Jurnal Kependidikan:
Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran
https://e-journal.undikma.ac.id/index.php/jurnalkependidikan/index

Vol. 10, No. 3 : September 2024
E-ISSN: 2442-7667
pp. 965-975
Email: jklppm@undikma.ac.id

Gamification in Enhancing Student Financial Knowledge, Engagement, and Enjoyment in Financial Education

Arief Yulianto[1*], Suwito Eko Pramono[2], Angga Pandu Wijaya[3], Nasrun[4]
[1*,2]Graduate School, [3]Faculty of Economics and Business,
Universitas Negeri Semarang, Indonesia.
[4]Faculty of Education, Universitas Negeri Medan, Indonesia.
*Corresponding Author. Email: ariefyulianto@mail.unnes.ac.id

Abstract: This study aims to examine the impact of gamification on financial knowledge through student enjoyment and student engagement. This study employed a quantitative approach and used a survey to examine the relationships between variables. The sampling technique used was purposive sampling, with 289 students who have previously received financial education at a public university participating as respondents. The research instrument utilized a questionnaire developed based on prior studies. The results were tested using Variational Bayesian Structural Equation Modeling (VB-SEM) to analyze the influence between variables. The findings showed that gamification had a positive impact on student enjoyment and student engagement. This study demonstrates that gamification does not directly influence students' financial knowledge. Student engagement fully mediated the effect of gamification on students' financial knowledge, whereas enjoyment does not affect students' financial knowledge. This study underscores the importance of fostering student engagement in gamification to enhance financial knowledge. The implications of this research include strengthening student engagement through various strategies, such as apperception, motivation, and interaction during the use of gamification in financial education.

Article History
Received: 14-06-2024
Revised: 20-07-2024
Accepted: 28-08-2024
Published: 18-09-2024

Key Words:
Gamification;
Financial Knowledge;
Student Engagement;
Student Enjoyment;
Financial Education.

How to Cite: Yulianto, A., Pramono, S., Wijaya, A., & Nasrun, N. (2024). Gamification in Enhancing Student Financial Knowledge, Engagement, and Enjoyment in Financial Education. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran, 10*(3), 965-975. doi:https://doi.org/10.33394/jk.v10i3.12653

https://doi.org/10.33394/jk.v10i3.12653

Introduction

Many people view finance education as overwhelming and complicated, particularly those who are just beginning to learn about personal money management. Applying game-like aspects to non-gaming contexts—known as gamification—has become a viable strategy to improve financial decision-making and financial education. (Hu & Shang, 2018; Zainuddin et al., 2020). Gamification in financial education is crucial because it transforms learning about finances into an engaging and interactive experience (Rodríguez et al., 2018). Incorporating aspects like game dynamics, prizes, and challenges increases learners' motivation to engage and retain the material. This method encourages users to practice practical financial abilities in a risk-free setting by making complicated financial topics more approachable and relatable. People get more knowledge and self-assurance in handling their money as a result, which enhances their financial literacy and decision-making.

Gamification has the potential to significantly increase learners' engagement and accessibility with financial ideas. Financial education may become more immersive and interactive by adding game-like elements like points, leaderboards, and narrative-driven challenges. This will ultimately enhance student motivation and engagement (DuBravac, 2012; Strmečki et al., 2015). It is especially crucial when it comes to financial education, as younger generations who have grown up in a digital, gaming-focused world may find it difficult to engage with traditional teaching approaches (Alsawaier, 2018). Additionally, gamification provides a safe and low-risk environment for students to investigate financial concepts and make choices, allowing them to learn from their mistakes without facing consequences in the real world (Hu & Shang, 2018). It can be especially valuable for individuals who may be hesitant to engage with financial topics due to a lack of confidence or previous negative experiences (Hanus & Cruz, 2015). Financial education can be improved to be more effective, enjoyable, and accessible to a wider range of learners by utilizing the possibilities of gamification. This, in turn, empowers people to make wiser and more responsible financial decisions throughout their lives (Zainuddin et al., 2020).

In the context of financial education, gamification can play a crucial role in enhancing student motivation and participation (Alsawaier, 2018). Many students find financial concepts and practices dull and disconnected from their daily lives, leading to a lack of interest and engagement (De Freitas et al., 2017). Gamification can help bridge this gap by making financial education more interactive, immersive, and relevant to students' interests and experiences. According to Lin (2022), gamification is a technique that uses elements like leaderboards, medals, and points to entice students and make studying more fun. In the context of financial education, where traditional teaching approaches frequently fall short of effectively engaging students, this approach is becoming more and more relevant. A study by García-López et al., (2023) found that gamification has the potential to substantially increase student enthusiasm and engagement, which will enhance the learning process. The efficiency of gamification in improving financial knowledge comes into doubt by the incorporation of gamification in financial education, though, because the connection between engagement, enjoyment, and information retention is still not well understood.

A flow state occurs when individuals are fully immersed in an activity, experiencing heightened focus and enjoyment (Prior et al., 2016). In educational settings, achieving this state can lead to deeper learning and better retention of information. For instance, research by Bai et al., (2020) demonstrated that students who experienced flow during gamified learning activities showed higher levels of engagement and better academic performance. However, while these platforms can boost participation, they may inadvertently lead to a focus on game mechanics rather than substantive learning (Buckley & Doyle, 2016). This highlights the need for careful design and implementation of gamified elements in finance education to avoid diluting the subject's complexity. Another critical aspect to consider is the potential for gamification to create a false sense of mastery. Oliveira et al., (2022) suggest that while gamified learning can enhance engagement, it may not necessarily correlate with improved knowledge retention or application. Students may perform well in quizzes or games but struggle to apply the concepts in real-world scenarios, such as investment analysis or financial forecasting. this disconnect underscores the importance of integrating gamification with traditional pedagogical methods that emphasize critical thinking and problem-solving skills. van der Heide & Želinský (2021) found that younger generations, particularly Millennials and Gen Z, are more receptive to gamified learning experiences. However, older students or professionals may prefer conventional learning methods that focus on in-depth analysis and theoretical understanding. This divergence necessitates a tailored approach to gamification in finance education, ensuring that diverse learning preferences are accommodated while still delivering rigorous content.

Previous studies have yielded mixed results regarding the effectiveness of gamification in enhancing financial knowledge, despite its potential benefits. Some researchers, such as Chen & Liang, (2022), believe that gamification can result in shallow

Jurnal Kependidikan:
Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran
https://e-journal.undikma.ac.id/index.php/jurnalkependidikan/index
Vol. 10, No. 3 : September 2024
E-ISSN: 2442-7667
pp. 965-975
Email: jklppm@undikma.ac.id

engagement, where students may find the exercises enjoyable but are unable to understand important financial ideas. This discrepancy emphasizes the necessity of more research, especially in the area of financial literacy, to determine how gamification affects student learning results. There is a clear research gap since the mechanisms by which gamification influences students' financial knowledge are not well understood, calling for a thorough investigation of this relationship. There are significant concerns regarding the use of gamification in promoting a deeper comprehension of financial topics given its effect on student engagement. To create a more engaging and dynamic learning environment, educational institutions have been incorporating gamified components into their curricula more and more in recent years. Playing interesting financial games may encourage students to take an active role in their education, improving their entire educational experience. According to Yau & Wong (2022), students who engaged in gamified financial simulations showed improved comprehension of financial concepts and increased engagement, indicating that these interactive tools can effectively close the knowledge gap between theory and practice. Finding a balance between participation and the seriousness necessary for successful financial education is still difficult, though. Gamification has the potential to draw in students, but it may also cause some of them to take these activities less seriously, which would diminish their instructional value. This tendency prompts worries about the possibility of shallow learning, in which pupils concentrate more on the game mechanics than on the fundamental financial ideas being taught. To ensure that the educational objectives are reached without sacrificing the integrity of the learning process, educators must carefully craft gamified experiences that both interest learners and emphasize the significance of the subject matter.

More research is necessary since the relationship between gamification and knowledge of finance is still complicated and inconsistent. Although the exact mechanisms by which gamification affects knowledge acquisition remain unclear, it has the potential to improve student engagement and the pleasure of financial education. With an emphasis on the functions that engagement and enjoyment play in the learning process, this study aims to investigate these mechanisms. By analyzing how these components interact, the research seeks to provide important insights into the impact of gamification on student enjoyment and student engagement, as well as its effects on student financial knowledge.

Research Method

This study employed a quantitative approach using the survey to analyze the influence of gamification on financial knowledge through student enjoyment and student engagement. Quantitative research is a systematic investigation that focuses on quantifying data and uncovering patterns through statistical analysis, to identify relationships and test hypotheses (Singer, 2019). This research was a form of causal research, which is a type of study focused on identifying cause-and-effect relationships between variables. It seeks to determine how changes in one variable directly influence changes in another.

The population of this study consisted of university students, specifically those enrolled in public universities who have already completed a financial course and have practiced gamification in learning financial education courses. The sample was obtained using non-probability sampling, specifically purposive sampling. Based on Oribhabor & Anyanwu, (2020), the population size is unknown, sampling is conducted using Cochran's formula, with a 95% confidence level, a 5% margin of error, and a population proportion of 25%, resulting in 289 respondents. Data were collected by distributing questionnaires to respondents, specifically students who have used games to learn financial education. The

Vol. 10, No. 3 : September 2024
E-ISSN: 2442-7667
pp. 965-975
Email: jklppm@undikma.ac.id

collected data were then analyzed using Variational Bayesian Structural Equation Modeling (VB SEM). This approach is utilized due to its adaptable and effective nature in estimating complex models, especially when working with extensive datasets or complex variable relationships. It integrates the benefits of structural equation modeling (SEM) with Bayesian inference (Feng et al., 2017).

Results and Discussion

The test results include both the outer model and inner model assessments. The outer model assessment, which includes validity and reliability tests, is presented in Table 1.

Table 1. Validity and Reliability Test Results

Variable	Indicator	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Gamification	GM1	0.938	0.969	0.976	0.89
	GM2	0.917			
	GM3	0.963			
	GM4	0.946			
	GM5	0.952			
Student Enjoyment	SE1	0.957	0.973	0.979	0.904
	SE2	0.947			
	SE3	0.949			
	SE4	0.955			
	SE5	0.947			
Student Financial Knowledge	SFK1	0.937	0.977	0.982	0.914
	SFK2	0.961			
	SFK3	0.963			
	SFK4	0.958			
	SFK5	0.962			
Student Engagement	SG1	0.956	0.967	0.976	0.91
	SG2	0.954			
	SG3	0.945			
	SG4	0.961			

Based on the test results in Table 1, all indicators are deemed valid as they have loading values greater than 0.7. Validity is further supported by the Average Variance Extracted (AVE) results from the Smart PLS analysis, which exceed 0.5, indicating good convergent validity for the constructs. The reliability test results also show that all variables are reliable, with Cronbach's Alpha and Composite Reliability values exceeding 0.7

Table 2. R-Squared Test Results

Variable	R Square	R Square Adjusted
Student Engagement	0.928	0.928
Student Enjoyment	0.898	0.898
Student Financial Knowledge	0.895	0.894

Jurnal Kependidikan:
Jurnal Hasil Penelitian dan Kajian Kepustakaan
di Bidang Pendidikan, Pengajaran dan Pembelajaran
https://e-journal.undikma.ac.id/index.php/jurnalkependidikan/index

Vol. 10, No. 3 : September 2024
E-ISSN: 2442-7667
pp. 965-975
Email: jklppm@undikma.ac.id

Table 2 shows that the R-squared value exceeds 0.8, indicating that the model has very high predictive power. This means that more than 80% of the variance in the dependent variable can be explained by the independent variables included in the model.

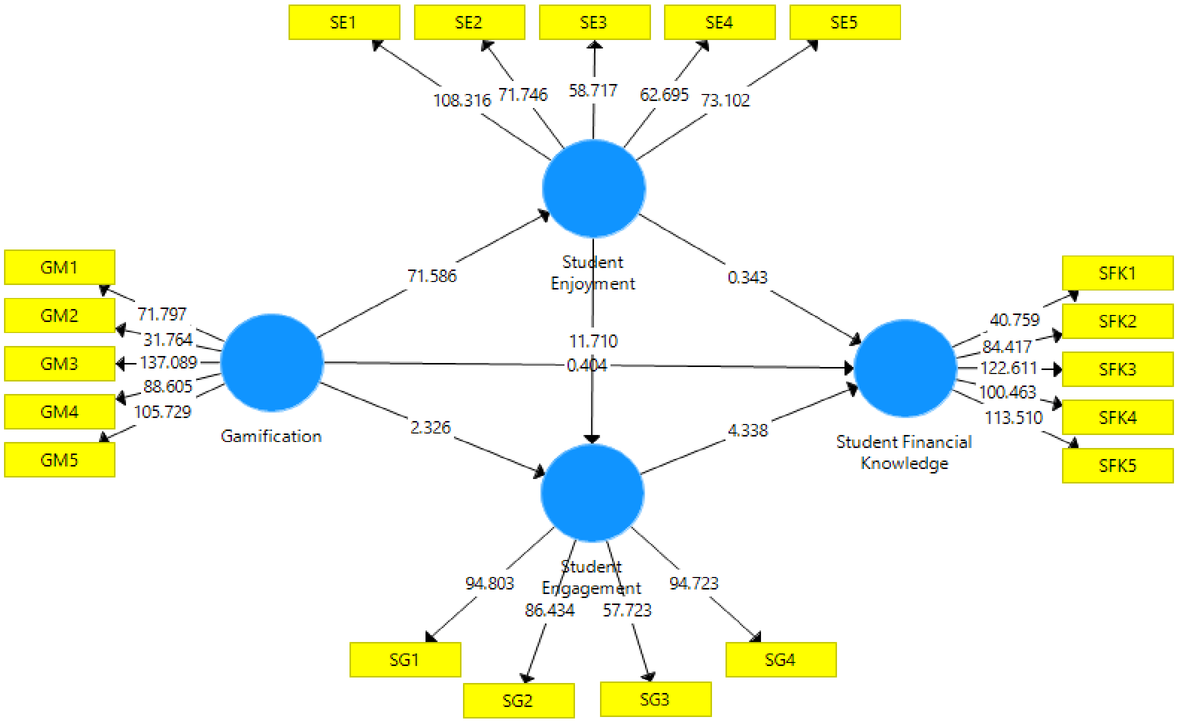

Figure 1. Research Framework

Table 3. Direct Effect Result

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Gamification → Student Engagement	0.166	0.16	0.071	2.326	0.020
Gamification → Student Enjoyment	0.948	0.946	0.013	71.586	0.000
Gamification → Student Financial Knowledge	0.034	0.036	0.084	0.404	0.686
Student Engagement → Student Financial Knowledge	0.856	0.814	0.197	4.338	0.000
Student Enjoyment → Student Engagement	0.805	0.81	0.069	11.71	0.000
Student Enjoyment → Student Financial Knowledge	0.061	0.099	0.177	0.343	0.732

Table 4. Indirect Effect Result

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Gamification → Student Engagement → Student Financial Knowledge	0.142	0.132	0.072	2.068	0.046
Gamification → Student Enjoyment → Student Financial Knowledge	0.057	0.094	0.167	0.343	0.732
Student Enjoyment → Student Engagement → Student Financial Knowledge	0.689	0.656	0.158	4.372	0.000

The results of the study, as depicted in Figure 1, and detailed in the direct effects shown in Table 3 and the indirect effects shown in Table 4, indicate that gamification has a direct impact on student engagement and student enjoyment, but it does not directly influence students' financial knowledge. The findings revealed a direct impact of student enjoyment on student engagement, suggesting that enjoyable gamification plays a role in enhancing students' enjoyment while learning financial education. The study also showed that student enjoyment did not directly affect students' financial knowledge. However, the results demonstrated a direct influence of student engagement on financial knowledge. Regarding indirect effects, the findings indicated that student enjoyment does not mediate the relationship between gamification and financial knowledge. In contrast, student engagement does mediate the impact of gamification on financial knowledge. Additionally, student enjoyment partially mediates the effect of gamification on student engagement.

The study found that gamification directly influenced both student engagement and student enjoyment. It aligns with existing literature that emphasizes the motivational power of gamified learning environments. The enjoyment derived from such experiences likely stems from the interactive and dynamic nature of games, which can make learning more appealing and less daunting (Prawiyogi et al., 2021). This enjoyment fosters greater engagement, as students are more inclined to participate actively in learning activities when they find them pleasurable. Recent studies suggest a direct effect between gamification and student engagement. Hartt et al. (2020) revealed that gamified learning experiences could increase student motivation and participation. This increase in engagement is often attributed to the interactive nature of gamified elements, which encourage students to immerse themselves in the learning process, thereby enhancing their overall educational experience. However, the findings also reveal that while student enjoyment positively impacts engagement, it does not directly enhance financial knowledge. It suggests that enjoyment alone, although a crucial component of student engagement, may not be sufficient to drive cognitive gains in complex domains like financial literacy.

The results indicate that while students may be motivated and actively participating due to the enjoyment factor, this does not necessarily lead to the deep, reflective thinking required for mastering financial concepts. Moreover, the study indicates that student enjoyment plays a crucial role in fostering engagement. When students enjoy the learning process, they are more likely to engage deeply with the material presented. For instance, a case study involving high school students participating in a gamified financial literacy program showed that those who found the activities enjoyable demonstrated higher levels of engagement and retention of financial concepts (Ariff et al., 2022). Student enjoyment is a critical factor influencing engagement and learning outcomes. Mosalanejad & Mansouri (2023) highlighted that students who experience enjoyment in learning activities are more likely to engage in self-directed learning and exhibit persistence in challenging tasks. Furthermore, Nguyen-Viet & Nguyen-Viet (2023) results indicate that student's willingness to participate in class activities was directly influenced by their positive learning experiences. This research emphasizes how important it is to include fun components in teaching methods, especially when it comes to areas like financial education that students could find difficult. A fun learning environment motivates teachers to raise student engagement and motivation, which eventually improves academic performance. The correlation between financial knowledge and engagement is particularly significant, especially in light of the favorable effects of gamification and student delight on engagement. Research has indicated a positive correlation between enhanced financial literacy results and increased student engagement levels. (Fortuna et al., 2023; Yulianto & Wijaya, 2022). Feroz et al., (2022) demonstrated that students who actively participated in financial education programs exhibited a significant increase in their financial knowledge.

The findings of the current study indicated that while student enjoyment did not directly influence financial knowledge, increased engagement did. It suggests that engagement acts as a mediating factor in the relationship between gamification and financial literacy. As students engage more deeply with gamified content, they are likely to acquire and retain financial knowledge more effectively (Linciano, 2021). This emphasizes how crucial it is to create educational interventions that purposefully increase engagement in addition to emphasizing enjoyment in order to improve learning results. The results of this study show that the relationship between gamification and financial knowledge is considerably mediated by student participation. This suggests that students' comprehension of financial topics significantly increases when they actively participate in gamified learning sessions. Previous studies have demonstrated that gamification—the integration of game-like aspects into educational environments—increases student enthusiasm and engagement (Fitria, 2023). The result is consistent with previous research, which indicates that when students are actively involved in their learning processes, they retain information more effectively and apply it to practical situations. Specifically, gamification, which incorporates game-like elements into educational contexts, has been shown to enhance motivation and participation among students, leading to a deeper understanding of complex subjects such as finance (Bayuk & Altobello, 2019).

In particular, the findings showed that students' financial knowledge increased with greater engagement with gamified information. One of the study's main findings was the moderating role of student participation in the relationship between gamification and financial knowledge. Engagement, as opposed to enjoyment, was proven to have a direct impact on students' financial literacy. It suggests that gamification's ability to make studying enjoyable and actively involve students in a way that fosters deep learning may be a key factor in its effectiveness at enhancing educational outcomes. This finding is consistent with earlier studies that highlight the value of participation in educational settings (Bilro et al., 2021). Gamification appears to be the crucial element in bridging the gap between enjoyment and knowledge gain in student engagement. Studies show that students are more likely to develop a deeper understanding of the subject matter when they actively participate in their learning processes. Specifically, gamification techniques—such as incorporating game-like elements into educational tasks—have been demonstrated to increase student engagement and motivation. This increased engagement encourages students to devote more time, energy, and mental resources to their learning activities, which is essential for comprehending and retaining complex financial information (Wang et al., 2017). Integrating gamification in educational settings fosters a sense of enjoyment and creates a more interactive and dynamic learning environment. Studies have shown that students exposed to gamified learning experiences tend to exhibit higher levels of persistence and resilience when faced with challenging concepts (Yau & Wong, 2022). According to this research, gamification has the potential to make typically monotonous subjects more engaging, ultimately improving academic performance. The association between gamification and financial knowledge is not primarily driven by student enjoyment, which was found to have a partial mediating influence on student involvement. Nonetheless, enjoyment does contribute to engagement. This result emphasizes the complex interplay of various factors, suggesting that educators need to consider multiple aspects when designing gamified learning environments.

The study emphasizes the critical role of student engagement as an intermediary in the connection between gamification and financial knowledge acquisition. While gamification itself does not have a direct effect on financial knowledge, its success is largely dependent on the degree to which students are engaged with the gamified material. The research also indicates that simply enjoying the gamified content does not necessarily lead to better financial knowledge, challenging the assumption that increased enjoyment directly correlates with improved educational outcomes. This finding highlights the importance of distinguishing between enjoyment and engagement in theoretical frameworks for gamification, suggesting that these models should be updated to include student engagement as a key mediator. By doing so, the research gains a more detailed understanding of how gamification influences learning and can develop models that more accurately reflect the interplay between gamified experiences and academic achievements.

To fully leverage the advantages of gamification in financial education, it is crucial for educators and designers to prioritize strategies that boost student engagement. This could involve incorporating elements that promote apperception—helping students connect new concepts with their prior knowledge—along with sustaining motivation and encouraging active participation. When designing gamified educational tools, the primary focus should be on fostering active engagement rather than just enhancing enjoyment. This might include creating interactive tasks, providing constructive feedback, and ensuring that the gamified components are directly aligned with the educational objectives. Moreover, educational institutions should consider integrating engagement-focused gamification strategies into their curricula, which may also involve offering professional development for educators to effectively apply these techniques and improve student engagement, thereby enhancing overall learning outcomes. (Wirani et al., 2021). Additionally, the results showed that students who expressed greater satisfaction with gamified activities tended to interact more thoroughly with the material, which improved their memory of financial concepts. This shows that enjoyment is important for creating the engagement required for effective learning, even though it does not immediately improve knowledge acquisition.

Conclusion

The results of this study conclude that gamification has a positive impact on student enjoyment and student engagement. The study demonstrates that gamification does not directly influence students' financial knowledge. Instead, student engagement fully mediates the effect of gamification on students' financial knowledge, while enjoyment does not impact students' financial knowledge. This study underscores the importance of fostering student engagement in gamification to enhance financial knowledge. The implications of this research include strengthening student engagement through various strategies, such as apperception, motivation, and interaction during using gamification in financial education.

Recommendation

Educators and instructional designers should focus on creating well-rounded learning experiences that balance academic rigor with enjoyment to ensure students engage with the material and make meaningful learning progress. These findings have significant implications for teachers and curriculum designers aiming to enhance financial literacy through innovative teaching strategies. It appears that the key to optimizing learning outcomes is for educators to design gamified experiences that are both entertaining and engaging. Future research could explore which specific gamification components are most effective at increasing student engagement and how to best implement them to improve material retention. Additionally, examining gamification in various academic settings and subject areas may provide a more comprehensive understanding of its impact on learning across different fields.

References

Alsawaier, R. S. (2018). The effect of gamification on motivation and engagement. In *International Journal of Information and Learning Technology* (Vol. 35, Issue 1). https://doi.org/10.1108/IJILT-02-2017-0009

Ariff, M. I. M., Khalil, F. M., Rahman, R. A., Masrom, S., & Arshad, N. I. (2022). Developing mobile game application for introduction to financial accounting. *Indonesian Journal of Electrical Engineering and Computer Science*, *27*(3). https://doi.org/10.11591/ijeecs.v27.i3.pp1721-1728

Bai, S., Hew, K. F., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. In *Educational Research Review* (Vol. 30). https://doi.org/10.1016/j.edurev.2020.100322

Bayuk, J., & Altobello, S. A. (2019). Can gamification improve financial behavior? The moderating role of app expertise. *International Journal of Bank Marketing*, *37*(4). https://doi.org/10.1108/IJBM-04-2018-0086

Bilro, R. G., Loureiro, S. M. C., & Angelino, F. J. de A. (2021). The Role of Creative Communications and Gamification in Student Engagement in Higher Education: A Sentiment Analysis Approach. *Journal of Creative Communications*, *17*(1). https://doi.org/10.1177/0973258621992644

Buckley, P., & Doyle, E. (2016). Gamification and student motivation. *Interactive Learning Environments*, *24*(6). https://doi.org/10.1080/10494820.2014.964263

Chen, J., & Liang, M. (2022). Play hard, study hard? The influence of gamification on students' study engagement. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.994700

De Freitas, S., Irving, L., Verbert, K., Gibson, D., Star, K., Alvarez, V., & Charleer, S. (2017). How to use gamified dashboards and learning analytics for providing immediate student feedback and performance tracking in higher education. *26th International World Wide Web Conference 2017, WWW 2017 Companion*. https://doi.org/10.1145/3041021.3054175

DuBravac, S. (2012). Game mechanics for classroom engagement. *Cutting-Edge Technologies in Higher Education*, *6*(PARTC). https://doi.org/10.1108/S2044-9968(2012)000006C006

Feng, X. N., Wang, Y., Lu, B., & Song, X. Y. (2017). Bayesian regularized quantile structural equation models. *Journal of Multivariate Analysis*, *154*. https://doi.org/10.1016/j.jmva.2016.11.002

Feroz, H. M. B., Zulfiqar, S., Noor, S., & Huo, C. (2022). Examining multiple engagements and their impact on students' knowledge acquisition: the moderating role of information overload. *Journal of Applied Research in Higher Education*, *14*(1). https://doi.org/10.1108/JARHE-11-2020-0422

Fitria, T. N. (2023). The impact of gamification on students' motivation: A Systematic Literature Review. *LingTera*, *9*(2). https://doi.org/10.21831/lt.v9i2.56616

Fortuna, J. M., de la Fuente, G., & Velasco, P. (2023). Does gamification mediate the relationship between digital social capital and student Performance? A survey-based study in Spain. *International Journal of Management Education*, *21*(3). https://doi.org/10.1016/j.ijme.2023.100846

García-López, I. M., Acosta-Gonzaga, E., & Ruiz-Ledesma, E. F. (2023). Investigating the Impact of Gamification on Student Motivation, Engagement, and Performance. *Education Sciences*, *13*(8). https://doi.org/10.3390/educsci13080813

Hanus, M. D., & Cruz, C. (2015). Leveling up the classroom: A theoretical approach to education gamification. In *Emerging Research and Trends in Gamification*. https://doi.org/10.4018/978-1-4666-8651-9.ch009

Hartt, M., Hosseini, H., & Mostafapour, M. (2020). Game On: Exploring the Effectiveness of Game-based Learning. *Planning Practice and Research*, *35*(5). https://doi.org/10.1080/02697459.2020.1778859

Hu, R., & Shang, J. (2018). Application of Gamification to Blended Learning in Elementary Math Instructional Design. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *10949 LNCS*. https://doi.org/10.1007/978-3-319-94505-7_7

Lin, J. (2022). The effects of gamification instruction on the roles of perceived ease of learning, enjoyment, and useful knowledge toward learning attitude. *TOJET: The Turkish Online Journal of Educational Technology*, *21*(2).

Linciano, N. (2021). Enhancing financial knowledge and risk literacy through edutainment: CONSOB's experience. In *Financial Education and Risk Literacy*. https://doi.org/10.4337/9781789908855.00016

Mosalanejad, L., & Mansouri, E. (2023). Development of gamification as addiction education and examining its effects on students' motivation and enjoyment. *Bangladesh Journal of Medical Science*, *22*(3). https://doi.org/10.3329/bjms.v22i3.65325

Nguyen-Viet, B., & Nguyen-Viet, B. (2023). Enhancing satisfaction among Vietnamese students through gamification: The mediating role of engagement and learning effectiveness. *Cogent Education*, *10*(2). https://doi.org/10.1080/2331186X.2023.2265276

Oliveira, W., Hamari, J., Joaquim, S., Toda, A. M., Palomino, P. T., Vassileva, J., & Isotani, S. (2022). The effects of personalized gamification on students' flow experience, motivation, and enjoyment. *Smart Learning Environments*, *9*(1). https://doi.org/10.1186/s40561-022-00194-x

Oribhabor, C. B., & Anyanwu, C. A. (2020). Research Sampling and Sample Size Determination: A practical Application. *Journal of Educational Research (Fudjer)*, *2*(1).

Prawiyogi, A. G., Aini, Q., Santoso, N. P. L., Lutfiani, N., & Juniar, H. L. J. (2021). Blockchain Education Concept 4.0: Student-Centered iLearning Blockchain Framework. *JTP - Jurnal Teknologi Pendidikan*, *23*(2). https://doi.org/10.21009/jtp.v23i2.20978

Prior, D. D., Mazanov, J., Meacheam, D., Heaslip, G., & Hanson, J. (2016). Attitude, digital literacy and self efficacy: Flow-on effects for online learning behavior. *Internet and Higher Education*. https://doi.org/10.1016/j.iheduc.2016.01.001

Rodríguez, M., Díaz, I., Gonzalez, E. J., & González-Miquel, M. (2018). Motivational active learning: An integrated approach to teaching and learning process control. *Education for Chemical Engineers*, *24*. https://doi.org/10.1016/j.ece.2018.06.003

Singer, J. D. (2019). Reshaping the Arc of Quantitative Educational Research: It's Time to Broaden Our Paradigm. *Journal of Research on Educational Effectiveness*, *12*(4). https://doi.org/10.1080/19345747.2019.1658835

Strmečki, D., Bernik, A., & Radošević, D. (2015). Gamification in e-learning: Introducing gamified design elements into e-learning systems. *Journal of Computer Science*, *11*(12). https://doi.org/10.3844/jcssp.2015.1108.1117

van der Heide, A., & Želinský, D. (2021). 'Level up your money game': an analysis of gamification discourse in financial services. *Journal of Cultural Economy*, *14*(6).

https://doi.org/10.1080/17530350.2021.1882537

Wang, F., Wang, Y., & Hu, X. (2017). Gamification Teaching Reform for Higher Vocational Education in China: A case study on Layout and Management of Distribution Center. *International Journal of Emerging Technologies in Learning (IJET)*, *12*(09). https://doi.org/10.3991/ijet.v12i09.7493

Wirani, Y., Nabarian, T., & Romadhon, M. S. (2021). Evaluation of continued use on Kahoot! As a gamification-based learning platform from the perspective of Indonesia students. *Procedia Computer Science*, *197*. https://doi.org/10.1016/j.procs.2021.12.172

Yau, P. C. Y., & Wong, D. (2022). Powering Financial Literacy Through Blockchain and Gamification: How Digital Transformation Impacts Fintech Education. *Lecture Notes in Networks and Systems*, *358 LNNS*. https://doi.org/10.1007/978-3-030-89906-6_63

Yulianto, A., & Wijaya, A. P. (2022). Peningkatan Literasi Keuangan Melalui Metode Stimulus-Respon. *Journal of Community Empowerment*, *2*(2). https://doi.org/10.15294/jce.v2i2.59615

Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Educational Research Review*, *30*. https://doi.org/10.1016/j.edurev.2020.100326