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Gamification and Student Achievement: Potential Benefits, Limitations, and Effective Use in Educational Environments

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Abstract

Background/Purpose – This study explores the relationship between gamification and student achievement, and provides a brief overview of how gamification can be used more effectively to enhance student learning. The study also addresses the potential opportunities and limitations of using gamification in education.

Practical implications – Research indicates that gamification can be an effective tool to improve students' learning motivation. Therefore, in contemporary education systems where students' motivation can be easily challenged, teachers should reserve more room for gamification in their lesson planning, and school administrators should provide schoolwide support for such activities to enhance student motivation and school outcomes.

Conclusion – Although research shows that gamification can positively affect student learning and motivation, it also suggests that its promise as a beneficial approach largely depends on how effectively it is integrated into the learning process. Yet, when properly integrated into the overall teaching process, gamification has strong potential to make learning more motivating, engaging, and effective.

1. Introduction

Over the past decade, finding ways to provide students with a more motivating, engaging, and effective learning experience has become an even more significant concern among both policymakers and educational practitioners (Papadakis, 2022). Gamification was one of the several approaches proposed to address this concern. The basic idea underlying gamification was that some elements in games, such as points, levels, feedback loops, and badges, which were proven to arouse attention and sustain effort, might also help enhance students' attention and interest in course content, thus improving students' learning outcomes.

Since its introduction as an idea, gamification has captured the attention of researchers and teachers, with both enthusiasm and skepticism. Some research has found that gamification could be a promising tool to support student motivation; most has underlined that its success largely depends on how carefully it is designed, adapted, and integrated into pedagogy (Thi Binh et al., 2024). For instance, some studies in the field of science education showed that the use of game-like elements in science classes increased students' interest and participation in the lesson. However, these studies did not provide any evidence that this enthusiasm translated into improved conceptual understanding or measurable learning outcomes. On the other hand, several other studies reported very little or no differences in students' learning performance compared to traditional teaching approaches. These mixed outcomes might indicate that superficial applications of gamification without an underlying pedagogical purpose might not be sufficient to improve students' learning outcomes. However, they may temporarily increase their attention and effort (Zourmpakis, Kalogiannakis, & Papadakis, 2023). In other words, to transform student engagement into student achievement, gamification must certainly align with what and how students are meant to learn.

2. Gamification and Student Motivation

Assuming that all learners would respond similarly to the same gaming mechanics, such as points, badges, or feedback loops, the early applications of gamification might have decreased its potential. These "one-size-fits-all" designs do not respond well to the diverse needs and expectations of students. What drives students' motivation to learn and how they respond to reward systems varies widely depending on contextual and individual factors. A leaderboard that motivates one student can quietly discourage another. Similarly, as evidenced by some studies, individual factors such as gender can be influential on students' responses to gamified approaches. For instance, one recent study showed that traditional gamified approaches were often associated with greater motivational gains among boys than among girls, who responded less strongly or not at all (Zourmpakis, Kalogiannakis, & Papadakis, 2024). Therefore, gamification approaches that ignore such diversity are unlikely to deliver consistent results.

Early literature emphasizes that gamification can be used as a motivational tool in the student learning process since it increases student motivation and positively affects their achievement. (Buckley & Doyle, 2016; García-López et al., 2023; Das et al., 2022). However, a growing body of recent literature points out that gamification approaches should follow a more flexible path that is more attuned to the students' needs and expectations. This approach, called adaptive gamification, suggests adjusting game elements to students' profiles, preferences, and actions instead of offering identical experiences to everyone. Research in science classrooms has lent support to this perspective. One recent study has shown that adaptive designs have produced notable improvements in both motivation and achievement when compared with traditional instruction in a science lesson (Zourmpakis et al., 2024). Studies have also shown that fewer gender disparities are

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observed in learning designs with more adaptive gamification practices. This suggests that personalized gamification designs can be a more efficient way to support student motivation and outcomes.

Theoretical perspectives help explain why personalized designs could be more effective for this end. Self-determination theory, for example, proposes that learner motivation mostly depends on whether and how students' needs for competence, autonomy, and relatedness are met. Adaptive gamification can be a promising approach to address these needs. By adjusting challenge levels, offering meaningful choices, and encouraging collaboration or competition where appropriate, adaptive gamification can help create a more responsive and engaging learning environment through increasing students' active participation and cognitive involvement in the learning process.

Teachers' experiences also support the view that adaptive gamification shows greater promise. Educators who have integrated adaptive gamification into science lessons describe higher engagement, more positive attitudes toward learning, and improved classroom climate (Papadakis, Zourmpakis, Kalogiannakis, & Kasotaki, 2025). However, teachers also voice some practical concerns, such as limited professional development, unclear design frameworks, and the challenge of aligning game mechanics with curriculum goals. These observations remind us that gamification can only become a meaningful tool with careful planning and pedagogical grounding.

More importantly, gamification should not be considered a replacement for proven approaches to teaching/ learning, but should remain as a complement to what is being pedagogically done. Inquiry-based learning, for instance, remains a cornerstone of science education, valued for its emphasis on exploration, critical thinking, and conceptual depth. Studies comparing inquiry-based learning approaches with adaptive gamification show that, when adapted to learners' needs and carefully integrated into inquiry-based frameworks rather than used in isolation, gamification can lead to better results (Zourmpakis et al., 2024). To sum up, integration could be a more promising strategy for effective gamification rather than substitution.

As can be seen, evidence on the effects of gamification is still inconclusive, and the field faces several important questions to be addressed in the future. We still know little about the long-term effects of gamified approaches. One priority should be developing clearer design principles for choosing and combining game elements so as to address the diversity in classrooms better (Rivera & Garden, 2021). Secondly, as adaptive gamification systems become more complicated, ethical and privacy considerations around data use must be paid particular attention to. Finally, none of this will succeed without confident, well-supported teachers. As classroom practitioners themselves point out, the effectiveness of gamification depends as much on the knowledge and choices of teachers as on the tools themselves (Papadakis et al., 2025; Karakose et al., 2025). Sustained professional learning is vital to help teachers interpret data from adaptive gamification systems, align game elements with learning goals, and balance extrinsic incentives with intrinsic motivation.

3. Conclusion

Gamification involves a set of design principles that can make learning more motivating, responsive, and effective when properly integrated into the teaching-learning process. Despite its many positive effects on learning, gamification does not always produce meaningful results in teaching and learning. When poorly integrated into the learning process, it can even make learning less efficient and ineffective, rather than improving success. School leaders and teachers can only achieve success if they integrate gamification into the learning process, taking into account students'

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diverse needs and expectations, as well as the diverse characteristics of educational contexts (Karakose & Polat, 2025; Karakose & Tulubas, 2025; Ozdogru et al., 2025).

The future of gamification depends more on its careful integration into the pedagogy of teaching than on its ostentatious image. Adaptive gamification systems that meet learners' individual needs, relevant pedagogies that embed game elements meaningfully into the learning process, and teachers who know how to make the most of both are vital to render gamification a promising tool for making learning more playful and making achievement more attainable for all students.

Declarations

Conflicts of Interest. The authors declare no conflict of interest.

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Generative AI Usage Declaration. During the preparation of this study, the authors used Generative AI tools to assist with language editing and clarity of expression. Specifically, ChatGPT, and Grammarly were used to improve the language and enhance the overall readability of the text. These AI assistants were employed to enhance the linguistic quality of the manuscript, including grammar, style, and clarity of expression. After using these tools, the authors reviewed and revised the content as necessary.

References

Buckley, P., & Doyle, E. (2016). Gamification and Student Motivation. *Interactive Learning Environments, 24*(6), 1162–1175. https://doi.org/10.1080/10494 820.2014.964263

Das, S., Osipova, M., Nakshatram, S.V., Söbke, H., Hauge, J.B., Springer, C. (2022). Gamification for Spatial Digital Learning Environments in Higher Education: A Rapid Literature Review. In: Kiili, K., Antti, K., de Rosa, F., Dindar, M., Kickmeier-Rust, M., Bellotti, F. (Eds.), Games and Learning Alliance. GALA 2022. Lecture Notes in Computer Science. Springer, Cham, vol. 13647. https://doi.org/10.1007/978-3-031-22124-8_29

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,* 813. https://doi.org/10.3390/educsci13080813

Karakose, T. & Tulubas, T. (2025). The Role of Educational Leaders in the Age of Artificial Intelligence (AI). *Educational Process: International Journal, 16*, e2025267. https://doi.org/10.22521/edupij.2025.16.267

Karakose, T., & Polat, H. (2025). Science Mapping of the Knowledge Base on the Effects of Artificial Intelligence (AI)Based Chatbots on Student Learning Outcomes: A Bibliometric Study. In: Lampropoulos, G., Papadakis, S. (eds) Social Robots in Education. Studies in Computational Intelligence, vol 1194. Springer, Cham. https://doi.org/10.1007/9783031829154_18

Karakose, T., Tülübaş, T., Kanadli, S., & Gurr, D. (2025). What factors mediate the relationship between principal leadership and teacher professional learning? Evidence from meta-analytic structural equation modelling (MASEM). *Journal of Educational Administration, 63*(1), 6376. https://doi.org/10.1108/JEA0520240160

Ozdogru, M., Tulubas, T., Karakose, T., Kanadlı, S., Kardas, A., & Papadakis, S. (2025). How does teacher self-efficacy mediate the relationship between student outcomes and principal leadership for learning? Results from meta-analytic structural equation modelling (MASEM). *Acta Psychologica, 258*, 105144. https://doi.org/10.1016/j.actpsy.2025.105144

Papadakis, S. (2022). Apps to promote computational thinking and coding skills in young children: A pedagogical challenge for 21st-century learners. *Educational Process: International Journal*, *11*(1), 7-13. https://dx.doi.org/10.22521/edupij.2022.111.1

Papadakis, S., Zourmpakis, A.-I., Kalogiannakis, M., & Kasotaki, S. (2025). Teachers' perspectives on integrating adaptive gamification applications into science teaching. *Journal of Electrical Systems, 21*(1), 7917. https://doi.org/10.52783/jes.7917

Rivera, E. S., & Garden, C. L. P. (2021). Gamification for student engagement: A framework. *Journal of Further and Higher Education, 45*(7), 999–1012.

Thi Binh, A. D., Hoang, T. H., & Quang, H. T. (2024). Designing Effective Hybrid Course Curriculum: A Design Science Approach to Gamification and Student Outcomes Validation. *Evaluation Review, 0*(0), 1–34. https://doi.org/10.1177/0193841X241291752

Zourmpakis, A.-I., Kalogiannakis, M., & Papadakis, S. (2023). Adaptive gamification in science education: An analysis of the impact of implementation and adapted game elements on students' motivation. *Computers, 12*(7), 143. https://doi.org/10.3390/computers12070143

Zourmpakis, A.-I., Kalogiannakis, M., & Papadakis, S. (2024). The effects of adaptive gamification in science learning: A comparison between traditional inquiry-based learning and gender differences. *Computers, 13*(12), 324. https://doi.org/10.3390/computers13120324

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