DOI: https://doi.org/10.4038/jdrra.v3i1.78
The Journal of Desk Research Review and Analysis, Vol. 3, Issue 1, 2025, 151 - 161

GAMIFIED LEARNING: THE IMPACT OF MOBILE GAMES ON STUDENT ENGAGEMENT AND ACHIEVEMENT IN REMOTE EDUCATION

T Adikari[1], A Shanuka[2], N Binduhewa[3], T Wikum[4] and J Senanayake[5]

Abstract

This study explores the integration of mobile games as educational tools in remote learning environments, focusing on their impact on student engagement, collaboration, and learning outcomes. Drawing exclusively from existing academic literature, this research examines how mobile games can enhance educational experiences through interactivity, gamification, and real-time feedback mechanisms. Mobile games have emerged as powerful tools to foster learner motivation and attention by incorporating reward systems, storytelling, and multiplayer features. These features contribute to increased engagement by encouraging active participation and social interaction among students. Collaborative elements, such as team-based challenges and cooperative gameplay, have been shown in prior studies to promote peer-to-peer learning and communication skills. However, the adoption of mobile games in remote education is not without challenges. Technological barriers, including limited internet access and device availability, continue to restrict equitable implementation. Moreover, the digital divide is particularly pronounced in regions where educators lack adequate training to incorporate mobile learning strategies effectively. Existing research also highlights concerns regarding the alignment of game content with curriculum standards and the risk of over-reliance on entertainment-driven features. A comprehensive review of academic studies and published analyses on mobile learning applications indicates that, when thoughtfully integrated, mobile games can serve as effective supplements to traditional e-learning platforms. They offer inclusive, adaptive, and engaging learning experiences that cater to diverse learning styles. This study contributes to the ongoing discourse on game-based learning by consolidating isnsights from existing research and identifying key considerations for future adoption in remote education contexts.

Keywords: Collaborative Learning, Gamification, Mobile Games, Remote Education, Student Engagement

[1]Department of Industrial Management, University of Kelaniya, Sri Lanka.
Email: malshanweerasinghe25@gmail.com https://orcid.org/0009-0001-2274-9210
[2]Department of Industrial Management, University of Kelaniya, Sri Lanka.
Email: ashenshanuka1222@gmail.com https://orcid.org/0009-0006-6940-817X
[3]Department of Industrial Management, University of Kelaniya, Sri Lanka.
Email: ilanakabindu@gmail.com https://orcid.org/0009-0003-2729-0327
[4]Department of Industrial Management, University of Kelaniya, Sri Lanka.
Email: tharukawikum2@gmail.com https://orcid.org/0009-0004-4450-4347
[5]School of Computing, Engineering & Technology, Robert Gordon University, United Kingdom.
Email: j.senanayake1@rgu.ac.uk https://orcid.org/0000-0003-2278-867

Received date: 30.04.2025 Accepted date: 17.07.2025
Print Publishing Date: 31.10.2025 Web Publishing Date: 31.10.2025

Introduction

The advent of mobile games has significantly transformed educational methodologies, particularly in remote learning environments. As educational institutions increasingly adopt digital tools to enhance learning experiences, the integration of mobile games presents a promising avenue for boosting student engagement and learning outcomes. The objective of the study is to assess how mobile games would affect student engagement and learning outcomes in remote education by studying these critical research questions.

Interactive and engaging, mobile games have been claimed to improve student motivation and academic performance. These games include rewards, interaction and storytelling activities that have been found to significantly increase student engagement with learning tasks (Ren, Xu, & Liu, 2024; Smiderle, Rigo, Marques, Peçanha de Miranda Coelho, & Jaques, 2020). It makes sense to fit such elements into the context of contemporary education. However, it is not grounds for employment.

Studies conducted on this topic show that mobile games can be collaborative and social, and they also increase individual learning. Events like multiplayer modes, team challenges and collaborative projects have been found to develop teamwork talents (Balalle, 2024), but remote education integrating mobile games as a means of instruction is not everything peachy. However, technological constraints and the ensuing digital divide, along with a requirement for appropriate education training, are three major hurdles that must be overcome to utilise mobile games effectively in an educational context (Carrión Candel & Colmenero, 2022; Krouska, Troussas, & Sgouropoulou, 2022).

Accordingly, this research investigates the distinctive characteristics of mobile games that contribute to student engagement, their impact on peer collaboration, the barriers to implementation, and their perceived value relative to traditional e-learning tools. Using a qualitative, literature-based approach, the study synthesises existing findings to provide insights into the role of mobile games in enhancing distance education. It offers recommendations to address key implementation challenges.

RESEARCH QUESTIONS AND OBJECTIVES

A. Questions

1. What are the specific features of mobile games that contribute to increased student engagement in remote learning?
2. How do mobile games affect students' interaction and collaboration in remote education environments?
3. What are the challenges and barriers to integrating mobile games into remote education?

B. Objectives

1. Identify and analyse the key features of mobile games that enhance student engagement in remote education.
2. Assess the impact of mobile games on students' interaction and collaboration with peers in remote education settings.
3. Explore the challenges and barriers faced by educators and students when integrating mobile games into remote education.

Literature Review

1) Effectiveness of Mobile Games in Enhancing Student Engagement

Mobile games have been an effective way to increase student engagement, given the interactive pieces and some of those game mechanics. Studies pointed out several advantages of using educational games

for fostering multiple cognitive abilities and problem-solving skills, and can improve the inclination to learn (Ren, Xu, & Liu, 2024; Smiderle, Rigo, Marques, Peçanha de Miranda Coelho, & Jaques, 2020). Empirical investigation with cross-sectional data has found a significant positive relationship between digital educational games and the motivation towards learning among students. At the same time, there is also a partially mediated effect of student engagement (Li, Chen, & Deng, 2024). Further, the quality of a school's digital environment is another key moderating condition that affects whether these games can effectively engage students and heighten motivation (Li, Chen, & Deng, 2024). For example, Azzouz Boudadi and Gutiérrez-Colón (Boudadi & Gutiérrez-Colón, 2020) revealed that game mechanics such as point-based systems or leaderboards improved motivation to create a more interactive learning environment. In addition, learning applications created for mobile devices that involve student interactions and offer easy access to information can substantially increase academic achievement with a positive effect on students' attitudes towards the subject (Demir & Akpınar, 2018). Gamification functionality generates the sturdiness of student retention and continuously energises them to attain goals and compete while simultaneously instigating teamwork (Balalle, 2024). Students should use educational games for integration, as they help to increase retention of learning through an interactive environment (Yu, Gao, & Wang, 2021). This notion serves as motivation to gamify educational practice that fosters more engaging and fruitful ways to stimulate learning (Yu, Gao, & Wang, 2021). Previous research has shown that game-based methods such as Vortex quizzes have a significant impact on student engagement with course content compared to non-game-based activities (Nadeem, Oroszlanyova, & Farag, 2023). Leaderboards and digital badges add additional excitement through competitive components (Pechenkina, Laurence, Oates, Eldridge, & Hunter, 2017).

In addition, gamification strategies are used in mobile games to give feedback and rewards immediately, which retain player interest (Huang, Fang, Liu, & Zhang, 2022). Mobile Game-based Learning (MGbL) significantly improved student motivation levels and academic scores during the COVID-19 pandemic due to its interactive game elements and the portable nature of mobile platforms, which students preferred (Krouska, Troussas, & Sgouropoulou, 2022). Music and interactive elements in gamified learning environments can enhance student engagement and motivation, especially in the university context (Carrión Candel & Colmenero, 2022).

2) Impact of Mobile Games on Collaborative Learning and Peer Interaction

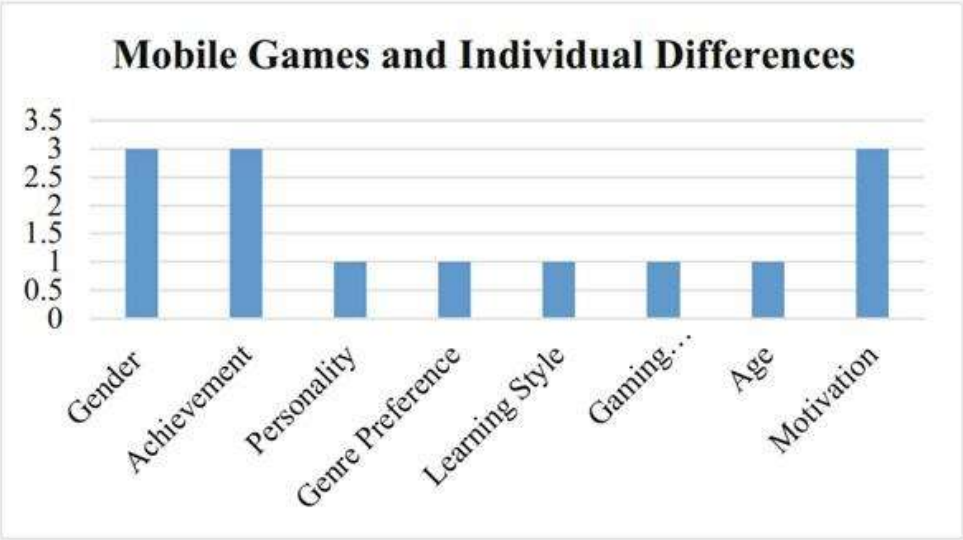

Figure 01: Mobile games and individual differences

By far, the most significant benefit of mobile games is the improvement in collaboration-based learning and social interaction among peers at educational institutions. On one hand, long gaming hours lead to a negative impact on academic performance (Neerupa, Naveen Kumar, Pavithra, & John William, 2024), while mobile games' interactive gameplay coupled with vibrant graphics scores high in invoking student interest. In fact, the relationship between mobile games and academic performance will become multifaceted. Both parental involvement with education, together with their background knowledge as to where a student is in educational development, may be key factors in these relationships. Further, in connecting teleplay and pedagogies, it can be spotted that personal vigour and individual gaming style awareness are among the important factors while doing so (Khan, n.d.).

The advent of technology has led to a better integration of educational games, defined by Nadeem, Oroszlanyova, and Farag (2023) as a compelling series of choices and goals within the school environment. In fact, educators have even begun to take on game-related methods for better student engagement and effectiveness (Chen & Jenks, 2023). These tools and practices constitute effective approaches that facilitate the enrichment of learning experiences and sustainable teaching strategies (Salhab & Daher, 2023). Mobile games with collaborative elements and communication tools can help promote collaborative learning and peer interaction as they work together through the game, enhancing teamwork abilities among students (Bernard, n.d.; Yu, Gao, & Wang, 2021). Figure 2 describes the Theory of Gamified Learning, illustrating how game elements and instructional content influence attitudes and behaviour, ultimately impacting learning outcomes.

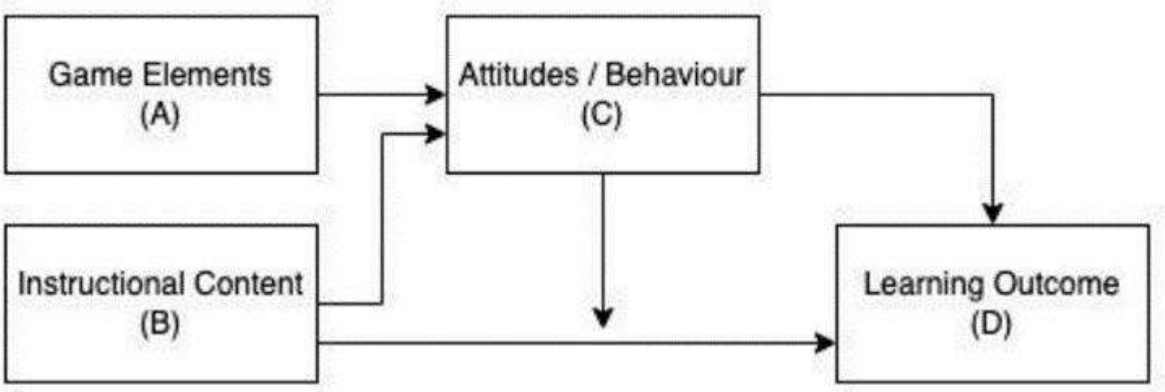

Figure 02: Theory of Gamified Learning

Cooperative games can significantly improve peer interaction and collaboration since they promote powerful teamwork through effective communication. These characteristics help to create a climate in which students develop peer interactions that enhance their learning experience (Balalle, 2024). Game-based learning environments foster collaborative learning through a common orientation toward students participating in the same goals, which is aimed at cultivating teamwork and social interaction. Games are interactive by nature and provide an environment for peer dialogue and mutual support, which is needed to learn communication skills (Yu, Gao, & Wang, 2021).

Research suggests that game-based learning programs can increase student interaction and cooperation among peers. In this case, students did some group activities through the games, which are good at promoting working as a team and cooperative learning. Elements of gamification, like leaderboards, etc., enable peer interactions to reinforce communication and teamwork (Nadeem, Oroszlanyova, & Farag, 2023). The elements of interactivity in mobile games enable peer support and promote collaborative learning environments (Pechenkina, Laurence, Oates, Eldridge, & Hunter, 2017).

During the COVID-19 pandemic, digital games, including mobile ones, were shown to promote socialisation and collaboration among students, enhancing student engagement as well through team-based gameplay. Like a Quiz Time application! Increased collaboration amongst students (Krouska, Troussas, & Sgouropoulou, 2022). The gamification approach introduced into mobile games also contributes to communication and collaboration, making it more effective for learners (Carrión Candel & Colmenero, 2022). Innovative system-based gamified learning assists in promoting the feeling of community among peers during teamwork and vice versa, increasing peer interaction also (Umamah, 2023).

3) Challenges and Barriers to Implementing Mobile Games in Remote Education

Utilisation of mobile games in distance learning has several difficulties and constraints, both technical (pedagogical issues) and logistical. The digital divide is a significant concern for the Mobile Game-based Learning (MGbL) implementation because not all students have mobile phones or good internet connections in some cases (Carrión Candel & Colmenero, 2022). This disparity could provide an even further divide in the ability to play games for learning. Also, teachers face the problem of how to integrate mobile games into teaching-learning processes since they may not have been exposed (Krouska, Troussas, & Sgouropoulou, 2022), leading sometimes to professional development. Proper training and resources are essential for educators to incorporate these tools into their teaching practices effectively.

Another significant challenge comes from technological limitations. Not all students, however, have the resources for reliable internet access and suitable devices, an essential component for mobile games in education as identified (Balalle, 2024; Yu, Gao, & Wang, 2021). Education games are challenged by inaccuracies in players' data, preventing the smooth assimilation of educational gaming applications. Furthermore, the need to maintain educational rigour while linking game content with learning objectives means that effective planning and design are required (Nagalingam & Ibrahim, 2015). Without proper guidance and training, making sure that the game-based activities hit curriculum goals can be hard.

However, more than anything, logistical issues matter. Despite being a solution, it can also be problematic in terms of ensuring that all students have the required hardware and software, especially during remote education (Krouska, Troussas, & Sgouropoulou, 2022). Fleischer (Fleischer, 2012) points to challenges such as motivating teachers who need support in moving beyond traditional instructional practices, balancing the necessity of autonomous learning with instructor guidance, and developing relevant curricula for laptop programs (Sung, Chang, & Liu, 2016). Such problems demonstrate the importance of institutional backing and funding towards mobile games via digital infrastructure to aid proper incorporation.

Some of the solutions to tackle these challenges include infrastructure development, capacity development for teachers, and games specifically designed for learning purposes (Balalle, 2024; Yu, Gao, & Wang, 2021). For these barriers, Yu et al. (2021) suggest the necessity of support from institutions and training for educators (Yu, Gao, & Wang, 2021). In summary, these challenges must be overcome if educators are to fully realise the potential for games on mobile devices to increase student involvement and improve learning outcomes in remote education environments.

4) Comparative Analysis of Mobile Games and Traditional E-Learning Tools

Mobile games have specific advantages compared to traditional e-learning tools and thus provide a more experienced way of learning. Numerous research reports contend that mobile games in e-learning

increase student satisfaction and enhance learning outcomes, simply because they offer interactivity and personalisation. For instance, among these tools are Mobile learning applications, which have a significant positive impact on the academic performance of students for their flexibility and interactivity (Demir & Akpınar, 2018). However, it is important to acknowledge limitations as well, about not being able to accurately simulate realistic traffic conditions and the risk of too much gamification (Huang, Fang, Liu, & Zhang, 2022).

Mobile games have consistently outperformed traditional e-learning methods in student engagement and satisfaction, which increases student motivation and academic output better than traditional ways (Krouska, Troussas, & Sgouropoulou, 2022). Mobile apps provide personalised and even adaptive learning strategies that are likely to hook end-users more than static e-learning platforms. Mobile games present immediate feedback and interactive elements that help see better results of retention and understanding as to when traditional programs are used (Nagalingam & Ibrahim, 2015). In addition, Koutromanos and Avraamidou (2014) state that gamification in educational settings significantly boosts student interest and performance, making it a valuable device for present-day educational practices (Koutromanos & Avraamidou, 2014). However, comparative studies have revealed that mobile environments possess unique attributes and capabilities that support a richer learning experience among students as compared to traditional methods while enhancing their outcomes. Mobile games are a lot more interesting and rewarding than the traditional e-learning methods, as students are well entertained, leading to improved engagement and thereby satisfaction (Balalle, 2024). All this extra engagement, in turn, leads to better learning and retention of information (Yu, Gao, & Wang, 2021). Through game-based learning (GBL), it was found that academic performance as well as retention of information improvement are greater than traditional e-learning methods and in some cases laboratory training techniques (Nadeem, Oroszlanyova, & Farag, 2023).

Mobile games are competitive and more interactive, and students tend to get involved in mobile-based learning (Nadeem, Oroszlanyova, & Farag, 2023). Research also suggests that students prefer game-based learning tools to traditional e-learning platforms, as indicated by surveys showing increased levels of satisfaction, motivation and engagement (Pechenkina, Laurence, Oates, Eldridge, & Hunter, 2017). In the research by Pechenkina et al. (2017), students using a gamified mobile app showed better engagement and retention rates, in addition to higher academic performance as compared with traditional tools (Pechenkina, Laurence, Oates, Eldridge, & Hunter, 2017). This evidence reveals that interactive and engaging mobile games can dynamically improve the learning output retention rate of students in remote educational environments.

Methodology

This study adopts a qualitative research methodology to explore how mobile games contribute to student engagement and learning outcomes in remote education environments. The research is grounded entirely in the analysis of existing literature and documented sources, to synthesise insights from prior academic work on mobile game-based learning.

The study begins with a systematic literature review, drawing on reputable academic databases such as PubMed, ERIC, Google Scholar, JSTOR, and other educational technology journals. The inclusion criteria for the literature review include studies published from 2010 onwards, peer-reviewed articles, and publications focused on mobile learning, gamification, and digital tools in remote education. Priority is given to studies that examine the intersection of mobile games with learner engagement, motivation, collaboration, and academic performance.

To further enhance the thematic scope, the research analyses documented evaluations and published case studies of popular educational mobile apps (e.g., CodeMonkey, Duolingo, DragonBox). The apps are examined based on secondary analyses and content available in scholarly reviews, technical documentation, and academic comparative studies. Features such as game mechanics, interactivity, reward systems, and collaborative functions are coded and categorised using qualitative content analysis techniques to identify recurring pedagogical patterns.

The study applies thematic analysis to synthesise findings across the reviewed literature, highlighting patterns in how mobile games influence learning behaviours, student engagement, and cognitive development in virtual environments. In addition, the analysis includes comparisons between mobile game-based learning and traditional e-learning tools, based on previously published comparative research.

Finally, demographic factors such as age, gender, and educational context are considered by reviewing segmented findings from existing studies. These insights are used to identify how mobile game effectiveness varies across learner groups and to highlight inclusive strategies for implementation. The resulting thematic framework provides a comprehensive, literature-based understanding of mobile game integration in remote education.

Results and Discussions

Existing studies indicate that educational games on mobile platforms have demonstrated effectiveness across various subjects, including mathematics, science, language learning, and programming. Research has shown that platforms such as CodeMonkey and DragonBox are associated with improved performance in math and coding assessments, particularly due to their interactive and gamified learning structures. In the domain of language acquisition, tools like Duolingo have been reported to enhance vocabulary development and grammatical understanding through engaging, bite-sized lessons. These mobile games tend to be especially effective for younger learners, as their interactive formats and reward-based mechanisms help maintain attention and motivation, thereby improving classroom engagement.

A. Enhancing Interaction and Collaboration

Integration of multiplayer modes, team challenges, and group projects in mobile games has been shown to enhance interaction and collaboration between students. The way the cooperative game elements work improves teamwork skills and peer relationships. During COVID-19, the question-and-answer apps like Quiz Time! Suggested that making more things multiplayer and team-based not only made students spend longer playing the game but also facilitated a sense of community. Students and teachers alike pointed to an increase in activities that were more collaborative than before, as well as results where participants exhibited improved communication skills. Minecraft: Education Edition. The application has proven to be tremendous as it allows for group projects and collaborative problem-solving, leading to better team dynamics and outcomes.

B. Integrating Multiple Learning Styles in Educational Game Design

The integration of multiplayer modes, team challenges, and group-based tasks in mobile educational games has been widely recognised in the literature as a means of enhancing student interaction and collaboration. Cooperative game elements encourage the development of teamwork skills, peer engagement, and interpersonal communication, contributing to more dynamic and socially enriched learning experiences. During the COVID-19 pandemic, studies highlighted the role of interactive applications such as quiz-based and multiplayer educational games in fostering a sense of community

and shared learning among students. These tools allowed learners to engage with peers through collaborative challenges, which in turn supported the development of communication skills and strengthened group cohesion. Platforms like Minecraft: Education Edition have been noted in scholarly reviews for their ability to facilitate group projects and collaborative problem-solving tasks. These features not only promote teamwork but also support deeper cognitive engagement through shared goals and real-time interaction, leading to improved group dynamics and enhanced educational outcomes.

C. Techniques for Improving Effectiveness

A variety of instructional strategies are commonly utilised in educational mobile games to enhance their overall effectiveness. One key technique is the integration of interactive elements, such as quizzes, puzzles, and simulations, which actively engage learners and reinforce content through hands-on participation. These elements encourage users to apply knowledge immediately, promoting deeper cognitive processing.

Gamification is another widely adopted approach, involving mechanisms such as point systems, leaderboards, and digital badges. These features serve to motivate learners by introducing elements of achievement and healthy competition, thereby sustaining user interest and encouraging continued participation.

Adaptive learning algorithms are frequently employed to personalise the learning experience. By dynamically adjusting content difficulty in response to individual performance, these systems ensure that learners are appropriately challenged, leading to optimised learning outcomes and reduced frustration.

Immediate feedback mechanisms are also central to effective educational game design. When learners receive real-time responses to their actions, they can correct mistakes promptly and internalise correct information more efficiently.

Narrative techniques and storytelling are often used to make educational content more engaging and memorable. Through contextualised scenarios and character-driven plots, learners are better able to relate to and retain instructional material.

Finally, social features, such as collaborative tasks and multiplayer modes, foster peer interaction and teamwork. These aspects not only improve engagement but also contribute to the development of communication and problem-solving skills in educational contexts.

D. Impact of UX and UI Design

Existing literature emphasises that the design of user experience (UX) and user interface (UI) plays a crucial role in determining the effectiveness of educational mobile games. Well-organised and intuitive interfaces are consistently linked to higher learner engagement, as they reduce cognitive load and simplify navigation. Studies highlight that elements such as clear visual hierarchies, aesthetically pleasing layouts, and accessible controls enhance usability, allowing learners to focus more on instructional content rather than technical interactions.

Research also suggests that interactive interface elements—such as gesture-based controls, drag-and-drop features, and animated transitions—support learner engagement by fostering a sense of control and responsiveness within the application. Additionally, personalisation features, including customisable avatars or user profiles, have been associated with increased learner motivation and emotional investment by enabling more immersive and individualised learning experiences.

The literature further supports the importance of visual cues, such as progress bars, achievement animations, and completion indicators, in providing learners with a sense of accomplishment and direction. These features serve as immediate feedback mechanisms that reinforce progress and encourage sustained effort.

In collaborative learning contexts, effective UI design is particularly critical. Reviews of multiplayer educational applications underscore that seamless navigation and organised content presentation are essential for facilitating smooth group interactions, ensuring all users can contribute to shared tasks without confusion or delay.

E. High User Ratings and Positive User Feedback

There are several reasons that educational mobile games present significant value in education. They lead to more satisfied students in addition to better student performance. They add value to the learning process because they compel students to think out of the box. A prime example of the performance of the game-based learning module in comparison to traditional e-learning tools can be seen with DP education, which has shown a considerable increase in engagement and motivation. Thus, mobile games are also very effective.

F. Challenges and Barriers

While mobile games offer several advantages, their implementation in remote education is hampered by a number of challenges. These include, but are not limited to:

- Technological constraints: Due to the lack of access to devices and a reliable internet connection, playing a game and receiving the necessary information can be troublesome for many students.
- Training and integration: Educators frequently lack training and experience with these tools, meaning that their integration is less likely to be effective and will require substantial guidance. While mobile games are designed to maximise their ease of use, many educators are unfamiliar with game and application-based learning pedagogies and require additional instruction to use them properly.
- Educational rigour: The games may not present enough of an educational challenge, may be overloaded with information irrelevant to the course, or may not follow the curriculum's goals. Ensuring that this is not the case requires a solid understanding of both the game and the educational program.
- Logistical issues: Not every student possesses the hardware required to run specific applications or games, or the software may not be supported by school computers, even in the remote education scenario. As such, schools may be required to make a substantial investment in digital infrastructure and support systems to integrate them properly.

Conclusion

Incorporating mobile games into distance education has the potential to change how students engage significantly, work together, and learn with different needs. As students and teachers have found the ELC tools user-friendly with improved learning outcomes, positive testimonials from both make them effective. Apart from activities and performing stages in a school, many educational games have emerged now. The benefit of these will be to increase student engagement rather than test scores, as well as collaboration. However, the extent to which these mobile games have been successful in education will depend on addressing some technical and pedagogical challenges. With the right tools at their disposal, mobile games can offer robust support for teaching and learning in nearly every subject

and age-level combination, leading to improved grades while maintaining peak levels of student satisfaction.

Interactive elements, gamification, adaptive learning algorithms, and immediate feedback, together with narrative elements and social features, engage students in the educational process, which is likely to provide better results and a more advanced type of game. These techniques are responsive to different learning styles, which can help students engage more with content. Overcoming the obstacles impeding their implementation will ensure that educational mobile games can be powerful resources for modern education and a catalyst to enhance student engagement and learning achievements greatly.

G. Future Works

This study suggests that future research should examine the impact of mobile games on student learning outcomes and engagement over an extended period. For example, by studying adaptive learning algorithms and personalised game experiences, we can improve individual student performance. Moreover, it will be key to resolve issues around technological inequity and find large-scale solutions for how best to include mobile games in curricula. For a type of mobile learning environment, examining the impact from the standpoint of various age groups and subjects would provide comprehensive findings. However, the innovative approaches to game-based learning strategies could be even more effective by combining educational technology, psychological, and pedagogical perspectives at a greater whole interfacial dimensionality.

Acknowledgements

We would like to express our sincere gratitude to Janaka Senanayake for his valuable guidance, support, and encouragement throughout the course of this research. His expertise and mentorship were instrumental in shaping the direction and quality of this study. We also extend our appreciation to the Department of Industrial Management, University of Kelaniya, for providing the resources and academic environment necessary for our research. Lastly, we acknowledge the financial support provided by the University of Kelaniya, which made this research possible.

References

Boudadi, N. A., & Gutiérrez-Colón, M. (2020). Effect of gamification on students' Motivation and learning achievement in second language acquisition within higher education: A literature review 2011–2019. The EuroCALL Review, 28(1), 40–54. https://doi.org/10.4995/eurocall.2020.12974

Balalle, H. (2024). Exploring student engagement in technology-based education in relation to gamification, online/distance learning, and other factors: A systematic literature review. Social Sciences & Humanities Open, 9, 100870. https://doi.org/10.1016/j.ssaho.2024.100870

Bernard, F. S. (n.d.). Examining the impact of game-based learning on student engagement and performance in an introductory computer programming course at the University of the Southern Caribbean (USC). [Unpublished manuscript].

Carrión Candel, E., & Colmenero, M. J. R. (2022). Gamification and mobile learning: Innovative experiences to motivate and optimise music content within university contexts. Music Education Research, 24(3), 377–392. https://doi.org/10.1080/14613808.2022.2042500

Chen, C., & Jenks, A. (2023). Unlocking the potential: Analysing the impact of online games On high school history education and learning outcomes. Jurnal Ilmu Pendidikan dan Humaniora, 12(2), 82–95. https://doi.org/10.35335/jiph.v12i2.33

Demir, K., & Akpınar, E. (2018). The effect of mobile learning applications on students' Academic achievement and attitudes toward mobile learning. Malaysian Online Journal of Educational Technology, 6(2), 48–59. https://doi.org/10.17220/mojet.2018.02.004

Huang, J., Fang, G., Liu, Y., & Zhang, M. (2022). The impact of mobile educational games

On contemporary users' learning behavior. Journal of Global Information Management, 30(11), 1–22. https://doi.org/10.4018/JGIM.313196

Khan, A. A. (n.d.). The impact of mobile games on the education system: A critical analysis. [Unpublished manuscript].

Koutromanos, G., & Avraamidou, L. (2014). The use of mobile games in formal and informal Learning environments: A review of the literature. Educational Media International, 51(1), 49–65. https://doi.org/10.1080/09523987.2014.889409

Krouska, A., Troussas, C., & Sgouropoulou, C. (2022). Mobile game-based learning as a Solution in COVID-19 era: Modeling the pedagogical affordance and student interactions. Education and Information Technologies, 27(1), 229–241. https://doi.org/10.1007/s10639-021-10672-3

Li, Y., Chen, D., & Deng, X. (2024). The impact of digital educational games on students' Motivation for learning: The mediating effect of learning engagement and the moderating effect of the digital environment. PLOS ONE, 19(1), e0294350. https://doi.org/10.1371/journal.pone.0294350

Nadeem, M., Oroszlanyova, M., & Farag, W. (2023). Effect of digital game-based learning On student engagement and motivation. Computers, 12(9), 177. https://doi.org/10.3390/computers12090177

Nagalingam, V., & Ibrahim, R. (2015). User experience of educational games: A review of The elements. Procedia Computer Science, 72, 423–433. https://doi.org/10.1016/j.procs.2015.12.123

Neerupa, C., Naveen Kumar, R., Pavithra, R., & John William, A. (2024). Game on for Learning: A holistic exploration of gamification's impact on student engagement and academic performance in educational environments. Management Matters, 21(1), 38–53. https://doi.org/10.1108/MANM-01-2024-0001

Pechenkina, E., Laurence, D., Oates, G., Eldridge, D., & Hunter, D. (2017). Using a gamified Mobile app to increase student engagement, retention, and academic achievement. International Journal of Educational Technology in Higher Education, 14, 31. https://doi.org/10.1186/s41239-017-0069-7

Ren, J., Xu, W., & Liu, Z. (2024). The impact of educational games on learning outcomes: Evidence from a meta-analysis. International Journal of Game-Based Learning, 14(1), 1–25. https://doi.org/10.4018/IJGBL.336478

Salhab, R., & Daher, W. (2023). University students' engagement in mobile learning. European Journal of Investigation in Health, Psychology and Education, 13(1), 202–216. https://doi.org/10.3390/ejihpe13010016

Smiderle, R., Rigo, S. J., Marques, L. B., Peçanha de Miranda Coelho, J. A., & Jaques, P. A. (2020). The impact of gamification on students' learning, engagement and behaviour based on their personality traits. Smart Learning Environments, 7(1), 3. https://doi.org/10.1186/s40561-019-0098-x

Sung, Y.-T., Chang, K.-E., & Liu, T.-C. (2016). The effects of integrating mobile devices With teaching and learning on students' learning performance: A meta-analysis and research synthesis. Computers & Education, 94, 252–275. https://doi.org/10.1016/j.compedu.2015.11.008

Umamah, A. (2023). Mobile games-based learning for gamer generations: A systematic review. In Y. Liu & S. Chujuarjeen (Eds.), Proceedings of the International Conference on Education, Humanities, and Management (ICEHUM 2022) (Vol. 741, pp. 125–137). Atlantis Press SARL. https://doi.org/10.2991/978-2-38476-040-4-13

Yu, Z., Gao, M., & Wang, L. (2021). The effect of educational games on learning outcomes, Student motivation, engagement and satisfaction. Journal of Educational Computing Research, 59(3), 522–546. https://doi.org/10.1177/0735633120969214

Fleischer, H. (2012). What is our current understanding of one-to-one computer projects: A systematic narrative research review. Educational Research Review, 7(2), 107–122. https://doi.org/10.1016/j.edurev.2011.11.004