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Enhancing Business Accounting Student Performance through Gamified Learning

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Abstract

Accounting is widely regarded as a complex subject, and traditional teaching methods often fail to fully engage students or enhance learning outcomes. This study investigates the effectiveness of gamification and vocational programmes as pedagogical approaches to improve student engagement and academic performance in accounting education. A quantitative research design was employed, with primary data collected from 254 undergraduate and postgraduate students enrolled in accounting and vocational accounting programmes across India. Measurement scales were adapted from validated studies, and Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied using SmartPLS 4.0 to test the proposed hypotheses. The results indicate that gamification has a significant positive effect on student engagement ($\beta = 0.683$, $p < 0.001$) but does not directly influence academic performance ($\beta = 0.017$, $p = 0.448$). Conversely, vocational programmes positively affect both engagement ($\beta = 0.264$, $p = 0.014$) and academic performance ($\beta = 0.903$, $p < 0.001$). These findings suggest that while gamified interventions enhance motivation, participation, and collaboration, practical and skill-based vocational training is essential for improving measurable learning outcomes. This study contributes to the accounting education literature by demonstrating the complementary roles of gamification and vocational programmes, emphasizing the importance of integrating motivational and performance-oriented pedagogical strategies. For educators and curriculum designers, combining gamified learning with vocationally oriented activities offers a promising approach to increase engagement, reinforce conceptual understanding, and prepare students for real-world professional challenges. The study also provides implications for curriculum design, policy development, and future research on hybrid pedagogical models.

Keywords: gamification; engagement; vocational courses; accounting education

1. Introduction

Financial reporting constitutes a critical function of every organization, and accounting serves as the backbone of this process. Despite its importance, accounting is widely perceived as a complex and challenging subject to master. Conventional teaching approaches—predominantly lecture-based methods and blackboard instruction—are increasingly inadequate in addressing the learning needs of contemporary students. With rapid technological advancement, there is a growing necessity to adopt technology-embedded and innovative pedagogical approaches in accounting education.

Accounting represents a fundamental competency for entrepreneurs and business professionals. However, learning accounting is often viewed as tedious and difficult, particularly by students without a formal

accounting background (Rosli et al., 2019). For business students, this difficulty is frequently exacerbated by traditional teaching practices that limit active participation and experiential learning. Such approaches have been shown to reduce students' motivation, engagement, and attentiveness, thereby hindering effective learning outcomes (Grabinski et al., 2020). Although financial accounting is a core subject in business and accounting curricula, it continues to be regarded as both uninteresting and demanding, especially among novice learners.

Today's students are highly techno-oriented and accustomed to interactive digital environments. When traditional instructional methods dominate classroom delivery, subjects such as accounting may appear abstract, monotonous, and difficult to comprehend. In this context, gamification emerges as a promising pedagogical strategy for teaching accounting concepts. Gamification integrates game elements into learning activities, making the educational process more interactive and engaging. Prior research suggests that gamification offers an effective instructional method in higher education classrooms (Creel et al., 2021) and can significantly support non-accounting students in understanding accounting courses (Tandiono et al., 2022). Owing to its adaptability and learner-centered design, gamification has gained widespread adoption across various educational disciplines (Xi & Hamari, 2020).

The current educational landscape is increasingly shaped by artificial intelligence, machine learning, and data-driven decision-making. Consequently, students must be equipped not only with theoretical knowledge but also with practical skills aligned with market demands. Sole reliance on textbook-based learning is insufficient for preparing students for contemporary workplaces. Higher education institutions therefore face growing pressure to integrate skill-oriented and experiential learning approaches into their curricula. Despite its potential, educational researchers and practitioners continue to face challenges in determining when, where, and how gamification should be effectively implemented (Huang et al., 2020). Gamification can act as a motivational mechanism by encouraging experimentation, problem-solving, and continuous learning through game-based tasks, feedback systems, and reward structures, making it particularly suitable for both in-person and remote education environments (Escamilla & Martínez, 2020).

Against this backdrop, the present study aims to analyze the engagement and effectiveness of gamification as a pedagogical approach for improving the delivery of accounting education. Specifically, the study examines the role of gamification in enhancing student engagement and its influence on academic performance in accounting courses.

1.1. Novel Pedagogical Approaches

Gamification has increasingly been adopted as an instructional strategy to help accounting students understand and manage real-world business scenarios within classroom settings (González-Acosta et al., 2020). It is widely recognized as a tool that enhances the teaching–learning process by incorporating game mechanics such as competition, rewards, feedback, and interactivity. A range of platforms and tools—including Monopoly, Kahoot, Quizizz, business simulations, and color accounting—are now commonly used to support gamified learning experiences in accounting education.

Gamification holds substantial potential to foster student motivation and engagement by offering appealing and goal-oriented learning environments that align with specific educational objectives (Jamaluddin et al., 2017). Given that today's learners have lifelong exposure to digital technologies and gaming environments, educators are uniquely positioned to leverage these experiences to improve instructional effectiveness (Moncada & Moncada, 2014).

Digital platforms such as Kahoot provide an interactive and enjoyable learning environment in which students can review and reinforce course content through quizzes, puzzles, and real-time feedback. Using mobile devices or laptops, students actively participate in classroom activities involving multiple-choice, true–false, and short-answer questions (Creel et al., 2021). Prior studies have demonstrated the effectiveness of Kahoot in analyzing and reinforcing accounting concepts through student-centered interaction (Montero et al., 2019).

Similarly, color Accounting offers an innovative visual approach to teaching accounting principles by employing color-coded diagrams to represent financial concepts and relationships. This method facilitates rapid acquisition of accounting literacy and enhances students' financial understanding and business acumen. Although direct empirical studies on color accounting remain limited, evidence from research on visual and color-based learning suggests that the use of color can improve comprehension, conceptual clarity, and learner attitudes by making abstract concepts more intuitive and accessible.

Quizizz is another educational tool that enables students to engage in collaborative and competitive learning activities. Research indicates that Quizizz effectively enhances student learning outcomes and engagement in accounting classrooms by promoting active participation and immediate feedback (Zhao, 2019). In addition to quiz-based platforms, simulation-based learning tools are increasingly employed to teach complex subjects such as accounting by creating virtual representations of real-world business environments. These simulators allow students to manipulate variables, observe outcomes, and understand the financial implications of business decisions, thereby facilitating experiential learning (Escamilla & Martínez, 2020). Business simulation games such as Monopoly and digital platforms like MonsoonSIM enable students to apply accounting principles in realistic scenarios, encouraging critical thinking, collaboration, and strategic decision-making.

MonsoonSIM, in particular, supports experiential learning by enabling students to analyze business processes, financial performance, budgeting, and decision-making across functional areas. Its features—such as real-time feedback, data analytics, scalability, and cost efficiency—make it a valuable tool for accounting and business education. Figure 1 presents the interface of the learning system.

Figure 1. Interface of learning systems.

Gamified accounting education positively influences students' conceptual understanding, analytical abilities, motivation, and perceived learning outcomes. Gamified environments have been associated with improved academic achievement, retention, and mastery of complex accounting concepts by fostering collaborative, social, and constructivist learning experiences. When effectively designed, gamification and simulation-based approaches can serve as powerful pedagogical tools to enhance both engagement and learning efficiency in accounting education.

2. Literature Review

Contemporary accounting education faces increasing pressure to adopt innovative pedagogical approaches that enhance student engagement while also improving learning outcomes. Traditional lecture-based instruction has been widely criticized for its limited capacity to promote active learning, particularly in complex and practice-oriented subjects such as accounting. In response, scholars have increasingly examined

the role of gamification and vocational education as alternative instructional strategies capable of addressing these challenges.

Gamification and vocational programmes are grounded in complementary educational theories. Gamification is commonly linked to Self-Determination Theory (SDT) and Experiential Learning Theory, which emphasize intrinsic motivation, autonomy, feedback, and learning through experience. Vocational education, by contrast, is rooted in Human Capital Theory and Self-Concept Theory, focusing on skill acquisition, practical competence, and career-oriented learning outcomes. Together, these approaches provide a robust framework for examining student engagement and academic performance in accounting education.

2.1. Gamification and Student Engagement

Gamification involves the integration of game design elements—such as points, levels, challenges, simulations, and immediate feedback—into educational contexts to promote learner interaction and motivation. Prior research consistently demonstrates that gamification enhances student engagement by fostering curiosity, enjoyment, and sustained attention (Xi & Hamari, 2020; Rivera & Garden, 2021). In accounting education, gamified tools such as simulations, quizzes, and business games allow students to actively apply accounting concepts rather than passively receive information. Empirical studies indicate that gamification significantly improves behavioral, emotional, and cognitive engagement among students (Creel et al., 2021). By creating immersive and interactive learning environments, gamification encourages participation, collaboration, and problem-solving, which are essential for understanding abstract accounting principles (Khaleel et al., 2020). These findings suggest that gamification plays a critical role in increasing students' engagement levels in accounting classrooms.

H1: Gamification has a positive impact on student engagement.

2.2. Gamification and Academic Performance

The relationship between gamification and academic performance has produced mixed findings in the literature. While gamification is effective in enhancing motivation and engagement, its direct influence on academic performance is less consistent. Gamification primarily affects perceived learning rather than objective performance indicators (Jaramillo-Mediavilla et al., 2024). From an experiential learning perspective, gamification supports knowledge construction through practice and feedback. However, the translation of engagement into measurable academic performance may depend on factors such as instructional design, assessment alignment, and duration of exposure. In accounting education, where procedural accuracy and conceptual rigor are critical, gamification alone may not be sufficient to produce immediate performance gains without structured reinforcement (Zeng et al., 2024). Despite these mixed results, the potential of gamification to positively influence academic outcomes warrants empirical examination, particularly within accounting education contexts where evidence remains limited.

H2: Gamification has a positive impact on academic performance.

2.3. Vocational Programmes and Student Engagement

Vocational programmes in accounting emphasize applied learning, industry relevance, and skill development aligned with professional standards. Such programmes are designed to equip students with practical competencies through structured training and real-world exposure (Niittylahti et al., 2019). While vocational education has been shown to enhance employability and job readiness, its effect on student engagement is less extensively examined (Yates et al., 2020). Studies grounded in self-concept theory suggest that vocational education can enhance students' academic self-efficacy and task relevance, which may indirectly influence engagement (Choy & Yeung, 2022). However, vocational programmes often prioritize technical proficiency and assessment-driven outcomes over interactive or motivational learning designs. As a result, engagement levels in vocational settings may be moderate compared to gamified learning environments (Niittylahti et al.,

2023). Nevertheless, the structured and practice-oriented nature of vocational programmes suggests a positive relationship with student engagement, particularly for learners who value career-oriented education.

H3: Vocational programmes in accounting have a positive impact on student engagement.

2.4. Vocational Programmes and Academic Performance

Vocational education is strongly associated with improved academic performance due to its emphasis on hands-on training, competency-based assessment, and alignment with industry requirements (Lovat & Darmawan, 2019). Accounting vocational curricula are often guided by professional standards established by organizations such as the American Accounting Association (AAA) and the International Federation of Accountants (IFAC), ensuring relevance and rigor. Empirical evidence consistently demonstrates that vocational programmes enhance students' technical knowledge, procedural accuracy, and examination performance (Dubeau et al., 2017). By engaging students in applied tasks and real-world problem-solving, vocational education facilitates deeper learning and knowledge retention, leading to superior academic outcomes. Accordingly, vocational programmes are expected to have a strong positive effect on academic performance in accounting education.

H4: Vocational programmes in accounting have a positive impact on academic performance.

Although prior studies have examined gamification and vocational education independently, limited research has directly compared their effects on student engagement and academic performance within accounting education using structural equation modeling. Moreover, the mechanisms through which engagement translates into academic outcomes remain underexplored. This study addresses these gaps by empirically testing a comprehensive model that simultaneously evaluates the effects of gamification and vocational programmes on engagement and academic performance, thereby contributing to the pedagogical and accounting education literature. Figure 2 presents research model.

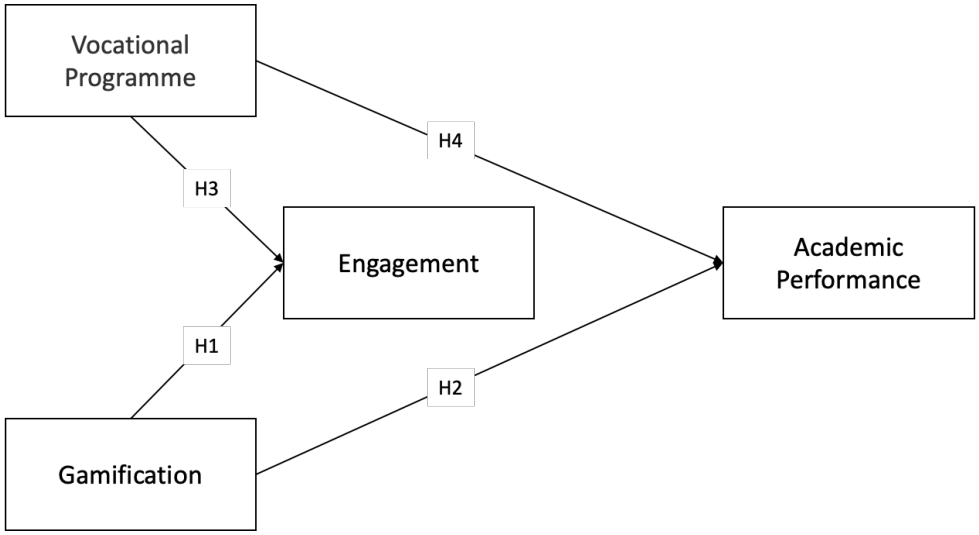

Figure 1. Research model.

3. Methodology

A quantitative research design was adopted to examine the relationships among gamification, vocational programmes, student engagement, and academic performance in accounting education. The study relied on primary data collected through a structured questionnaire administered to undergraduate and postgraduate students enrolled in finance and accounting-related programmes. The focus was on students pursuing traditional accounting degrees as well as Bachelor and Master of Vocational programmes in accounting, in line with the objective of comparing gamified and vocational pedagogical approaches within the accounting domain.

A total of 400 questionnaires were distributed using a random sampling technique across higher education institutions in India. Of these, 254 completed and usable responses were received, yielding a response rate of 63.5 percent. Data collection was carried out between December 2024 and March 2025. All items in the questionnaire were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Structural Equation Modeling (SEM) was employed as the primary quantitative technique to test the proposed hypotheses and examine the relationships among latent constructs. SEM is a multivariate analytical approach that enables the simultaneous assessment of multiple relationships between observed and unobserved variables and is widely used for theory testing and model validation. Given the exploratory nature of the study and its emphasis on prediction, the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach was adopted. PLS-SEM is particularly suitable for complex models and does not require strict assumptions of data normality. The data analysis was conducted using SmartPLS version 4.0. All measurement items used in the study were adapted from previously validated scales reported in the literature to ensure content validity and reliability. Minor modifications were made to align the items with the accounting education context. Academic performance was measured using three items capturing problem-solving ability, self-improvement, and scoring outcomes in accounting subjects (Ciuchita et al., 2023; De Oliveira Durso et al., 2020; Jamaluddin et al., 2017). Student engagement was assessed through items reflecting interaction with classmates, self-confidence, conceptual understanding, and development of practical skills (James et al., 2025; Xi & Hamari, 2020; Khaldi et al., 2023; Alsawaier, 2018). Vocational programmes were measured using items related to alignment with gamified learning methods, enhancement of real-life knowledge and job-oriented skills, and the concept of earning while learning (Choy & Yeung, 2022; Örencik et al., 2023). Gamification was assessed using four items capturing additional reading habits, ease of learning difficult topics, enjoyment of the learning process, and information exchange among peers (Alsawaier, 2018; Ariff et al., 2022; Saleem et al., 2022; Koivisto & Hamari, 2019). Participation in the study was voluntary, and respondents were informed of the academic purpose of the research. Anonymity and confidentiality were assured, and all data were used exclusively for research purposes.

4. Results

Table 1 summarizes the demographic profile of the 254 participants in the study. The gender distribution is nearly balanced, with females slightly outnumbering males (50.8% vs. 49.2%), indicating an equitable representation of both genders. Regarding age, the majority of participants were in the 21–25 years group (59.1%), while 40.9% were aged 26–30 years. This shows that the sample mainly consisted of young adults, which is typical for student populations or early-career professionals. In terms of educational level, most participants were undergraduates (66.9%), with postgraduates comprising 33.1% of the sample. This suggests that the study primarily reflects the perspectives of undergraduate students while still including a substantial proportion of postgraduate participants.

Table 1. Participant profile (n=254).

Variable	Category	Frequency	Percentage (%)
Gender	Male	120	49.2
	Female	134	50.8
Age Group (Years)	21–25	156	59.1
	26–30	98	40.9
Level of Study	Undergraduate	172	66.9
	Postgraduate	82	33.1

Table 2 presents the results of the construct reliability and convergent validity assessment for the study variables, including gamification, engagement, academic performance, and vocational programme. The reliability of the constructs was evaluated using Dijkstra–Henseler's rho (ρA), Jöreskog's rho (ρc), and Cronbach's alpha (α). All constructs exhibit values exceeding the recommended threshold of 0.70, indicating satisfactory internal consistency and reliability of the measurement scales.

Convergent validity was assessed using the Average Variance Extracted (AVE). The AVE values for all constructs are above the minimum acceptable level of 0.50, confirming that each construct explains more than

half of the variance of its associated indicators. Engagement and academic performance demonstrate particularly strong convergent validity, with AVE values of 0.5783 and 0.6172, respectively, suggesting robust measurement quality. Table 3 presents the assessment of discriminant validity among the study constructs using the Fornell–Larcker criterion. Discriminant validity is established when the square root of the Average Variance Extracted (AVE) of each construct is greater than its correlations with other constructs.

Table 2. Construct validity and reliability.

Construct	Dijkstra-Henseler's rho (ρA)	Jöreskog's rho (ρc)	Cronbach's alpha (α)	Average Variance Extracted
Gamification	0.8113	0.8042	0.8039	0.5086
Engagement	0.8735	0.8726	0.873	0.5783
Academic Performance	0.8681	0.8654	0.8653	0.6172
Vocational Programme	0.8085	0.8077	0.8071	0.5836

Table 3. Discriminant validity.

Construct	Gamification	Engagement	Academic Performance	Vocational Programme
Gamification	0.887			
Engagement	0.612	0.725		
Academic Performance	0.579	0.701	0.798	
Vocational Programme	0.495	0.528	0.610	0.912

Table 4 presents the structural model results, including path coefficients, t-values, p-values, and hypothesis testing outcomes. The analysis evaluates the direct effects of gamification and vocational programmes on student engagement and academic performance. The results indicate that gamification has a strong and significant positive effect on engagement ($\beta = 0.683$, $t = 5.762$, $p < 0.001$), supporting H1. However, the effect of gamification on academic performance is not significant ($\beta = 0.017$, $t = 0.130$, $p = 0.448$), leading to the rejection of H2. This suggests that while gamification effectively engages students, it does not directly translate into improved academic outcomes in accounting courses. Vocational programmes demonstrate a significant positive effect on both engagement ($\beta = 0.264$, $t = 2.201$, $p = 0.014$) and academic performance ($\beta = 0.903$, $t = 7.277$, $p < 0.001$), supporting H3 and H4, respectively. These findings indicate that vocational training enhances both student involvement and learning outcomes, with a particularly strong impact on academic performance.

Table 4. Path coefficients.

Paths	Beta	t-values	p-values	Result
Gamification -> Engagement	0.683	5.7618	0.0000	H1 accepted
Gamification -> Academic Performance	0.017	0.1300	0.4483	H2 rejected
Vocational Programme -> Engagement	0.264	2.2008	0.0140	H3 accepted
Vocational Programme -> Academic Performance	0.903	7.2769	0.0000	H4 accepted

The coefficient of determination (R^2) values for the study constructs are presented in Figure 3 to indicate the explanatory power of the structural model. As shown, engagement has an R^2 value of 0.821, suggesting that 82.1% of the variance in student engagement is explained by gamification and vocational programmes. Similarly, academic performance has an R^2 value of 0.840, indicating that 84.0% of the variance in academic performance is accounted for by the predictors included in the model.

Table 6 presents the model fit indices for the proposed structural model. The fit of the model was evaluated using the Standardized Root Mean Square Residual (SRMR), d_ULS, and d_G metrics, which assess the discrepancy between the observed and predicted covariance matrices in PLS-SEM. The SRMR values for both the saturated model (0.0383) and the estimated model (0.0384) are well below the recommended threshold of 0.08, indicating a good fit between the model and the data. Similarly, the d_ULS and d_G values for the saturated (0.1996 and 0.1401, respectively) and estimated models (0.2006 and 0.1403, respectively) are within acceptable limits, further confirming that the structural model adequately reproduces the observed relationships.

Table 6. Model fit.

	Saturated model	Estimated model
SRMR	0.0383	0.0384
d_ULS	0.1996	0.2006
d_G	0.1401	0.1403

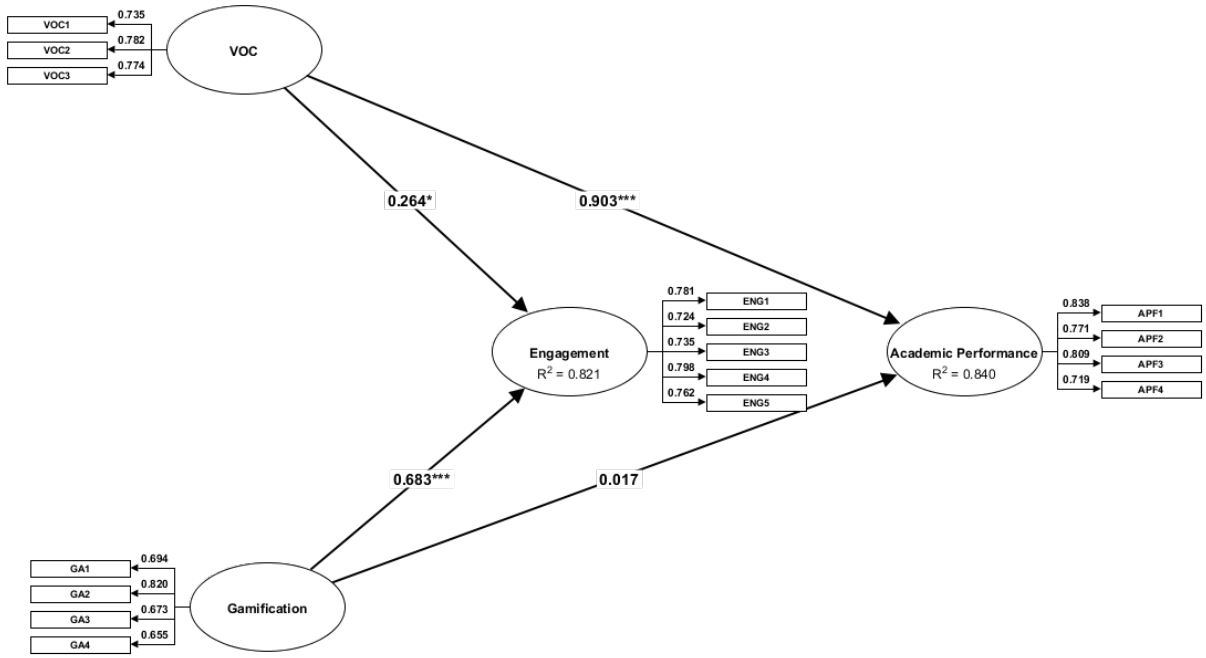

Figure 3. Structural model.

5. Discussion

The findings of this study provide important insights into the role of gamification and vocational programmes in accounting education. The results indicate that gamification has a strong positive effect on student engagement but does not directly enhance academic performance. This aligns with prior research suggesting that gamification effectively fosters motivation, interaction, and attention, yet may not automatically translate into improved learning outcomes if the gamified elements are not tightly integrated with core academic objectives (Jamaluddin et al., 2017; Xi & Hamari, 2020). Gamified tools such as simulations, quizzes, and interactive challenges provide an enjoyable learning environment, enhance participation, and encourage collaborative problem-solving, all of which are critical for engagement. However, the lack of a significant direct effect on academic performance suggests that students may focus more on the game mechanics than on deep learning of accounting concepts, emphasizing the importance of careful instructional design.

In contrast, vocational programmes exhibited significant positive effects on both engagement and academic performance, with a particularly strong influence on performance outcomes. This finding supports the notion that vocational education, which emphasizes practical skills, real-world applications, and industry-aligned training, effectively enhances students' knowledge retention and competence (Choy & Yeung, 2022; Foerster et al., 2016). Vocational programmes provide structured, practice-oriented learning experiences, which enable students to directly apply accounting principles in realistic scenarios, thereby improving performance. However, compared to gamification, vocational programmes are relatively less engaging in terms of interactivity and playful learning elements, which may explain their comparatively lower effect on engagement.

Taken together, these findings highlight the complementary roles of gamification and vocational education in accounting pedagogy. Gamification is particularly effective in stimulating motivation and engagement, making learning enjoyable and interactive, while vocational programmes ensure mastery of practical skills and enhance measurable academic outcomes. Educators and curriculum designers can leverage both

approaches to balance engagement and learning effectiveness, especially in complex subjects like accounting that require both conceptual understanding and applied competence.

The study also contributes to theory by providing empirical evidence that engagement acts as a critical mediator between pedagogical strategies and learning outcomes, underscoring the importance of student-centered approaches in higher education. The results emphasize that technological and gamified interventions must be aligned with learning objectives to translate engagement into tangible academic performance gains.
These findings have several theoretical implications. First, they support Self-Determination Theory (SDT) and Experiential Learning Theory, showing that engagement is driven by intrinsic motivation and active participation, whereas performance depends on applied learning opportunities. Second, the study highlights that engagement alone does not guarantee academic success, suggesting that pedagogical strategies need to address both motivational and performance-oriented dimensions. Finally, the results contribute to the literature by empirically demonstrating the complementary roles of gamification and vocational education, extending prior studies that examined these approaches in isolation.

From a practical perspective, the findings suggest that educators should adopt blended pedagogical strategies that integrate gamified elements with vocationally oriented activities. Gamification can be employed to increase motivation, collaboration, and participation, while vocational programmes provide hands-on, skill-based experiences that directly enhance academic achievement. Curriculum designers can leverage this dual approach to improve both engagement and learning outcomes, particularly in complex subjects such as accounting. Moreover, institutions may consider investing in technological infrastructure, faculty training, and curriculum redesign to facilitate effective integration of gamification and vocational learning.

Finally, the study emphasizes pedagogical implications for higher education in the digital age. Educators should ensure that gamified activities are purposefully aligned with learning objectives to avoid superficial engagement. Vocational content should incorporate elements of interactivity and gamified feedback to maintain student interest while reinforcing applied learning. By strategically combining motivational and skill-based interventions, accounting education can be made more engaging, effective, and aligned with real-world professional demands.

The study also identifies avenues for future research. Longitudinal studies could explore how sustained engagement through gamification affects academic performance over time. Comparative studies across disciplines, cultures, or educational levels could further validate the generalizability of these findings. Additionally, research can investigate hybrid models that seamlessly integrate gamification with vocational learning to optimize both engagement and performance.

6. Conclusion

This study demonstrates that integrating gamification and vocational programmes in accounting education offers distinct but complementary benefits. Gamification significantly increases student engagement by introducing interactive, competitive, and rewarding learning experiences, which enhance participation, motivation, and collaborative skills. However, its impact on academic performance is limited when gamified activities are not explicitly aligned with learning objectives. Conversely, vocational programmes strongly improve academic outcomes by providing practical, skill-based learning aligned with real-world accounting applications, although they are less engaging than gamified interventions. The practical implications are clear: educators should design blended pedagogical strategies that combine the motivational power of gamification with the practical rigor of vocational programmes. Such an approach can foster higher engagement, deeper conceptual understanding, and improved performance while preparing students for the demands of professional accounting roles. Policymakers and curriculum developers should consider investing in both technological infrastructure and experiential learning programmes to maximize learning effectiveness. Limitations of this study include its focus on accounting students in India and short-term assessment of learning outcomes. Future research could explore long-term effects, apply the model in other disciplines, examine cross-cultural differences, and investigate the mediating role of engagement in more detail.

Additionally, future studies could explore hybrid approaches that better integrate gamified elements with vocational content to optimize both engagement and academic performance.

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