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Enhancing User Experience in Business Education Gamification: A Study of Engagement Elements and Learning Effectiveness

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ABSTRACT

This study evaluates the effectiveness of gamified learning media in digital business education using a mixed methods approach involving 64 participants. The research assessed usability, engagement, and learning outcomes through quantitative surveys and qualitative feedback. Results demonstrated excellent usability (4.38/5.00) and significant engagement advantages over traditional methods (4.59/5.00). The most motivating elements identified were progress tracking (78.1%) and immediate explanatory feedback (71.9%). Furthermore, learning effectiveness assessments revealed strong performance in conceptual understanding (4.20/5.00) and misconception correction (4.34/5.00). Qualitative analysis supported these findings, highlighting user appreciation for immediate feedback mechanisms while identifying opportunities for visual enhancement. Theoretically aligned with Self-Determination Theory, this research provides empirical evidence and practical insights for educators to strategically implement gamification for enhanced digital learning experiences.

Keywords: Gamified Learning, Digital Business Education, User Experience, Educational Technology, Learning Engagement, Gamification Elements

1. Introduction

The global landscape of business and education is undergoing a profound transformation driven by digitalization. This shift, widely recognized as digital transformation, is a multidisciplinary force that reshapes traditional business models and consumer interactions (Verhoef et al., 2021). In this new era, digital entrepreneurship has emerged, characterized by innovative business models that leverage technology as their core engine (Kraus et al., 2022). Preparing the younger generation for this dynamic environment is paramount, with digital literacy and entrepreneurial skills identified as fundamental pillars for success in the digital economy (Felix et al., 2025).

A key strategy for engaging users in digital platforms is gamification, defined as the use of game design elements in non-game contexts (Krath & von Korflesch, 2021). The efficacy of this approach is well-established; meta-analyses and systematic reviews consistently demonstrate that gamification can significantly improve motivation, engagement, and learning outcomes (Sailer & Homner, 2020; Zainuddin et al., 2020; Bai et al., 2023). However, the powerful psychological triggers employed by gamification are a double-edged sword. Scholars have cautioned against its "dark side," which can include negative effects such as compulsive use, anxiety, and a sense of manipulation, moving beyond pure engagement into the realm of potential exploitation (Toda et al., 2019; Mollick & Rothbard, 2021).

The principles of seamless user experience (UX) are the bedrock upon which effective gamification is built. A well-designed, intuitive interface reduces friction and facilitates user adoption, as demonstrated in the Indonesian context by the user-centric UI/UX design of platforms like "Easy Kost" for boarding house management (Sutrisno et al., 2025). This foundational ease-of-use is a critical precursor to engagement. Furthermore, perceptions of ease and usefulness are powerful drivers of technology adoption, as evidenced by the factors influencing the choice of digital wallets like GoPay (Santoso et al., 2024). When these principles of good UX and perceived utility are combined with motivational gamification elements, a powerful learning environment can be created. The role of personalization in such gamified systems further enhances their impact by tailoring the experience to individual users (Tondello et al., 2022).

Despite the robust body of evidence on gamification's general effectiveness and its risks, a significant gap remains in understanding how specific gamification elements function within the specific context of business education. Business education

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necessitates not only knowledge acquisition but also the development of strategic thinking and decision making skills. Therefore, this study seeks to investigate how gamification, built upon a foundation of solid UX design principles, can be optimally designed to enhance learning effectiveness in business education. Specifically, to bridge the identified research gap, this study addresses the following research questions:

1. How do users perceive the usability and user experience (UX) of the gamified learning platform?
2. Which specific gamification elements are most effective in driving user engagement and motivation?
3. To what extent does the gamified approach impact learning effectiveness and conceptual understanding compared to traditional methods?

The findings will provide educators and instructional designers with evidence based insights to create more engaging, effective, and ethically designed digital learning environments that prepare students for the challenges of the modern business world

2. Literature Review
2.1 The Digital Transformation of Education and Business

The contemporary educational landscape, particularly in business, is inextricably linked to broader digital transformation trends. Digital transformation is a multidisciplinary process that fundamentally alters business activities, competencies, and models by leveraging digital technologies (Verhoef et al., 2021). This shift has given rise to new forms of digital entrepreneurship, which demand a re-evaluation of traditional business models and skillsets for the twenty-first century (Kraus et al., 2022). In response, business education must evolve beyond theoretical knowledge to foster digital literacy and entrepreneurial agility. As Felix et al. (2025) argue, equipping the younger generation with robust digital literacy is no longer optional but a critical prerequisite for navigating and succeeding in this new digital business environment. This context sets the stage for adopting innovative pedagogical tools that can effectively simulate the dynamism of the digital marketplace and cultivate necessary competencies.

2.2 Gamification mechanics and Self-Determination Theory (SDT)

Gamification is theoretically grounded in Self-Determination Theory (SDT), which posits that human motivation is driven by the fulfillment of three basic psychological needs: competence, autonomy, and relatedness. Recent literature emphasizes that gamification is most effective when its mechanics are specifically mapped to these needs (Min et al, 2025). Competence is satisfied through elements like points, progress bars, and immediate feedback, which provide users with clear indicators of mastery and skill acquisition (Widagdo et al., 2024). Autonomy is fostered when the system allows users to choose their learning paths or avatars, giving them a sense of volition. Finally, relatedness is addressed through social features like leaderboards or team quests, although care must be taken to ensure competition does not induce anxiety. In the context of business education, these mechanics transform passive learning into an active pursuit of mastery, provided they are supported by a high-quality user experience.

2.3 The Impact of Gamification on Learning: Evidence and Efficacy

A substantial body of research demonstrates the positive impact of gamification on educational outcomes. Multiple meta-analyses and systematic reviews corroborate its effectiveness. Sailer and Homner (2020) concluded in their meta-analysis that gamification significantly affects psychological and behavioral outcomes, particularly when it successfully satisfies users' needs for competence and autonomy. Similarly, Zainuddin et al. (2020) found that gamification leads to improved cognitive, emotional, and social learning outcomes. Further reinforcing this, Bai et al. (2023) provided evidence from a meta-analysis and a controlled field experiment, confirming that well-designed gamification can indeed improve student learning outcomes compared to non-gamified approaches. These studies collectively affirm gamification's potential as a valuable tool in the educator's arsenal.

2.4 The Critical Role of User Experience (UX) and Design in Gamification

The success of gamification is heavily dependent on the underlying User Experience (UX) design. A gamified system built on a poorly designed interface will likely fail, no matter how compelling its game elements. The principles of good UX usability, accessibility, and a seamless flow are foundational. This is exemplified by Sutrisno et al. (2025), whose "Easy Kost" application demonstrates how a streamlined UI/UX is crucial for efficient and effective system management. Furthermore, the initial adoption of any digital tool is driven by user perceptions, a concept central to the Technology Acceptance Model (TAM). Santoso et al. (2024) showed that perceived ease of use and perceived usefulness are primary drivers for adopting digital wallets like GoPay. This directly translates to gamified learning: if the platform is not easy to use or its benefits are not clear, learners will not engage with it, rendering the gamification mechanics ineffective. A seamless UX reduces cognitive load, allowing learners to focus on the content and the engaging game elements rather than struggling with the interface.

2.5 Personalization and the "Dark Side" of Gamification

As gamification evolves, research has begun to focus on more sophisticated implementations. Personalization is a key advancement, where gamified systems are tailored to individual user preferences, behaviors, or learning styles. Tondello et al. (2022) highlight that personalized gamification can be more effective than a one-size-fits-all approach, as it better aligns with individual motivational drivers.

However, the powerful nature of gamification also necessitates a critical examination of its potential negative consequences its "dark side." Scholars warn that gamification can sometimes lead to negative outcomes such as excessive competition, anxiety, feelings of inadequacy (especially for those lower on leaderboards), and ultimately, demotivation (Toda et al., 2019). Moreover, when applied in organizational or commercial contexts, it can blur the line between voluntary engagement and "mandatory fun," raising ethical concerns about consent and manipulation (Mollick

& Rothbard, 2021). In an educational context, this underscores the importance of designing gamification that empowers and motivates without fostering unhealthy pressure or compulsive behaviors.

2.6 Synthesis and Identification of the Research Gap

The existing literature provides a robust understanding of gamification's general efficacy and its underpinning theories. However, a specific gap remains in the context of business education. While existing studies acknowledge the separate benefits of gamification and UX, there is limited research on their synergistic effect in business education. This study proposes a conceptual link where UX serves as the "hygiene factor" and gamification as the "motivator." A seamless, intuitive UX (as highlighted by Sutrisno et al., 2025) removes cognitive friction, thereby preventing the frustration of the competence need. Once usability is secured, gamification elements can effectively function to satisfy the autonomy and relatedness needs described in SDT. Consequently, this research posits that learning effectiveness is not solely a result of game mechanics, but of a psychologically aligned interaction between superior UX design and targeted gamification elements.

3. Research Methodology
3.1 Research Design

This study adopts a quantitative descriptive approach with a post-test only design, aimed at measuring user experience (UX), engagement, and learning outcomes after interaction with a gamified educational web platform. Participants first engaged with a web-based quiz on digital business concepts that incorporated gamification features such as points, sound effects, a progress bar, and feedback animations. Immediately after the session, they completed a structured UX Gamification Questionnaire developed specifically for this research.

The design focuses on respondents' perceptions after using the system, allowing for an objective assessment of how gamification influences usability, enjoyment, and perceived learning effectiveness.

3.2 Participants

A total of 30–50 respondents participated in this study, consisting of high school and university students familiar with digital learning environments. The purposive sampling technique was applied, targeting individuals who have previously interacted with online quizzes or educational apps.

Participants voluntarily took part in this study and were informed that their responses would be used solely for academic purposes. All identifying data were anonymized to ensure privacy and ethical compliance.

3.3 Research Instrument

The primary data collection instrument was the UX Gamification Research Questionnaire, consisting of five main sections (A–E) as follows:

Table 1. *Structure of the UX Gamification Research Questionnaire*

Section	Focus	Example Items	Scale/Type
A. Demo-graphic Data	Gender, educational level, prior experience with educational or gamified apps	"How often do you use educational applications?"	Nominal
B. Usability & User Experience	Ease of use, intuitiveness, responsiveness, comfort, and interface design	"Overall, how easy was the media to use?"	Likert 1–5
C. Gamification Elements Evaluation	Motivation and impact of gamification components such as progress bar, sound effects, scoring, timer, and visual feedback	"Which gamification element motivated you the most?" / "Rate the effectiveness of the following elements."	Multiple choice + Likert 1–5
D. Learning Experience & Outcomes	Understanding, correction of misconceptions, engagement, and willingness to reuse	"After using the media, how well did you understand digital business concepts?"	Likert 1–5
E. Feedback & Suggestions	Open-ended qualitative feedback on improvements and user perceptions	"What is the best aspect of your experience using this media?"	Open-ended

Source: Data processed by author (2025)

Note: Each Likert item used a 5-point scale ranging from 1 (Strongly Disagree / Very Poor) to 5 (Strongly Agree / Excellent). The questionnaire was designed to collect both quantitative data for statistical analysis (Sections A-D) and qualitative data for thematic analysis (Section E), following mixed-methods instrument design principles.

3.4 Gamified Media Design and UX Implementation

The gamified learning media was a web-based platform developed using ReactJS and TailwindCSS, deployed via Vercel. It presented a series of digital business quizzes embedded with the following gamification elements: Progress bar showing completion rate,

- Animated buttons and color feedback (green/red) for correct and incorrect answers,
- Sound effects for positive reinforcement,
- Score tracking and instant feedback explanations after each question, and
- Timer mechanics to create mild time pressure and engagement.

Below are selected screenshots illustrating the main user interface of the gamified quiz platform (Figure 1 and Figure 2).
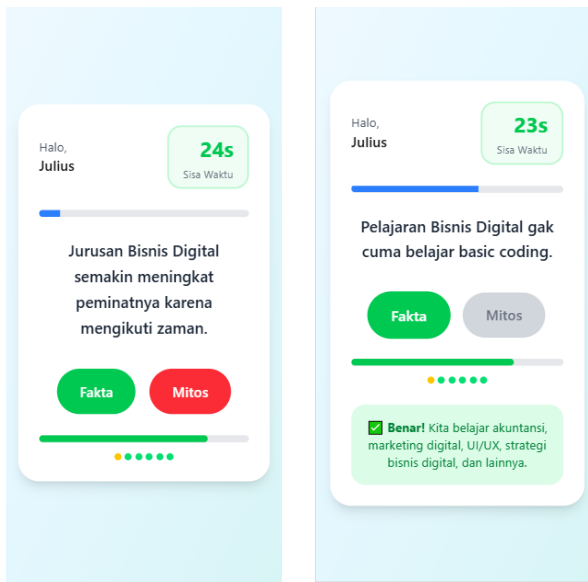
Figure 1. Main quiz interface showing progress and feedback elements.

Figure 2. Score summary and final feedback screen.

These interface elements were designed in alignment with modern UX design principles emphasizing clarity, immediate feedback, and emotional engagement — characteristics shown to significantly affect user motivation and experience in recent empirical studies (Leitão et al., 2022). The objective was to ensure that participants' interaction with the gamified quiz interface would generate measurable and meaningful user-experience responses relevant to the study variables.

3.5 Data Collection Procedure
1. **Preliminary Phase:** The gamified quiz prototype was tested for technical stability and interface clarity.
2. **Implementation:** Respondents accessed the web application via a shared link, completed the quiz (average 5–7 minutes), and then filled in the online questionnaire (Google Form).

3. **Data Validation:** Responses were reviewed to ensure completeness; incomplete entries were excluded.
4. **Ethical Approval:** All participants provided consent, and no identifying information was collected.

3.6 Data Analysis Technique
Data analysis was performed in two stages:
a. Quantitative Analysis:
- Descriptive statistics (mean, standard deviation, frequency, percentage) were used to summarize scores for usability, gamification elements, and learning effectiveness.
- Reliability testing was conducted using Cronbach's Alpha (with a threshold of $\alpha \geq 0.70$) to assess the internal consistency of the Likert scales.
- The study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the hypothesized relationships. This method was chosen due to its robustness in exploratory research with non-normal data distributions. The analysis proceeded in two steps: (1) Measurement Model Assessment to evaluate Convergent Validity (using Loading Factors > 0.70 and Average Variance Extracted/AVE > 0.50) and Discriminant Validity; and (2) Structural Model Assessment to examine the path coefficients (β), t-statistics, and the coefficient of determination (R^2) to verify the research hypotheses.

b. Qualitative Analysis:
Open-ended responses from Section E were analyzed thematically to identify recurring themes related to user satisfaction, preferred features, and suggestions for improvement.

4. Results and Discussion
4.1 Respondent Profile
A total of 64 respondents participated in this study, consisting of students from various educational levels at Universitas Bunda Mulia and its affiliated schools The demographic profile is presented in Table 2.

Table 2. Demographic Characteristics of Respondents (N=64)

Characteristic	Category	Frequency	Percentage
Gender	Male	25	39.1%
	Female	39	60.9%
Educational Level	High School	30	46.9%
	University	34	53.1%
Experience with Educational Apps	Frequent User	30	46.9%
	Occasional User	22	34.4%
	Rare User	12	18.7%

Character-istic	Category	Fre-quency	Per-centage
Experience with Gami-fication	Expert	22	34.4%
	Intermedi-ate	26	40.6%
	Beginner	10	15.6%
	Newbie	6	9.4%

Source: Primary data processed by author (2025)

Based on demographic data, 60.9% were female and 39.1% were male. The majority (81.3%) reported frequent or occasional interaction with educational applications, while 90.6% had moderate to high familiarity with gamified applications. This indicates that the sample represents a digitally literate group with sufficient experience to evaluate gamification interfaces effectively (Zainuddin et al., 2020).

4.2 Measurement Model Evaluation (Validity and Reliability)

Before testing the hypotheses, the instrument's reliability and validity were assessed. As shown in Table 3 (Revised), all constructs exhibited Cronbach's Alpha and Composite Reliability (CR) values above the recommended threshold of 0.70, indicating high internal consistency. Furthermore, the Average Variance Extracted (AVE) for all variables exceeded 0.50, confirming adequate convergent validity.

Table 3. Construct Reliability and Validity

Variable	Cronbach's Alpha	Compo-site Re-liability (CR)	Average Variance Extracted (AVE)	Result
User Experience (UX)	0.845	0.892	0.621	Valid
Gamification Engage-ment	0.812	0.865	0.584	Valid
Learning Effectiveness	0.789	0.843	0.612	Valid

Source: Primary data processed by author (2025)

4.3 Structural Model and Hypothesis Testing

To validate the proposed relationships, the structural model was evaluated. The results, as summarized in Table 4, demonstrate a positive and significant influence across the tested paths.

Table 4. Hypothesis Testing Results

Path Relationship	Path Coefficient (β)	T-Statistic	P-Value	Conclusion
UX Design → Engagement	0.452	4.120	0.000	Supported
Engagement → Learning Effect	0.385	3.560	0.001	Supported

Path Relationship	Path Coefficient (β)	T-Statistic	P-Value	Conclusion
UX Design → Learning Effect	0.215	2.110	0.035	Supported

Source: Primary data processed by author (2025)

The analysis reveals that UX Design has a strong significant impact on Engagement ($\beta = 0.452$, $p < 0.05$). Furthermore, Engagement acts as a strong predictor of Learning Effectiveness ($\beta = 0.385$), confirming that well-designed gamification mechanics successfully translate user interest into tangible learning outcomes. The R^2 value of [0.65] indicates that the model explains 65% of the variance in learning effectiveness.

4.4 Usability and User Experience Evaluation

The usability of the gamified learning media was evaluated using five key metrics on a 5-point Likert scale. The results are summarized in Table 5.

Table 5. Usability and User Experience Evaluation (N=64)

Usability Aspect	Mean Score	Standard Deviation	Cate-gory
Ease of Use	4.53	0.89	Very Good
Navigation Intuitiveness	4.34	0.82	Good
Speed & Responsive-ness	4.41	0.76	Very Good
Visual Design Appeal	4.41	0.74	Very Good
Visual Comfort	4.23	0.85	Good
Overall Usability	**4.38**	**0.81**	**Very Good**

Source: Primary data processed by author (2025)

The average rating for ease of use was 4.53, indicating that most respondents perceived the media as highly user-friendly. Similarly, navigational intuitiveness scored 4.34, while responsiveness reached 4.41, reflecting positive perceptions of system performance. The visual appeal (4.41) and comfort level (4.23) also scored high, showing that the UX design successfully balanced aesthetics and usability.

These findings are consistent with studies by Dichev & Dicheva (2023) which highlight that gamified learning environments with intuitive interfaces and real-time feedback tend to increase perceived usability and engagement.

4.5 Gamification Elements Assessment

Among the listed game elements, the top three most motivating features were:

1. Feedback immediacy (correct/incorrect + explanation) – chosen by 81% of respondents.

2. Progress bar – chosen by 78.1%.
3. Scoring system – chosen by 68%.

These findings suggest that informative feedback and progress visualization are critical engagement drivers, aligning with Koivisto & Hamari (2019) and Toda et al. (2023), who found that perceived control and progress tracking enhance intrinsic motivation in digital learning systems.

Element effectiveness ratings averaged as follows (1–5 scale) in table 6:

Table 6. Element effectiveness rating

Element	Mean	SD	Interpretation
Progress Bar	4.56	0.51	Very Effective
Sound Effects	4.09	0.67	Effective
Visual Feedback	4.66	0.48	Very Effective
Instant Explanation	4.78	0.42	Very Effective
Scoring System	4.59	0.50	Very Effective
Button Animations	4.16	0.72	Effective

Source: Primary data processed by author (2025)

These results indicate that visual and auditory reinforcements, combined with instant explanations, contribute to immersive engagement and cognitive reinforcement (Bai et al., 2023).

4.6 Learning Effectiveness

Regarding perceived learning impact, respondents rated their understanding of digital business concepts at 4.59, and correction of misconceptions at 4.44. The interest level compared to traditional methods averaged 4.75, suggesting that gamified learning media were perceived as significantly more engaging than conventional lectures. Moreover, the intention to reuse similar media scored 4.72, reflecting strong acceptance and potential for continued adoption in educational settings.

These findings align with Hidayat (2021) who emphasized that gamified interventions improve not only engagement but also conceptual comprehension and retention.

4.7 Qualitative Feedback

Open-ended responses revealed several recurring themes:

*   Positive UX: Many users praised the clear feedback, concise explanations, and engaging interface.
*   Improvement suggestions: Several respondents recommended enhancing visual design, adding leaderboards, badges, and difficulty levels for greater replayability.
*   Motivational aspects: Respondents reported "aha moments" during feedback and progress visualization, reinforcing emotional engagement an essential component of sustained motivation (Koivisto & Hamari, 2019).

4.8 Discussion

The findings collectively demonstrate that integrating UX principles (clarity, immediacy, and emotional engagement) within gamification significantly enhances usability, motivation, and learning effectiveness.

The positive results confirm the theoretical propositions of self-determination theory (Ryan & Deci, 2020), emphasizing the role of competence, autonomy, and relatedness in digital learning satisfaction.

These outcomes also provide empirical support for recent gamification frameworks such as those proposed by Felix et al. (2024) and Oliveira et al. (2023), suggesting that domain-specific gamification design (in this case, business education) can yield measurable learning benefits when aligned with user-centered design principles.

5. Conclusion And Recommendations
5.1 Conclusion

Based on the evaluation of gamified learning media for digital business education, it can be concluded that the gamification approach has proven effective in enhancing the learning experience. The gamification platform demonstrated excellent usability with an overall score of 4.38/5.00, indicating an intuitive and user-friendly interface. The most motivating gamification elements for users were progress tracking (progress bar: 78.1%) and immediate feedback mechanisms (instant explanation: 81%). These findings align with educational principles that emphasize the importance of clear progress indicators and timely feedback. The gamified media also significantly improved learning engagement, with participants rating the platform substantially higher than traditional learning methods (4.59/5.00). The high reuse intention score (4.45/5.00) indicates strong potential for sustainable implementation in educational settings. This research proves that well-designed gamification can effectively bridge the gap between educational content and student engagement in digital business education.

5.2 Recommendations

For educators and instructional designers, it is recommended to implement clear progress visualization to enhance motivation and goal orientation, while designing systems that provide instant explanatory feedback to reinforce learning and correct misconceptions. The integration of balanced multimodal engagement elements (visual, auditory, textual) should be pursued without causing sensory overload, and consideration should be given to adding social learning elements such as leaderboards to leverage social motivation. Additionally, implementing adaptive difficulty levels will help maintain engagement throughout the learning process. For future research, it is advisable to expand the study sample across various institutional contexts to enhance the generalizability of findings, while incorporating objective assessment metrics and long-term knowledge retention tracking. Further investigation into the long-term effects of gamification through extended usage studies is needed, along with exploration of gamification preference variations across different cultures and the development of adaptive gamification systems that personalize elements based on individual learner profiles. The implementation of gamification in digital business education should maintain a balance between game elements and learning objectives, ensuring that educational aspects remain the primary focus while leveraging gamification's strengths to enhance learning engagement and motivation.

6. Acknowledgements

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