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The Influence of Gamification on University Students' Learning Outcomes in India and Malaysia Integration of Self-Determination and Social Learning Theory

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Abstract

Gamification emerged as a new learning strategy to encourage students to learn in colleges. The paper investigates the effects of gamification, user experience, and environmental aspects on the cognitive, affective, and behavioral aspects of perceived motivation. According to the Self-Determination Theory (SDT) and Social Learning Theory (SLT), the interactions between social modeling and psychological needs are proposed to be analyzed within the framework of a dual-theoretical model in the context of gamified learning. A cross-sectional quantitative survey was utilized, with a five-point Likert scale questionnaire. The questionnaire included seven sections, three for the endogenous factors (gamification tools, user experiences, and environmental factors), and four for assessing exogenous variables (cognitive factors, affective factors, behavioral factors, and motivational features). Data were gathered through 172 respondents from Malaysia and India. The construct reliability and validity were validated using SmartPLS. Findings indicate that gamification tools are positively associated with cognitive impacts, user experience strongly predicts both cognitive and affective engagement, while environmental factors have a significant influence on behavior. The cognitive processes were more closely related to behavioral engagement than to affective state. The study brings together SDT and SLT under one unified framework and provides practical suggestions for gamified learning environment designers to promote continued engagement and academic performance, while contributing to SDG 4: Quality Education.

Keywords: Gamification, Self-Determination Theory (SDT), Social Learning Theory (SLT), Learning Outcomes, Cognitive Engagement, Affective Engagement, Behavioral Engagement.

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Introduction

The constant digital revolution has reshaped the education landscape at every level across the world. Today, students spend more time online learning, collaborating, and consuming content in addition to socializing. In higher education, this has gained momentum with the proliferation of hybrid and online modes due to COVID-19. These advances notwithstanding, there are still many challenges. A lot of schools are grappling with disinterested students, cognitive load, and low levels of intrinsic motivation tied to stress-related fatigue and decreased attention (Hafizoglu & Yerdelen, 2019). These challenges further emphasize an important aspect of learning and teaching practice. There is limited research that validates methods to increase engagement and motivation in gamification contexts. An imaginative amalgamation of motivational theories and social learning processes and instructional design concepts is needed to fill this gap (Donkor & Zhao, 2023). By so doing, higher education institutions can not only improve the efficiency of learning but also the ongoing involvement of students and the delivery of SDG-oriented quality education SDG 4: Quality Education to balance technological development and sustainable educational results.

The phenomenon of gamification is emerging as a potentially effective pedagogical tool (Mekler et al., 2017). This phenomenon can be defined as the application of game design to non-game settings and has recently been used extensively in education as a way of making students more motivated, engaged, and learning. It is effective, which is evidenced by empirical evidence. As an example, gamification has a high degree of improvement on perceived autonomy and relatedness, but a moderate degree on competence, in a meta-analysis by Li, Hew, and Du (2024). The recent developments are also an indicator of increased diversity of gamification studies with research on the competitive and cooperative consequences of flipped classes, learning analytics dashboards, and structural equation modeling of gamification components in online learning settings (Smirani & Yamani, 2024). Gamification would address the problem of disengagement of students and foster a learning environment that is stimulating and engaging. Overall, these developments demonstrate that gamification has a potential to reduce student disengagement and establish stimulating learning conditions.

Nevertheless, there are a number of gaps that persist. To start with, the majority of the studies have examined motivational processes based on the Self-Determination Theory (SDT) or the social processes based on the Social Learning Theory (SLT); not many studies have examined both approaches within one theory. Second, the majority of the studies were quite limited in their focus as they included some gamification components (e.g. badges and leaderboards) instead of the interaction between the aspects that surrounded gamification components, the user experience, and the contextual conditions on overall learning outcomes incorporating the cognitive, affective, and behavioral levels.

Third, gamification is also claimed to have enhanced engagement; its efficacy appears to be inconsistent depending on cultural peculiarities, academic fields, and the degree of learner digital literacy (Chen et al., 2023; Mamekova et al., 2021). Fourth, there is no literature about the long-term behavior change, knowledge retention, or persistent motivation, and potential short-term gains of the engagement are indicated (Putz et al., 2020). Finally, the arrival of AI-based adaptive learning tools and immersive solutions (Virtual Reality [VR] and Augmented Reality [AR] gamifications) offers new opportunities, yet there is very limited research shedding light on the seamless integration of such innovations with predominant theoretical frameworks underpinning gamification in higher education.

This research paper targets tertiary students as they are in a very crucial phase where they need to be self-regulated, intrinsically motivated, and digitally adaptive in order to achieve academic and career success. Technology-enhanced platforms are becoming the norm in higher education, which is why it is an appropriate setting to assess the effect of gamification on engagement and knowledge retention. In the previous studies, the necessity to examine gamified learning within the university context is also noted, as the motivation persistence issue is difficult to address (Smirani & Yamani, 2024). The research incorporated motivational and social elements of gamified learning settings to enhance student participation, retention, and achievement. It is assumed that the findings will inform educators, system designers, and policymakers to use gamification to enhance teaching and learning, which will be consistent with SDG 4: Quality Education.

Research Question

1. How do gamification tools and user experiences impact cognitive, affective, and behavioral learning outcomes of Indian and Malaysian university students?
2. How do the environmental conditions, including classroom conditions and institutional support, influence student engagement and motivation in gamified learning environments?

3. What is the role of the combination of Self-Determination Theory (SDT) and Social Learning Theory (SLT) in understanding the variations in the learning outcomes and motivation between different cultural settings (India and Malaysia) in a gamified learning environment?

Research Objective

1. To test the effect of gamification tools and user experiences on cognitive, affective, and behavioral learning outcomes of university students in India and Malaysia.
2. To investigate the impact of different types of environmental factors (such as classroom environments, institutional backing, and peer collaboration) on the students' engagement, motivation, and learning outcomes in gamified learning environments.
3. To examine how Self-Determination Theory (SDT) and Social Learning Theory (SLT) affect the disparities in learning outcomes and motivation in gamified education in the Indian and Malaysian cultural setting.

The structure of the paper is as follows: Section 1 is the Introduction, which introduces the gamification of higher education, its relevance, and its issues. Section 2: Literature Review: Self-Determination Theory (SDT) and Social Learning Theory (SLT) theoretical frameworks are presented, and previous research on the gamification, user experience, and environmental effects of learning is discussed. Section 3: Methodology outlines the methodology used, which is the quantitative methodology, including the survey design method and data analysis method. Section 4: Results and Discussion give the results of the data analysis and then gives an explanation of the impact of gamification on the learning outcomes. Section 5: Conclusion summarizes the major findings, implications for educators, and future research directions.

Literature Review

Gamification as a method of learning in the higher education field has gained a new trend of interest due to the fact that it is a solution to the growing student engagement, motivation, and learning outcomes. Elements of game design like points, badges, leaderboard, and challenges are integrated into non-game settings through gamification to encourage students (Deterding et al., 2011). The research has indicated that gamification enhances student retention and develops a sense of autonomy, particularly in distance learning courses (Hamari et al., 2014; Mamekova et al., 2021). But the effects of gamification on cognitive and behavioral learning are not clear, as the results of some studies indicate minimal effects in the long-term (Gudoniene et al., 2025). Also, its efficacy is affected by the cultural and contextual factors to a considerable extent, and more research should be conducted to comprehend its effects in various educational environments.

Leaderboards, badges, and other tools and mechanics of gamified systems are essential in motivating learners and enhancing the learning process (Busch et al., 2015). However, their application differs according to the circumstance. Using competitive features like leaderboards as an example, some students may be motivated by the competitive feature to continue to perform better but other students who do not perform well may become discouraged. Equally, Kahoot! It has been suggested that quizzes and other tools can be used to improve recall and group interaction in flipped classrooms. Despite these advantages, the potential of gamification can be undermined by the poorly designed gamification that can lead to the shallow participation (Alsawaier, 2018). Moreover, there is no study conducted on interactions between different gamification mechanisms to find out their impact on cognitive, affective and behavioral outcomes (Hamari et al., 2014).

User experience (UX) is one of the most critical factors to be taken into account to make gamified environments successful. Deep learning and motivation are encouraged by positive UX, which is defined by usability, enjoyment, and engagement (Al-Msallam et al., 2023). Gamification applications incorporated into course management systems in a smooth manner will probably enhance motivation levels of students and reduce cognitive dissonance leading to greater engagement. However, negative UX can cause disengagement, e.g. cognitive overload, perception of unfairness etc. (Seaborn & Fels, 2015). Cross-cultural studies show that UX depends on cultural background, and Asian students consider collaborative functions more than Western students. These cultural differences are the key to developing effective gamified systems.

The effects of gamification are on cognitive, affective, and behavioral learning. Cognitive learning has the advantage of having such features as feedback, adaptive challenges, and interactive assessments that increase retention and problem-solving abilities. The affective learning process is facilitated by emotional engagement since such features as badges and avatars add to the sense of achievement and belonging (Alexander & Punadi, 2025; Bai et al., 2022). The game characteristics that enable interaction with peers and engagement help to achieve behavior-related learning

outcomes (participation and collaboration) (Sailer & Homner, 2020). However, the sustainability of such practices, particularly in the framework of the removal of extrinsic rewards, is not well researched, and new studies are needed to evaluate the feasibility of gamified interventions (King, 2012).

According to the literature review, although the contexts and cultural backgrounds are different, gamification in higher education can significantly facilitate student engagement, motivation, and learning results. The enhancements can be seen when the learning environments are incorporated with the gamification tools, such as the badges, the leaderboards, and the feedback systems. Nevertheless, there are also some problems, such as the risk of superficial involvement and excessive dependence on extrinsic incentives. Moreover, the culture difference and user-experience are significant when it comes to the success of the gamified intervention. More studies are also required to understand the connections between different gamification mechanisms as well as to establish the long-term impacts of this on cognitive, affective, and behavioral outcomes of learning.

Methodology

The combination of SDT and SLT provides a holistic view of gamification, which at the same time takes into account the psychological needs of individuals and social learning processes. This dual view transcends the current literature and concentrates solely on the motivational or social process. This theoretical framework adds to the empirical confirmation of hypotheses that reflect the relations between gamification tools, user experience, classroom setting, and perceived learning outcomes on cognitive, affective, and behavioral levels. Based on the prior literature and the conceptual model presented in fig. 1, the following hypotheses are proposed:

H1. Gamification tools (e.g., matching, ordering, and classification) have a positive effect on cognitive learning abilities.

H2. The user experience positively influences cognitive learning abilities.

H3. User experience positively influences affective learning.

H4. Environmental factors positively influence the behavioral aspects of learning.

H5. Cognitive abilities positively influence the behavioral aspects of learning.

H6. Affective abilities positively influence the behavioral aspects of learning.

H7. Behavioral aspects positively influence the perceived learning outcomes, particularly motivation.

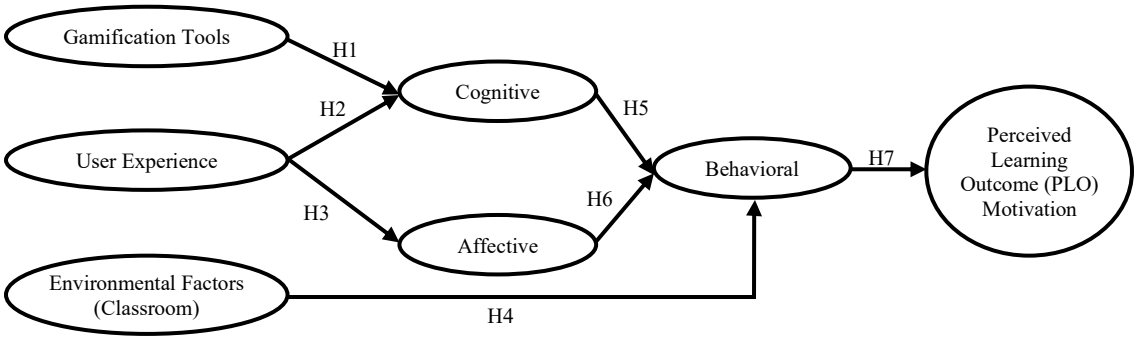


Fig. 1: Conceptual Framework

This study adopted a quantitative cross-sectional study model to investigate the effects of gamification on students' academic performance in Malaysian higher education. The sample size for this research study is 172 students, with a response rate of 49 % from 350 questionnaires distributed to university students in Malaysia and India. The questionnaire items were adapted through validated scales from the literature for categories such as gamification features (Sailer et al., 2017), user experience dimensions like flow, enjoyment, and satisfaction (Huang & Hew, 2021), motivational environmental factors including peer collaboration and social support, and learning outcomes across cognitive, affective, and behavior domain levels (Subhash & Cudney, 2018; Lopes et al., 2024). Motivation is measured in terms of SDT constructs (Deci & Ryan, 2000). All measures comprised five-point Likert scales. Data were collected online, and informed consent was obtained prior to participation. Data analysis was conducted using PLS-SEM. The analysis included the evaluation of the measurement model (reliability, convergent validity, and discriminant validity) and the structural model. Ethical approval was obtained, and the participants were assured of confidentiality and voluntary participation.

Table 1: Likert Scale Questionnaire for Gamification's Impact on Learning Outcomes

Research Question	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Effect of Gamification Tools and User Experiences	The gamification tools (e.g., points, badges, leaderboards) improve my cognitive learning outcomes.					
	The gamification tools increase my emotional interest in the learning material.					
	The gamification aspects encourage me to be participatory in classwork.					
	The gamification tools enhance my team-working skills.					
2. Environmental Conditions	Conditions in the classroom (e.g. seating, lighting) influence my learning process in gamified settings in a positive manner.					
	My engagement in gamified learning environments is boosted by institutional support (e.g., access to technology, involvement of teachers).					
	I am encouraged to engage in gamified learning due to the physical classroom setting.					
	Availability of technological tools (e.g. digital platforms, gamification software) influences my learning outcomes.					
3. Role of SDT and SLT in Cultural Context	My motivation to learn is positively influenced by the gamification tools (e.g., freedom of choice of challenges or paths).					
	The gamified environment makes me feel that I have achieved something and am competent in my studies.					
	Team-based gamification (e.g., team quests) will improve my learning process by increasing interactions with peers.					
	A mix of Self-Determination Theory (SDT) and Social Learning Theory (SLT) enables me to comprehend my learning more in a gamified environment.					
	The gaming learning environment cultivates a sense of community and belongingness in the students of various cultural backgrounds (India and Malaysia).					

Table 1 is a Likert scale questionnaire that will evaluate how gamification tools, user experiences, environmental conditions, and the Self-Determination Theory (SDT) and Social Learning Theory (SLT) affect the learning outcomes of university students in India and Malaysia. The questionnaire will be based on cognitive, affective, and behavioral learning outcomes, and the impact of classroom conditions, institutional support, and cultural influences on student engagement and motivation in gamified learning conditions. The respondents will be requested to evaluate their level of agreement with each statement on a five-point scale between Strongly Disagree and Strongly Agree.

Results and Discussion

Respondent Demographic Profile

The demographic profile (see table 2) indicates that the sample was rather even in the gender distribution, with 51.16 percent and 48.84 percent of the male and female sexes, respectively. The majority of them were aged between 18 and 55 (93.02%), which is the age of learners of higher education. Academic enrolment revealed that 50% of the respondents (50) were post-graduate students, with a second group of 45.93% being undergraduates, and others enrolled in programs (4.07). Moreover, a considerable percentage of students (66.86) said that they frequently encounter gamification in classroom tasks. These findings suggest that the gamified approach in the tertiary educational system, especially at higher education is becoming more globalized. The well-rounded representation that is part of the generalizability of the research is a reflection of what was mentioned, that various demographic distributions provide more convincing evidence when it comes to evaluating the adoption of gamification (Lopes et al., 2024).

Table 2: Respondents' Demographic Profile (N=172)

Variables	Percentage	Frequency
Gender		
Male	51.16	88
Female	48.84	84
Age		
17 and below	5.82	10
18 - 55	93.02	160
Above 55	1.16	2
Course enrolled		
Undergraduate	45.93	79
Postgraduate	50.0	50
Other	4.07	7
Frequency of playing games in the classroom		
Frequent	66.86	115
Not Frequent	33.14	57

Measurement Model Assessment

The measurement model was evaluated on the reliability and validity. Table 3 illustrates that all factor loadings were greater than 0.70 as well as Cronbach alpha and composite reliability were greater than the recommended 0.70. Mean values of the average variance extracted (AVE) were between 0.674 and 0.792, hence convergent validity was established. Also, the Fornell-Larcker criterion output (Table 3) demonstrated the discriminant validity, as the square root of AVE of both constructs was bigger than its correlation with other constructs. These results show that the constructs are internally consistent and conceptually separate. The strength of the measurement model gives confidence to the future hypothesis testing.

Table 3: Descriptive Statistics and Results for Convergent Validity for the Measurement Model

Constructs	Mean (SD)	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Gamification Tools	2.162 (0.70)		0.737	0.884	0.792
G1		0.752			
G2		0.828			
User Experience	2.218 (0.71)		0.651	0.851	0.741
U1		0.791			
U2		0.832			
Environmental factor	2.337 (0.78)		0.757	0.861	0.674
E1		0.722			
E2		0.821			
E3		0.760			
Behavioral factor	2.286 (0.74)		0.829	0.897	0.745
B1		0.756			
B2		0.806			
B3		0.832			
Cognitive factor	2.196 (0.65)		0.897	0.928	0.764
C1		0.772			
C2		0.813			
C3		0.700			
C4		0.783			
Affective factor	2.133 (0.72)		0.843	0.905	0.761
A1		0.815			
A2		0.728			
A3		0.767			
Motivation	2.110 (0.62)		0.838	0.892	0.741
P1		0.758			
P2		0.743			
P3		0.826			
P4		0.833			

**(acceptable threshold values in brackets)*

Table 4: Discriminant Validity for the Measurement Model

	Aff	Beh	Cogni	Environ	Gamify	PLO	USer
Affect	**0.872**						
Behavioural	0.621	**0.863**					
Cognitive	0.777	0.668	**0.874**				
Environment	0.463	0.714	0.506	**0.821**			
Gamifi	0.587	0.724	0.627	0.641	**0.890**		
PLO	0.796	0.628	0.774	0.494	0.622	**0.820**	
USer	0.608	0.542	0.731	0.438	0.569	0.639	**0.861**

****(values in bold: the square root of the average variance extracted for each construct)***

Table 4 demonstrates the correlation coefficients among the major variables of gamification and learning outcomes in students of the university. These variables are: affective (Aff), behavioral (Beh), cognitive (Cogni), environmental (Environ), gamification tools (Gamify), perceived learning outcomes (PLO), and user experience (User). The values show the strength and direction of relationships between the two variables, with a higher value (nearer to 1) showing stronger positive relationships. As an example, the cognitive and affective learning outcomes have a significant correlation (0.777), indicating that there is a strong relationship between the two elements of learning. The table offers some clues to the interaction between the various aspects of gamification and learning environments and how they play out in the overall learning experience and performance of students.

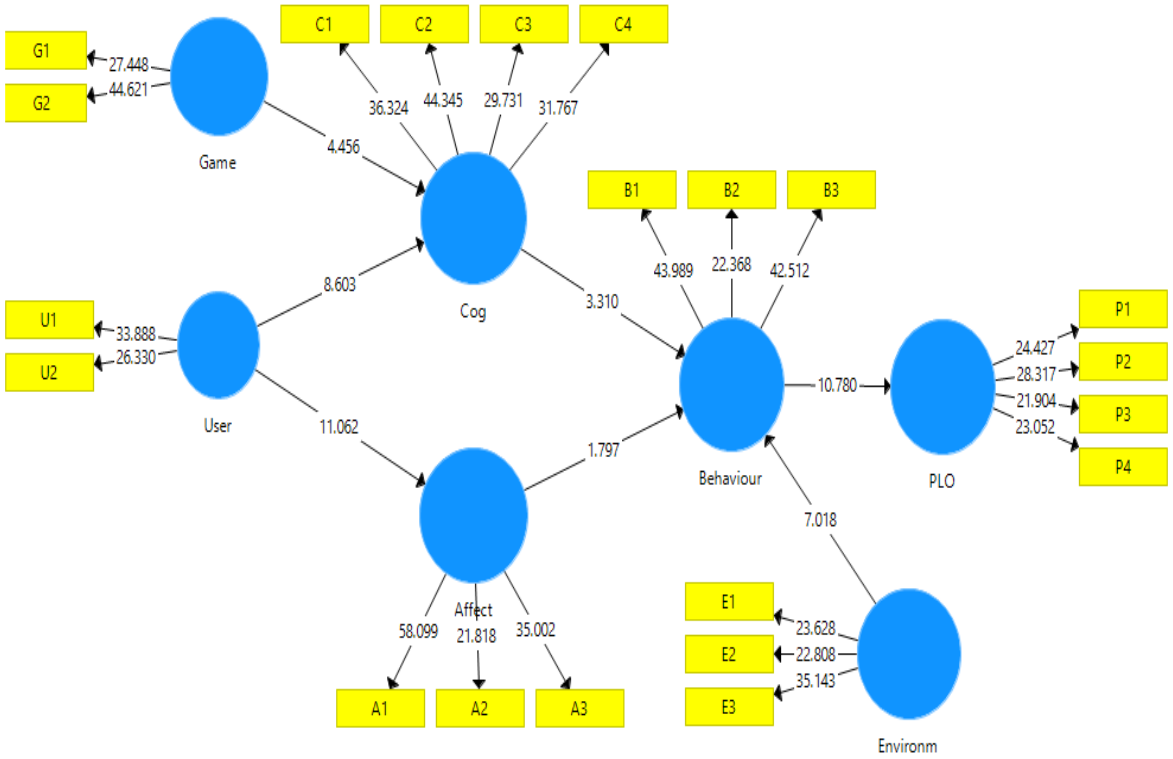


Fig. 2: Gamification and Learning Outcomes Structural Equation Model

Fig. 2 presents a structural equation model (SEM) illustrating the interrelationships among the main factors affecting learning outcomes in a gamified environment. Such variables in the model are Game, User, Cognitive, Affective, Behavioral, PLO (Perceived Learning Outcomes), and Environmental conditions. The arrows represent the directional relationships, and the numerical values are the strength of the paths or loadings among the variables. Indicatively, the connections between Game and Cognitive and Cognitive and Behavioral indicate the effects of gamified components on the cognitive and behavioral learning performance of students. The figure also shows the different indicators (e.g., G1, C1, B1, E1) of each construct, a full picture of the model structure, and the correlation between the latent variables and observed indicators.

Table 5: Hypothesis Testing Results

Hypothesis	Path	Path Coefficient	Result
H1	Game→Cognitive	4.456***	Supported
H2	User→Cognitive	8.603***	Supported
H3	User→ Affective	11.062***	Supported
H4	Environment→Behavioral	7.018***	Supported
H5	Cognitive→ Behavioral	3.310***	Supported
H6	Affective→ Behavioral	1.797	Not Supported
H7	Behavior→per motivation	10.780***	Supported

Table 5 shows the outcomes of the hypothesis testing of the relationship between different variables of the gamified learning environment and their effects on the student outcomes. Both hypotheses focus on the direct impact of one variable on the other, and path coefficients are used to measure the strength of the relationship. The levels of significance (written by the letters **) indicate the levels of statistical significance of the path coefficients. An example of these is the direction of relationship between Hypothesis 1 (H1) test, that is, between "Gamification" and "Cognitive" and it is affirmed by the high path coefficient of 4.456, which shows the strong positive relationship. Similarly, Hypothesis 6 (H 6), which checks the relationship between Affective and Behavioral, is not supported as the path coefficient (1.797) does not have a significant value. The table helps to identify the pathways that play a significant role in student learning outcomes, which can provide a clue on the most important aspects in the gamified education.

Structural Model and Hypothesis Testing

The structural model test indicates that the hypotheses were accepted (Table 5). The effect of gamification tools on the cognitive outcomes was found to be substantial, which means that interactive learning tools, like matching and classification, help to retain knowledge better (Sailer & Homner, 2020). The positive influence of user experience on cognitive and affective effects was also strong, which proves that the intuitive design and usability lead to intellectual engagement and emotional satisfaction. The environmental conditions showed a strong influence on the behavioral outcomes and emphasized the role of enabling learning environments that contribute to participation. The behavioral outcomes are greatly predicted by cognitive factors, which implies that behavioral change occurs after acquiring knowledge (Deci & Ryan, 2000).

Interestingly, affective outcomes did not play a significant role in behavioral change, which means that emotions alone might not cause observable behaviors unless the same is reinforced in the thoughts. This finding is in contrast to previous studies and is indicative of a research gap in which affective involvement must be facilitated by cognitive processing to be converted into long-term behavioral change. Lastly, behavioral outcomes revealed the significant positive impact on motivation which highlights that active involvement is the key driver of intrinsic motivation that identifies autonomy and competence as key motivation factors.

Discussion of Findings

The results indicated that gamification has an influence on the learning and motivation of students. The strengthening effects of gamification and user experience on cognitive performance suggest that interactive design and usability are obligatory in influencing the affective learning. This supports the fact that gamification performance is based on shallow incentives instead of meaningful interaction in a designed learning experience.

The results also show the significance of the cognitive and environmental factors in predicting the behavioural outcomes in favour of the socio-constructivist theories that learning behavioral effects are constructed in the process of exposure to content and context. Nonetheless, the insignificance of affective variables cannot be explained by the existing tendencies in gamification according to which the appeal to the emotions keeps the users interested. These findings suggest that affective reactions must be cognitively based in order to create consistent behavior change.

In practice, it should be noted that educators need to focus on the tools in gamification that facilitate thinking and learning environment instead of emphasizing the affective, like fun or enjoyment. Teachers facilitate intrinsic motivation (Deci & Ryan, 2000) by encouraging active behavioural participation, which fulfils the autonomy, competence, and relatedness needs. In theory, the gamification model is the model where motivation is a cognitive situation and behavior. The multi-stage model builds on existing knowledge in that it describes why certain gamification efforts are effective in terms of keeping the momentum of motivation, and other efforts fail to translate engagement into long-term learning practices.

Higher Education gamification practices are better than behavioral and are backed by favourable environmental factors. Even though it is effective, it influences the engagement, but it is not enough to support the successful learning unless it is supported by cognitive processes and active participation. The discovery is not only important in the development of theoretical frameworks guided by the Self-Determination Theory and Social Learning Theory, but also gives practical information on behalf of teachers and instruction developers.

Implications

The research contributes to the literature on gamification by introducing SDT and SLT in a two-theoretical framework where the three constructs, cognitive scaffold, psychological needs, and peer influence are equally useful in determining learner engagement. Research has looked at motivational or social pathways separately. Results indicated that cognitive and environmental factors are strong predictors of behavior and motivation as compared to affective states. Practically, the findings would help scholars and educational establishments to enhance student involvement and achievement. The presence of such features as progress tracking, timely feedback, and simple design has a beneficial impact on cognitive engagement, retention of knowledge, and collaboration in learning, which supports behavioral outcomes. The importance of the affective factors implies that emotional immersion cannot work without additional cognitive stimulation and social interaction. Scalable and sustainable implementation requires investment into infrastructure and support of digital infrastructure, as well as gamification features and training of the instructors. In line with SDG 4 (Quality Education), the outcomes are associated with inclusive, effective as well as equitable learning experiences. The research also helps promote SDG 10 (Reduced Inequalities) in developing peer

collaboration and conducive learning conditions and SDG 9 (Industry, Innovation and Infrastructure) by using innovative technology-enhanced teaching methods.

To policymakers, it brings out the possibility of gamification as scalable approach to enhance digital pedagogy and help in lifelong learning pathways. Altogether, all these implications provide practical advice on how to design gamified learning systems that would balance motivation and social aspects to high-quality and sustainable education.

Future Study and Conclusion

The research concludes that gamification can greatly improve the learning outcomes of university students in India and Malaysia, affecting cognitive, affective, and behavioral levels. The results indicate that the positive impact of gamification tools on cognitive learning (H1 supported, path coefficient = 4.456) is extremely high, and user experience is crucial in determining cognitive (H2 = 8.603) and affective engagement (H3 = 11.062). It has also been found that environmental factors have a significant impact on behavioral outcomes (H4 = 7.018). It is important to note that cognitive factors are a significant driver of behavioral engagement (H5 = 3.310, but not supported), and affective factors did not show a significant influence on behavior (H6 = 1.797, not supported), thus showing that the emotional engagement is not sufficient to produce observable learning behaviors on its own.

Statistically, the structural model is highly explanatory, with most of the hypothesized relationships being found to be statistically significant at high degrees of confidence ($p < 0.001$). Behavioral outcomes and perceived motivation showed the highest correlation (H7 = 10.780**), and this observation proves active participation to be a major determinant of student motivation. The measurement model was also found to be highly reliable and valid, with factor loadings greater than 0.70 and AVE values of 0.674 to 0.792, which make the constructs robust. These findings justify the combined use of the Self-Determination Theory (SDT) and Social Learning Theory (SLT), as it has been proven that both psychological needs (autonomy, competence, relatedness) and social interactions have a collective effect on learning activities and results.

Future studies must be done using longitudinal and experimental studies to assess the long-term sustainability of the gamification effects, especially once extrinsic rewards are withdrawn (Ram Sing et al., 2025). Furthermore, more research may be conducted on the next-generation gamification technologies, including adaptive learning systems based on artificial intelligence, VR, and gamified platforms tailored to an individual to improve the learning process. More extensive comparative research in cross-cultural education across more nations and learning situations would also give higher-quality insights into cultural differences in gamified learning. Lastly, future research ought to explore the interplay between the cognitive and affective processes in detail to gain a better insight into how emotional involvement can be converted into long-term behavioral modification within various educational settings.

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