engagement.

Research Methodology

The study embraced a quantitative and descriptive-analytical approach to establish the correlation between gamification, student engagement, and learning motivation on online learning platforms. Primary data were retrieved through a structured online questionnaire. First, the questionnaire was shared with the participants through Google forms. Then the collected data were processed through IBM SPSS Statistics and JASP. The executed data analyses included Reliability Analysis, Confirmatory Factor Analysis (CFA), and Pearson Correlation and Regression analyses.

The sample had 250 people who used learning platforms like Coursera, Udemy, Unacademy, BYJU'S and upGrad. We chose these people on purpose so that we only got people who had actually used learning platforms with game like things such as quizzes, badges and leaderboards. This way we made sure that what these people told us was real and based on their experience with online learning platforms that have game, like things.

Primary data were collected through a structured questionnaire comprising four sections: demographic profile, Gamification (8 items), Student Engagement (8 items), and Learning Motivation (8 items), each measured on a five-point Likert scale ranging from Strongly Disagree to Strongly Agree. The following statistical tools were applied:

Statistical	Purpose
Reliability Analysis	To test the internal consistency of the questionnaire
Confirmatory Factor Analysis (CFA)	To validate the measurement model
Pearson Correlation Analysis	To examine the relationship among variables
Regression Analysis	To examine the impact of Gamification on Student Engagement

Hypotheses of the Study

H01: There is no significant relationship between Gamification and Student Engagement.

H02: There is no significant relationship between Gamification and Learning Motivation.

H03: There is no significant relationship between Learning Motivation and Student Engagement.

H04: Gamification has no significant impact on Student Engagement.

Limitations of the Study

- The sample of 250 respondents may not fully represent all users of online learning platforms.
- Convenience/purposive sampling limits generalizability to the entire population of online learners.
- The study considered only three variables, excluding other factors that may influence engagement.
- Data were self-reported through an online questionnaire, depending on respondent honesty and accuracy.
- Data collection was constrained by a limited study period.

Analysis and Discussion

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	140	56
	Female	106	42.4
	Others	4	1.6
Age	Below 18	17	6.8
	18–22	138	55.2
	23–27	67	26.8
	28–32	23	9.2
	Above 32	5	2
Educational Qualification	Higher Secondary	25	10
	Undergraduate	77	30.8
	Postgraduate	116	46.4
	Doctoral	28	11.2
	Other	4	1.6
Learning Platform	Coursera	79	31.6
	Udemy	36	14.4
	Unacademy	51	20.4
	BYJU'S	42	16.8
	upGrad	28	11.2
	Others	14	5.6
Duration	Less than 6 months	68	27.2
	6 months–1 year	88	35.2
	1–2 years	57	22.8
	More than 2 years	37	14.8
Total	—	250	100

The demographic profile shows that most respondents were male (56%), aged 18–22 years (55.2%), and postgraduates (46.4%). Among the platforms, Coursera was the most widely used (31.6%), followed by Unacademy (20.4%) and BYJU'S (16.8%). Regarding duration of use, the largest group had used online learning platforms for 6 months to 1 year (35.2%), followed by less than 6 months (27.2%). Overall, the respondents were predominantly young, educated users with relatively recent experience using online learning platforms.

Reliability Analysis

Internal consistency of the three constructs was assessed using Cronbach's Alpha. All constructs exceeded the recommended threshold of 0.70, and item-total correlations for all items exceeded 0.30, indicating that no item required deletion.

Construct	No. of Items	Cronbach's Alpha	Item-Total Correlation Range
Gamification	8	0.924	0.700 – 0.784
Student Engagement	8	0.911	0.650 – 0.762
Learning Motivation	8	0.913	0.674 – 0.746

Confirmatory Factor Analysis (CFA)

CFA was conducted using the Diagonally Weighted Least Squares (DWLS) estimator to validate the three-factor measurement model. The factor model yielded $\chi^2 = 431.572$ with 249 degrees of freedom ($p < 0.001$). All 24 items (G1–G8, SE1–SE8, LM1–LM8) exhibited statistically significant standardized factor loadings ($p < 0.001$), and factor variances and covariances were all positive and statistically significant, confirming satisfactory construct validity.

Relationship	Estimate	Std. Error	z-value	p-value
Gamification ↔ Student Engagement	0.519	0.034	15.488	< 0.001
Gamification ↔ Learning Motivation	0.514	0.035	14.785	< 0.001
Student Engagement ↔ Learning Motivation	0.517	0.034	15.350	< 0.001

All covariances were positive and highly significant, confirming meaningful and consistent relationships among the three latent constructs and supporting the validity of the proposed measurement model for subsequent correlation and regression analysis.

Pearson Correlation Analysis

H0: There is no significant relationship among Gamification, Student Engagement, and Learning Motivation.

H1: There is a significant relationship among Gamification, Student Engagement, and Learning Motivation.

Variables	Gamification	Student Engagement	Learning Motivation
Gamification	1	.760***	.752***
Student Engagement	.760***	1	.804***
Learning Motivation	.752***	.804***	1

*** Correlation is significant at the 0.001 level (2-tailed), N = 250.

All three variables were strongly, positively, and significantly correlated ($p < 0.001$). Gamification correlated with Student Engagement ($r = 0.760$) and Learning Motivation ($r = 0.752$), while Learning Motivation showed the strongest association with Student Engagement ($r = 0.804$). The null hypothesis is therefore rejected, confirming significant positive relationships among Gamification, Student Engagement, and Learning Motivation.

Regression Analysis

H0: Gamification has no significant effect on Student Engagement.

H1: Gamification has a significant positive effect on Student Engagement.

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.807	0.652	0.651	3.97055

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	7322.807	1	7322.807	464.491	< .001
Residual	3909.778	248	15.765		
Total	11232.585	249			

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	5.167	1.011	—	5.110	0.000
Gamification	0.825	0.038	0.807	21.552	0.000

The correlation coefficient ($R = 0.807$) indicates a strong positive relationship between Gamification and Student Engagement, and $R^2 = 0.652$ shows that 65.2% of the variance in Student Engagement is explained by Gamification. The regression model was statistically significant ($F = 464.491$, $p < 0.001$), and the coefficient for Gamification ($B = 0.825$, $\beta = 0.807$, $t = 21.552$, $p < 0.001$) confirms a significant positive effect. The null hypothesis is rejected: Gamification has a significant positive effect on Student Engagement, such that an increase in gamification is associated with higher student engagement on online learning platforms.

Findings and Suggestions

Findings

- The majority of respondents (56%) were male, 55.2% were aged 18–22 years, and 46.4% held a postgraduate qualification, indicating that young, highly educated learners are the primary users of gamified online platforms.
- Coursera (31.6%) was the most frequently used platform, followed by Unacademy (20.4%) and BYJU'S (16.8%); most respondents (35.2%) had 6 months to 1 year of experience with online learning.
- Cronbach's Alpha values for Gamification (0.924), Student Engagement (0.911), and Learning Motivation (0.913) confirmed excellent internal consistency of the measurement scales.
- CFA confirmed that all 24 items loaded significantly on their respective constructs ($p < 0.001$), and the covariances among the three constructs were positive and significant, establishing satisfactory construct validity.

- Gamification showed a strong positive relationship with Student Engagement ($r = 0.760$, $p < 0.001$) and Learning Motivation ($r = 0.752$, $p < 0.001$); Learning Motivation showed the strongest relationship with Student Engagement ($r = 0.804$, $p < 0.001$).
- Regression analysis confirmed that Gamification significantly and positively predicts Student Engagement ($\beta = 0.807$, $R^2 = 0.652$, $F = 464.491$, $p < 0.001$), explaining 65.2% of the variance in engagement

Suggestions

- Enhance Gamification Features: Incorporate points, badges, leaderboards, rewards, and progress tracking to improve participation and engagement.
- Provide Personalized Learning Experiences: Offer adaptive content and learning paths based on learners' progress and interests to sustain motivation.
- Increase Interactive Learning Activities: Include interactive quizzes, discussion forums, group projects, and live sessions to encourage active participation.
- Recognize and Reward Learners: Use certificates, digital badges, and milestone rewards to encourage continuous learning.
- Improve Learner Support: Provide timely academic support, feedback, and mentoring to help learners remain engaged.
- Conduct Regular User Feedback Surveys: Periodically collect learner feedback to identify areas for improvement.
- Train Educators in Gamified Teaching: Provide instructor training on integrating gamification techniques into online teaching practices.

Conclusion

This study examined the impact of gamification on student engagement in online learning platforms and the interrelationship between gamification, learning motivation, and engagement. The findings indicate that gamification has a significant positive effect on student engagement, with game-based elements such as points, badges, leaderboards, rewards, and progress tracking encouraging learners to participate more actively and making the learning process more interactive and enjoyable. Reliability and validity tests confirmed that the research instrument was robust and produced consistent results, while Pearson correlation and regression analyses confirmed strong, significant, and positive relationships among gamification, learning motivation, and student engagement, with gamification emerging as a significant predictor of engagement. Overall, the study concludes that integrating well-designed gamification strategies into online learning platforms can create a more engaging, motivating, and effective learning environment, helping educational institutions and platform providers improve learner participation and course completion. The findings offer practical insights for educators, instructional designers, and platform developers, and future research may build on these results with larger, more diverse samples, additional predictor variables, and longitudinal designs to examine the long-term impact of gamification across varied educational contexts.

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