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GAMIFICATION IN HIGHER EDUCATION: INVESTIGATING MOTIVATIONAL DRIVERS AMONG ACCOUNTING UNDERGRADUATES IN MALAYSIA

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Abstract:

In recent years, gamification has become widely acknowledged as a dynamic and creative way to engage people in a diverse dimension of life, including educational environments. This strategy can be seen of as a helpful instrument to persuade people to make use of educational systems. Despite the widespread adoption of gamification to improve student engagement, there is a limited understanding of the precise psychological mechanisms that drive learning motivation particularly in Malaysian accounting education. This study aims to identify factors that impact student motivation in gamification-based learning environments. Drawing upon Self-Determination Theory (SDT), the research employed a quantitative research design using questionnaire data gathered from accounting undergraduates. The measurement and

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structural model assessments were conducted utilizing PLS-SEM. The online survey was completed by 137 accounting undergraduate students from UiTM Tapah, a public higher education institution in Malaysia. The results revealed that satisfaction and relatedness have significant positive influences on students' learning motivation, however confidence did not exhibit a significant statistical influence through gamification. These results reinforce the importance of developing emotionally engaging and socially supportive learning settings to foster motivation, which is vital for the successful incorporation of gamification in accounting education. The findings are expected to help educators and higher education administrators design more effective gamified learning environments that cater to students' motivational needs. Future study is recommended to include broader variables such as perceived usefulness of gamified tools and technological readiness for a more comprehensive insight of gamification implementation in Malaysia's higher education sector.

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Keyword:

Confidence, Gamification, Learning Motivation, Satisfaction, Relatedness



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Introduction

Sustaining learners' engagement throughout the educational process is a big difficulty for modern educators, especially given the current digital landscape, in which students are constantly immersed in personal computers and mobile devices outside of academic contexts. According to a number of studies, students' active involvement and behavioral engagement in the learning process improve in proportion to their motivation. Li et al., 2024; Ratinho & Martins, 2023). As a result, research into strategies that will inspire students to learn has recently gained significant interest and gamification is one such approach (Jaramillo-Mediavilla et al., 2024).

Gamification is the incorporation of game-based design elements and principles into non-game environments, for instance education and marketing, with the goal of increasing engagement, enjoyment, and participation in the learning process (Manzano-León et al., 2021; Torres-Toukoumidis et al., 2021). Gamification is widely recognized for its ability to modernize traditional educational practices (Hanus & Fox, 2015; Manzano-León et al., 2021; Ružic & Dumancic, 2023; Thurston, 2018). Research shows that game-based learning can improve skill acquisition, reduce cognitive load, and encourage active student participation (McColgan et al., 2018; Mohamad et al., 2018). Because gamification is directly related to learner motivation and participation, educational implementations usually focus on these motivating factors to enhance overall student commitment and academic performance (Baah et al., 2023; Dreimane,

2019; Koivisto & Hamari, 2019; Saleem et al., 2022). Scholars believe that gamification has the ability to revolutionize existing educational paradigms (Nehring et al., 2018), particularly by increasing student interest and academic engagement (Thurston, 2018). Zirawaga et al. (2017) proved that game-based learning efficiently motivates students to complete their coursework. Furthermore, their findings show that incorporating games into education reduces instructional boredom while increasing student confidence, providing a dynamic alternative to traditional teaching approaches.

Gamification in education provides alternate assistance for students who are disengaged with traditional instruction techniques (Alsawaier, 2018). As a result, including game-based aspects into course syllabus is an effective technique for reversing declining student motivation and engagement in higher education institutions. This innovation is especially recommended for non-STEM fields, where using interactive methodologies fosters student motivation through healthy competition and active learning dynamics (Gil-Doménech & Berbegal-Mirabent, 2019).

Motivation is an underlying drive that governs human conduct. It can take an extrinsic form, which is directed by external incentives, for instance grades, or an intrinsic form, which comes from inner delight and fulfillment. Extrinsic game characteristics are commonly used as an initial catalyst in educational gamification in order to build internal, intrinsic drive. Extensive research shows that gamifying learning environments improves student motivation, engagement, and system involvement (Bouchrika et al., 2021; Li et al., 2022; Saleem et al., 2022). However, introducing game features alone is insufficient to improve educational outcomes (Ofosu-Ampong et al., 2019). To create meaningful student engagement, gamified tools must be explicitly linked to learners' behavioral intents and underlying psychological drives.

There is a limited of in-depth understanding regarding the psychological mechanisms that drive learning motivation in Malaysian accounting education, despite the extensive use of gamification to enhance student engagement. Thus, the primary objective of this research is to investigate the determining factor which consist of psychological constructs such as confidence, satisfaction, and relatedness that demonstrate how gamification influences accounting students' learning motivation especially within Malaysian higher education accounting programs. According to Self-Determination Theory (SDT), intrinsic learning motivation develops when an individual's essential psychological demands for competence, autonomy, and relatedness are met (Ryan & Deci, 2000). Existing literature has largely focused on broad outcomes, for example, performance and commitment (Baah & et al., 2023; Saleem & et al., 2022) or generic instructional theoretical frameworks like ARCS motivational model. Past research efforts not empirically validate specific underlying psychological constructs, namely confidence, satisfaction, and relatedness under SDT, to show how gamification translates into student motivation (Ryan & Deci, 2000). This research makes a substantial contribution to the current body of knowledge by creating and analytically evaluating a research model to describe the components that influence accounting students' willingness to learn through gamification.

Literature Review

The Influence of Gamification on Confidence

Confidence in learning is defined as students' belief in their own ability to complete learning activities and effectively govern their learning processes (Ryan & Deci, 2000). Under SDT, confidence is closely aligned with the need for competence that enables students to engage with appropriately challenging tasks, fostering the self-assurance necessary to sustain interest and motivation. In other words, confidence involves allowing students to engage in activities with a significant level of challenge or difficulty to sustain interest. According to Orji et al. (2019), a learner's confidence level has a significant impact on their motivation to work hard to achieve academic goals. This construct aligns with the SDT component of competence, indicating that persons who regard themselves as capable are more driven to study (Wang et al., 2019; Wood, 2016). Confidence is essential in gamified learning environments, where students must solve challenges, perform tasks, and compete with peers. Previous research indicates that student confidence has a major impact on engagement and learning results (Fazimin, 2015; Park & Kim, 2016). High subject complexity in difficult areas like accounting can significantly impact student confidence and motivation. Therefore, it is argued that:

H1: Using gamification, confidence positively effects students' motivation towards learning.

The Influence of Gamification on Satisfaction

According to SDT, satisfaction reflects a learner's sense of contentment and fulfillment derived from course interactions, which is typically fostered through engaging game mechanics such as immediate feedback, progress tracking, and reward systems (Hamari et al., 2014; Orji et al., 2019). To sustain student motivation, learners must experience true satisfaction and positive reinforcement from their achievements along the learning path (Orji et al., 2019). Empirical research consistently links high levels of satisfaction to increased intrinsic motivation, academic persistence, and performance (Sun & Rueda, 2012). According to comparative research, students who take gamified classes are much more motivated, confident, and satisfied than those who are taught using traditional methods. Gamification provides a means of making educational content more accessible and interesting for accounting undergraduates, who regularly navigate abstract, technical, and sophisticated material, hence increasing overall learning satisfaction (Zainuddin et al., 2020).

H2: Using gamification, satisfaction positively effects students' motivation towards learning.

The Influence of Gamification on Relatedness

Relatedness relates to experiencing a sense of closeness and acceptance among individuals. The importance of this need for relatedness, particularly within the classroom context, has been relatively understudied. According to SDT, fulfilling the need for relatedness enhances intrinsic motivation by making learners feel supported and socially connected (Ryan & Deci, 2000). Gamification often incorporates social components such as leaderboards, team-based challenges, and peer interaction, which help cultivate relatedness (Kuo & Chuang, 2016). In Malaysian public universities, where collaborative learning and community values are emphasized, fostering relatedness may be particularly effective in motivating accounting students to embrace gamified learning. Therefore, we propose the hypothesis that:

H3: Using gamification, relatedness positively effects students' motivation towards learning.

Overall, the theoretical framework of the factors influencing learning motivation in gamified learning environments is shown in Figure 1.

Gamification

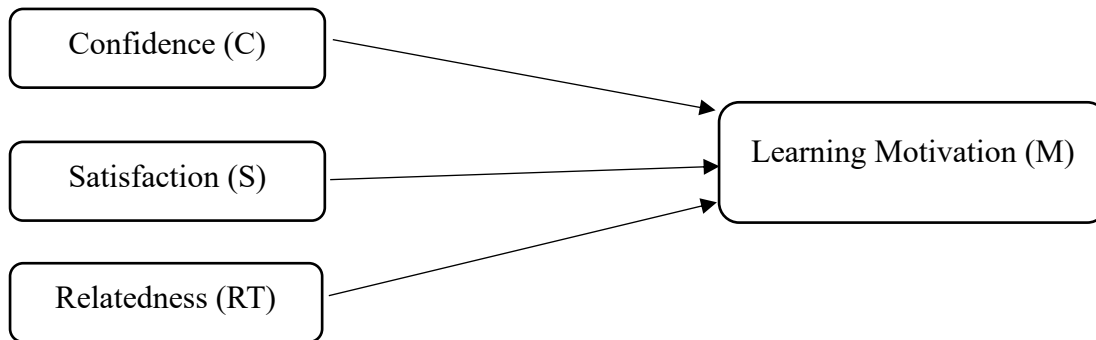


Figure 1: Theoretical Framework

Methodology

Sample

A quantitative research approach was adopted, with descriptive analysis used to investigate how gamification influences learning motivation. The target population was accounting undergraduates at Universiti Teknologi MARA (UiTM) Tapah, which has a larger number of Diploma in Accountancy students than other Private Finance Initiative (PFI) campuses. Data was collected between November 1, 2023, and March 31, 2024, targeting Part 3, 4 and Part 5 students in two diploma programs comprising the Diploma in Accountancy (DIA) and Diploma in Accounting Information Systems (DAIS) programmes. These students were selected specifically for their capability to understand highly technical accounting standards and apply them to generate published financial statements. Structured survey questionnaires were disseminated via Google Forms using a simple random sample technique, ensuring equal selection probability for all students in the sampling frame.

A questionnaire was adapted from previous studies in respect of learning motivation. The confidence and satisfaction dimensions were adopted from Keller's (1987) 12-item Reduced Instructional Materials Motivation Survey (RIMMS), while the relatedness construct was based on Guiffrida et al.'s (2008) Need for Relatedness at College Questionnaire (NRC-Q). Responses were evaluated on a 5-point Likert scale, from 1 ("strongly disagree") to 5 ("strongly agree"). The online survey was administered immediately after respondents completed a gamified accounting module. Overall, 137 questionnaires were received.

Results

Respondent Profile

Table 1 outlines the demographic characteristics of the 137 accounting undergraduates surveyed at UiTM Tapah, Malaysia. The sample comprises 34 male (24.82%) and 103 female (75.18%) students. Semester 1 students were intentionally excluded from the study as they had

not yet received academic grades to assess their current academic performance while for semester 2 students, accounting standards were not yet included in their program structure. 49 (35.77%) of the respondents spent at least an hour on gamification. Majority of the respondents used mobile devices for gamification 117 (85.4%). Most of the respondents obtained CGPA 3.50 and above 68 (49.64%).

Table 1: Respondents' Demographic Characteristics

Characteristics	Items	Frequency	Percent
Gender	Male	34	24.82%
	Female	103	75.18%
Age	18-19	12	8.76%
	20 and above	125	91.24%
Semester	3	116	84.67%
	4	4	2.92%
	5	17	12.41%
Average time spent for gamification	At least three hours	22	16.06%
	About two hours	27	19.71%
	At least an hour	49	35.77%
	Less than 30 minutes	27	19.71%
	None at all	12	8.76%
Most used devices by students for gamification	Desktop	4	2.92%
	Mobile	117	85.40%
	Laptop	12	8.76%
	None	4	2.92%
Academic Performance	3.50 and above	68	49.64%
	3.00-3.49	53	38.69%
	2.50-2.99	13	9.49%
	2.00-2.49	3	2.19%
	Less than 2.00	0	0%

Assessment of the Measurement Model

Smart PLS was employed to evaluate the questionnaire data in two steps using Partial Least Squares Structural Equation Modeling (PLS-SEM). The examination began with an assessment of the measurement model, followed by a review of the structural model. The measurement model establishes the relationships between individual survey items and their underlying constructs, whereas the structural model evaluates the direct path relationships between the exogenous and endogenous variables. PLS-SEM is well-suited for testing complex theoretical frameworks, such as applying SDT to gamified learning where the objective is to predict key endogenous target constructs (student learning motivation) and to explain the variance that is accounted for by multiple psychological drivers. Table 2 summarizes the assessment of the measurement model, which required establishing both convergent and discriminant validity. Convergent validity measures the degree to which several indicators of a same construct consistently align. According to the thresholds proposed by Hair et al. (2017), convergent validity is validated when indicator loadings meet or surpass 0.60, Average Variance Extracted (AVE) is at least 0.50, and Composite Reliability (CR) exceeds 0.70. As shown in Table 2, the measurement model met all criteria, with factor loadings ranging from 0.842 to 0.957, AVE

values from 0.796 to 0.908, and CR scores from 0.921 to 0.962. These statistical results support strong convergent validity across all constructs.

Table 3 shows the discriminant validity evaluation using the Fornell and Larcker criterion, which confirms that each latent construct in the study reflects a different dimension. The square value of each construct's AVE was greater than its association with all other constructs. As a result, the measuring model met the set criteria, demonstrating discriminant validity across all constructs.

Table 2: Assessment of the Measurement Model

Constructs	Measurement items	Loadings	Cronbach's α	CR	AVE
Confidence (C)	C1	0.933	0.863	0.936	0.879
	C2	0.942			
Satisfaction (S)	S1	0.941	0.942	0.962	0.895
	S2	0.955			
	S3	0.942			
Relatedness (RT)	RT1	0.842	0.873	0.921	0.796
	RT2	0.927			
	RT3	0.906			
Learning Motivation (M)	M1	0.949	0.903	0.952	0.908
	M2	0.957			

Table 3: Discriminant Validity of Measurement Model using Fornell and Larcker Criterion

Constructs	Confidence	Learning Motivation	Relatedness	Satisfaction
Confidence	0.938			
Learning Motivation	0.845	0.953		
Relatedness	0.841	0.851	0.892	
Satisfaction	0.884	0.852	0.825	0.946

Assessment of the Structural Model

Upon establishing the validity of the measurement model, a structural model analysis was performed to assess the three offered hypotheses. Hair et al. (2017) proposed that structural model assessment consider the direction and magnitude of the beta coefficient, as well as the statistical significance level of the t-values and p-values. Table 4 presents an overview of the findings from hypothesis testing.

Hypothesis 1 (H1) proposed that learner confidence enhances student motivation in gamified learning environments. Although the empirical path coefficient was positive, the connection was statistically non-significant ($\beta = 0.22$, $t = 1.58$, $p > 0.05$). Therefore, H1 was rejected. Hypothesis 2 (H2) claimed that satisfaction enhances motivation to learn through gamification. The data confirmed a statistically significant beneficial effect ($\beta = 0.339$, $t = 2.513$, $p < 0.05$),

thus H2 was supported. Finally, H3 it was hypothesized that relatedness would have a positive impact on students' motivation to learn by using gamification. The path analysis showed a strong, positive, and statistically significant association ($\beta = 0.386$, $t = 3.08$, $p < 0.05$). Therefore, H3 was supported.

Table 4: Results of Structural Model Assessment and Hypothesis Testing

Hypothesis	Relationship	Beta	Standard deviation	t value	p value	Decision
H1	Confidence Learning Motivation	-> 0.22	0.14	1.58	0.114	Rejected
H2	Satisfaction Learning Motivation	-> 0.339	0.135	2.513	0.012	Supported
H3	Relatedness Learning Motivation	-> 0.386	0.125	3.08	0.002	Supported

These findings demonstrate that the structural path model (Figure 2) robustly predicts how gamified learning environments successfully drive student motivation.

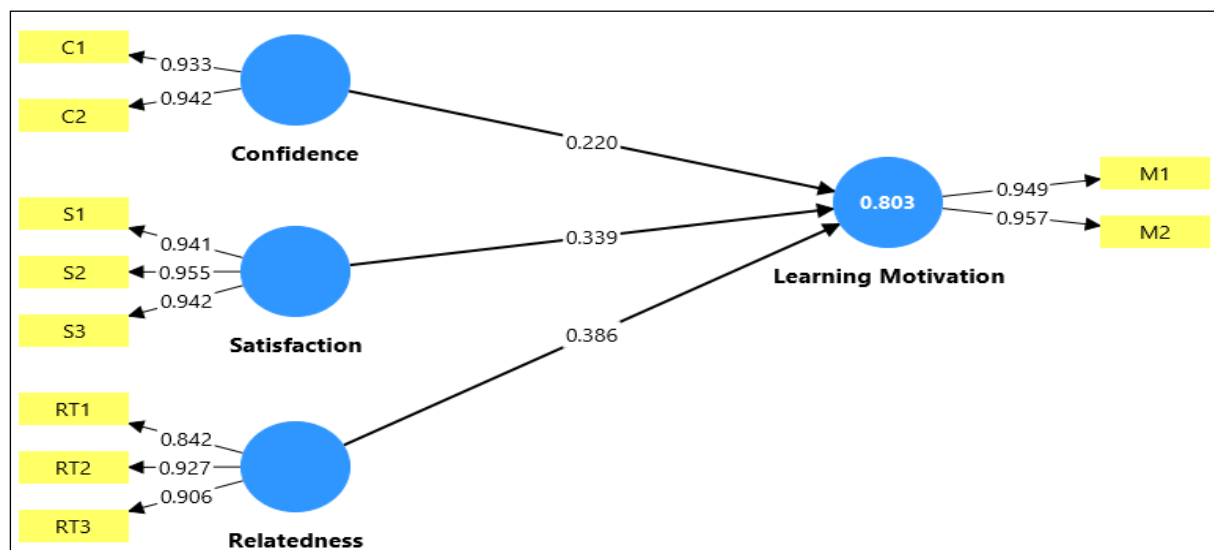


Figure 2: Path Model with Coefficients

Table 5 shows the coefficient of determination (R^2) and effect size (f^2) of the exogenous variables on the endogenous variable. The R^2 value indicated how much of the endogenous construct's variance can be explained by the combination of exogenous variables in the research model. Data given in Table 5 demonstrated that the R^2 was 0.803, which denotes that the exogenous variables (confidence, satisfaction and relatedness) all contribute to 80.3% of the variance in the endogenous variable (learning motivation). As regards the effect size, f^2 represents the value of R^2 that is changed when a given construct is removed from the model. Based on Cohen (1988), the impact of the effect size was judged to be small if the value of f^2 ,

was 0.02, medium if it was 0.15 and large if it was 0.35. The results in Table 5 indicate that the supported exogenous variables (confidence, $f^2 = 0.044$; and satisfaction, $f^2 = 0.115$) had a small effect size while (relatedness, $f^2 = 0.198$) had a medium effect size on the endogenous variable.

Table 5: Assessment of R^2 and f^2

Construct	R^2	f^2	Decision
Learning Motivation	0.803		
Confidence		0.044	Small
Satisfaction		0.115	Small
Relatedness		0.198	Medium

Discussion

The structural model assessment revealed empirical evidence that supported the given hypotheses. Hypothesis 1 ($H1$), which posited a positive association between confidence and learning motivation through gamification, was rejected ($\beta = 0.22$, $t = 1.58$, $p = 0.114$), with a small effect size ($f^2 = 0.044$). Although the direction of the relationship was positive, the lack of significance suggests that confidence alone may not be a strong predictor of students' motivation to learn by using gamification in this context. This suggests that students' motivation towards learning may be affected by psychological or contextual factors, rather than their perceived capability.

In contrast, Hypothesis 2 ($H2$) was supported ($\beta = 0.339$, $t = 2.513$, $p = 0.012$), with a small effect size ($f^2 = 0.115$). Gamification has been shown to have a considerable positive impact on students' learning motivation. This research implies that students who are satisfied with their learning experience, including the content, teaching techniques, and general learning environment, are more likely to be motivated. A good learning experience may increase students' emotional involvement and encourage them to participate actively and effectively in academic pursuits. This result supports the findings of previous study that has recognised learner satisfaction as a critical aspect in establishing and maintaining students' motivation to learn (Sailer & Homner, 2020).

Hypothesis 3 ($H3$) was supported ($\beta = 0.386$, $t = 3.08$, $p = 0.002$), with a medium effect size ($f^2 = 0.198$), demonstrating that relatedness has a considerable positive effect on learning motivation in a gamified setting. This research implies that children who have a strong connection to their peers, instructors, and the larger learning community are more likely to develop high levels of intrinsic motivation. Feelings of belonging, social connection, and interpersonal support can foster a good motivational atmosphere in which students feel valued, accepted, and encouraged to actively participate. This finding is congruent with SDT, which defines relatedness as one of the three essential psychological demands (autonomy, competence, relatedness) that contribute to autonomous motivation and favorable learning outcomes (Ryan & Deci, 2000).

The findings show that in a gamified learning environment, satisfaction and relatedness are important predictors of students' learning motivation. Although confidence showed a positive link with motivation, its effect was not statistically significant in this study. These findings emphasize the necessity of promoting students' sense of satisfaction and social connection

(relatedness) when creating gamified learning experiences. As a result, educators and higher educational institutions should prioritize techniques that improve learner satisfaction and foster meaningful connection and collaboration, as these elements are more likely to increase students' motivation to learn.

Conclusion

Ryan and Deci (2000) highlighted that Self-Determination Theory (SDT) gives a solid theoretical basis for exploring how satisfying individuals' basic psychological needs boosts learning motivation, particularly in gamified learning environments. Drawing insights from this theory, the primary objective of this research was to explore the role of gamification in increasing students' learning motivation and to determine the important factors that have a major influence on the relationship between gamification and students' motivation to engage in learning. The findings revealed that satisfaction and relatedness positively and significantly contribute to learning motivation in gamified learning environments, whereas confidence has no statistically significant influence. This conclusion contradicts the findings of Ozdamli (2018), who discovered that students enrolled in gamified accounting classes had high levels of confidence and motivation. However, the current study supports Ozdamli's results about the positive influence of satisfaction on students' learning motivation. The results of this study emphasize the significance of encouraging emotionally supportive and socially connected learning environments to enhance student motivation. Satisfaction with the learning experience through gamification and a strong sense of belonging were shown to be critical in promoting students' willingness to engage and persist in academic tasks. Understanding the characteristics that drive students to learn can help educators choose and implement appropriate educational technology, resulting in increased student engagement and participation in the learning process (Al-Fraihat et al., 2020). The significance of each aspect evaluated in this research gives practical insights for educators and higher education administrators as they need to plan and implement future learning initiatives at their institutions. To increase emotional involvement and active participation, instructors should create learning experiences that are interesting, collaborative, and socially interactive.

This research has various limitations that should be recognized. First, the data were gathered from a specific group of respondents, which may limit the generalizability of the findings. Future study should involve participants from a broader range of institutions of higher learning to safeguard a greater representative sample and improve the results' application across various educational environments. Second, the study concentrated on a small number of characteristics connected to gamification adoption. Future research should investigate other relevant elements, such as the perceived usefulness of gamified learning aids and students' technological readiness, as these may influence their adoption and use of gamification. Gamification's motivational benefits may be lessened if students have technological difficulty accessing online platforms. Similarly, students may be less motivated to participate in learning activities if they do not perceive gamified technologies as useful for assisting with the completion of complicated academic assignments. Furthermore, future studies should explore longitudinal and qualitative research methodologies as it may provide more detailed insights into the factors influencing gamification adoption in Malaysian higher education.

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