

Mobile Game-Based Learning Application about History of Kuala Lumpur

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To Link this Article: <http://dx.doi.org/10.6007/IJARPED/v14-i3/25707> DOI:10.6007/IJARPED/v14-i3/25707

Published Online: 09 July 2025

Abstract

The integration of mobile game-based learning (MGBL) into history education holds transformative potential for enhancing student engagement, motivation, and knowledge retention. This paper presents the design and development of a mobile application, *Sejarah KL*, aimed at teaching the historical heritage of Kuala Lumpur through interactive and gamified learning experiences. Grounded in the adapted digital educational game development methodology (GAMED) framework, the study incorporates key design components, including a storyboard, flowchart, use case diagram, and high-fidelity prototype. Features such as quizzes, interactive lessons, and visual narratives are employed to foster active participation and facilitate meaningful historical understanding. The findings underscore the role of mobile games as effective pedagogical tools for history education and cultural preservation, particularly within the Malaysian educational context.

Keywords: Mobile Game-Based Learning, History Education, Educational Application Development

Introduction

Mobile game-based learning (MGBL) has emerged as a powerful educational tool, particularly in enhancing students' engagement and knowledge retention, especially in subjects often perceived as less interactive, such as history. By integrating interactive gameplay elements with educational content, MGBL transforms traditional learning methods into more dynamic and participatory experiences. This approach shifts learning from passive memorization to active involvement, increasing learners' motivation and understanding. Numerous studies have highlighted that interactive and gamified learning environments can lead to better cognitive outcomes, especially when designed to support problem-solving and exploration, as advocated by the cognitive apprenticeship model (Chang et al., 2013).

In the context of history education, MGBL applications offer immersive and engaging platforms for students to learn about past events in a meaningful way. These applications utilize elements such as gamification, storytelling, and user experience (UX) design to foster

curiosity and sustained interest. When applied to local historical content, such as the history of Kuala Lumpur, mobile games can help students connect more deeply with their cultural heritage, making history more accessible, relatable, and enjoyable.

The development of such applications is timely, given the growing need for innovative digital tools that can revitalize history education and promote cultural preservation. This study proposes that a mobile game-based learning application focusing on Kuala Lumpur's history can significantly enhance students' motivation and retention by leveraging gamified educational experiences. Through the thoughtful integration of gameplay, narrative, and pedagogical design, the application aims to offer a transformative learning journey that supports both academic outcomes and cultural appreciation.

Literature Review

Gamification elements such as points, levels, and rewards are important as they can increase student motivation and engagement in learning history. There are various forms of implementation across different projects. For example, the History Learning Mobile Game (HLMG) demonstrated that incorporating gamification can effectively sustain student interest and achieve educational outcomes (Yue & Ying, 2017). Another example includes role-playing games (RPGs) like *Waktu Silam*, which have been shown to enhance students' interest and motivation by allowing them to experience historical events interactively. This approach can make learning about Kuala Lumpur's history more relatable and exciting (Moketar et al., 2021). The integration of game mechanics such as rewards and challenges can motivate learners while preserving cultural heritage, as seen in the development of games based on Malaysian folklore (Ali et al., 2020).

Mobile games can serve as platforms for cultural education, promoting traditional values and knowledge through interactive learning experiences (Liu et al., 2024). Establishing design frameworks that incorporate cultural elements can guide the creation of effective educational applications (Liu et al., 2024). While integrating cultural context in mobile game-based learning applications is beneficial, it is essential to balance cultural specificity with universal design principles to ensure accessibility for diverse user groups. Cultural and historical authenticity is critical for ensuring that the learning experience is accurate and meaningful. Mobile GBL applications often incorporate authentic historical content, images, and artifacts to create a realistic and immersive learning environment. For example, *Garuda 45* uses authentic historical content to teach the history of Indonesian independence, while *CompARE* uses authentic cultural heritage sites to support student learning (Christofher et al., 2024; Souropetsis & Kyza, 2025).

Feedback and assessment mechanisms are essential for monitoring user progress and providing guidance. Mobile GBL applications often incorporate quizzes, tests, and other assessment tools to evaluate user understanding and provide feedback. For example, a mobile game for teaching the historical event of Indonesia's independence movement uses quizzes to assess user knowledge and provide feedback based on their performance (Jondya et al., 2023). Interactive and immersive learning experiences are key to engaging users and promoting deep learning. For instance, CurioCity combines virtual content and dynamic interfaces with interactive elements to create an engaging and immersive learning experience (Mcfettridge & Iqbal, 2024).

User experience (UX) design plays a crucial role in the success of mobile GBL applications. A well-designed UX ensures that the application is intuitive, engaging, and easy to use. The Honeycomb UX method, used in a mobile game for teaching history, emphasizes user approval and satisfaction (Zaliluddin et al., 2024). Similarly, the Go Story application uses a human-centered design methodology to maximize usability and engagement (Biabdillah et al., 2021). Storytelling and narrative design are essential for creating engaging and meaningful learning experiences. Historical events and facts are often presented in the form of stories to make them more relatable and memorable. For instance, *Gossip at Palace* uses a storytelling approach to communicate the 18th-century history of an Italian residence to teenagers. The game capitalizes on narrative and game mechanics to foster young visitors' motivation to explore the museum and facilitate their meaning-making process (Rubino et al., 2015).

While mobile game-based learning applications offer numerous benefits, it is essential to consider potential challenges and limitations. The effectiveness of these applications depends on careful design and implementation to ensure that educational content is accurately and engagingly presented (Yue & Ying, 2017). Despite these challenges, the integration of mobile game-based learning applications in history education holds promise for enhancing student engagement and retention of historical facts about Kuala Lumpur.

Methodology

The development of the mobile game-based learning application in this study is guided by the digital educational game development methodology (GAMED), which provides a structured set of methods, rules, and postulates embedded within the digital educational game life cycle (Aslan & Balci, 2015). This life cycle outlines a comprehensive framework for organizing the phases, processes, deliverables, quality assurance activities, and project management tasks necessary for developing, deploying, maintaining, and evolving a digital educational game from inception to retirement (Aslan & Balci, 2015). In this study, the GAMED methodology was adapted to suit the educational objective of developing a mobile game-based learning application that focuses on the history of Kuala Lumpur. The aim is to deliver an engaging and interactive educational platform that seamlessly integrates historical content with gamification elements. By adopting this methodological framework, the design and development process follows a systematic approach that supports iterative development and ensures the alignment of pedagogical goals with technical design.

Results and Discussions

A. Game Design Using Storyboard



Fig. 1 Storyboard

Fig. 1 presents the storyboard design for the *Sejarah KL* mobile game-based learning application. The storyboard outlines the visual and narrative flow of the application, illustrating key user interactions and interface transitions across different scenes. It serves as a blueprint that guides the development process by aligning gameplay elements with educational content delivery. Each screen illustrated in the storyboard is carefully designed to maintain intuitive navigation and to support engagement through consistent visual elements. The storyboard not only visualizes the application's functionality but also ensures that historical content is embedded meaningfully within the game's structure. By doing so, the design aims to provide a seamless and immersive learning experience that combines educational value with interactive gameplay.

B. Flowchart

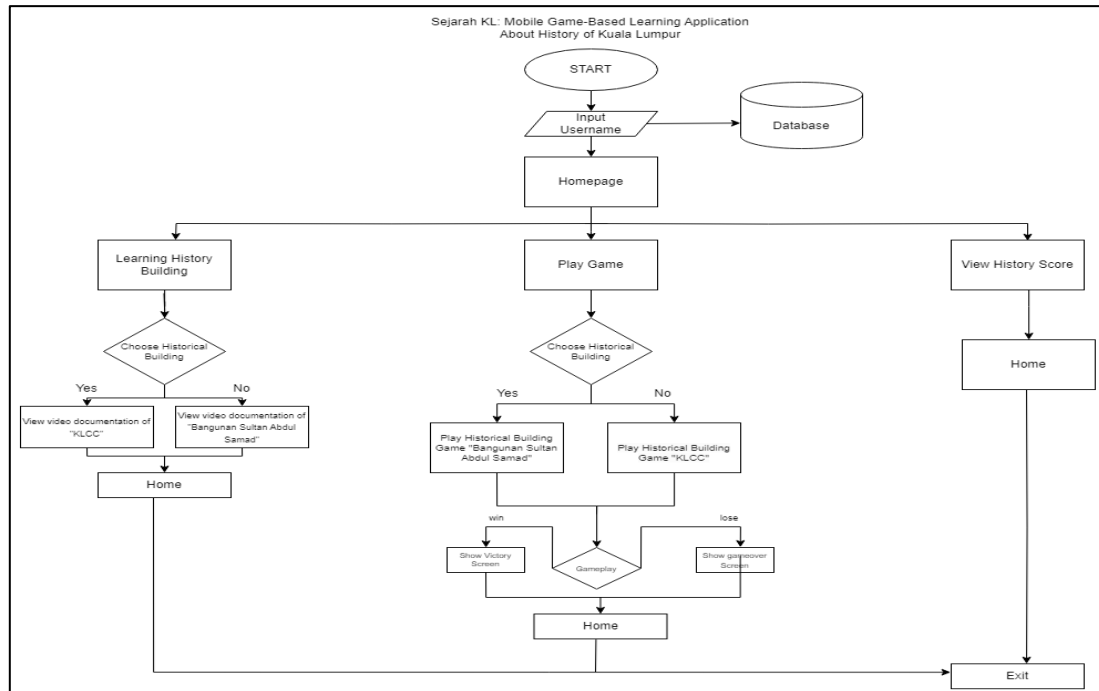


Fig. 2 Flowchart

Fig. 2 illustrates the flowchart that outlines the logical structure and user navigation pathways within the *Sejarah KL* mobile game-based learning application. This diagram represents the sequence of interactions from the user's entry point to the various functional components of the application, ensuring that the development process follows a clear and organized logic flow.

C. Use Case Diagram

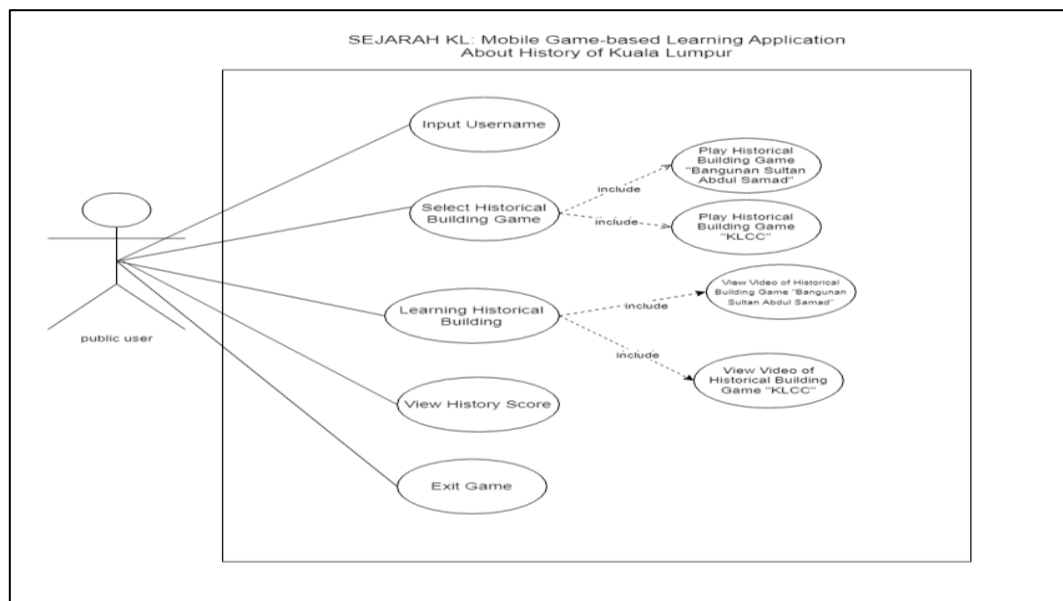


Fig. 3 Use case diagram for the application

Fig. 3 presents the use case diagram for the *Sejarah KL* mobile game-based learning application, illustrating the system's core functionalities from the user's perspective. The diagram serves as a high-level model that captures the interactions between the user (actor) and the various use cases (functional components) within the system. This modeling approach helps developers and stakeholders understand user expectations, system behavior, and feature requirements.

D. High-fidelity Prototype



Fig. 4 Loading Page

Fig. 4 illustrates the loading page of the *Sejarah KL* mobile game-based learning application. As the first interface encountered by users upon launching the application, the loading page plays a crucial role in setting the tone for the overall user experience. It introduces users to the visual identity of the application and serves as a transitional screen while system components are initialized. The loading page prominently features the *Sejarah KL* logo, centrally positioned against a clean and focused background. This design choice ensures brand visibility and provides a clear visual cue that the application is in the process of launching. The minimalistic design also contributes to reducing cognitive load during this initial stage, offering a visually calm and focused entry point before more complex interactions begin.

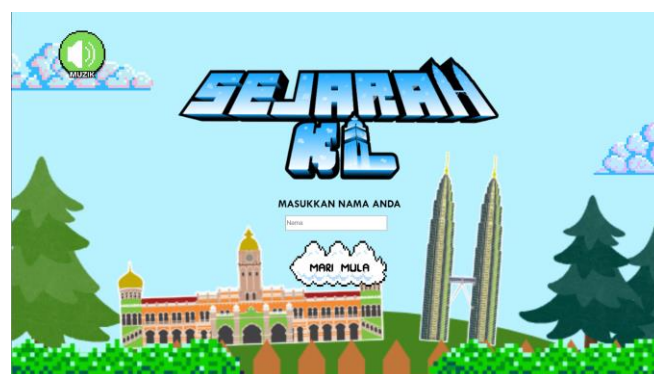


Fig. 5 Start Page

Fig. 5 illustrates the Start Page, which serves as the user's entry point into the mobile application. At the top of the screen, the application logo is prominently displayed, followed by a text input field where users are prompted to enter their username. Once entered, the username is stored in local storage to enable session continuity and personalization. A clearly

labeled button is provided to proceed to the homepage, allowing users to begin exploring the application.



Fig. 6 Homepage

Fig. 6 presents the Homepage of the application. This interface features five primary buttons: the “*Mari Belajar*” button, which provides access to historical lessons on significant buildings; and the “*Mula Permainan*” button, which directs users to the gameplay section. Located in the upper left corner are two additional buttons, which include one for displaying information about the application and another for toggling the background music on or off. The user’s username is displayed at the bottom center of the screen, reinforcing personalization. Lastly, an Exit button is positioned in the top right corner, enabling users to exit the application upon confirmation.

Conclusion

This study presents the development of *Sejarah KL*, a mobile game-based learning application designed to improve student engagement and historical understanding. The application combines gamification, narrative design, and user-centered interface elements to create an interactive educational experience focused on the history of Kuala Lumpur. The development process was guided by the adapted GAMED methodology, supported using a storyboard, flowchart, use case diagram, and high-fidelity prototype. The findings suggest that mobile game-based learning applications hold strong potential for enhancing history education and promoting cultural appreciation in a meaningful and engaging manner.

References

- Ali, M. F. B., Jeu, N. P., & Teeng, C. H. (2020). "Enriching Malaysian Cultural and Folklore through Mobile Game Learning Development: Wau & Toyol," 2020 IEEE Graphics and Multimedia (GAME), Kota Kinabalu, Malaysia, 2020, pp. 1-6, doi: <https://doi.org/10.1109/GAME50158.2020.9315081>
- Aslan, S., & Balci, O. (2015). GAMED: digital educational game development methodology. 91(4), 307–319. <https://doi.org/10.1177/0037549715572673>
- Biabdillah, F., Tolle, H., & Bachtiar, F. A. (2021). Go Story: Design and Evaluation Educational Mobile Learning Podcast Using Human Centered Design Method and Gamification for History. *Journal of Information Technology and Computer Science*, 6(3), 308-318. <https://doi.org/10.25126/jitecs.202163345>
- Chang, W.-C., Chang, C.-S., Yang, H.-C., & Jheng, M.-R. (2013). Game-Based History Ubiquitous Learning Environment Through Cognitive Apprenticeship. In: Park, J.J., Barolli, L., Xhafa, F., Jeong, H.Y. (eds) *Information Technology Convergence. Lecture Notes in Electrical Engineering*, vol 253. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-6996-0_65
- Christofher, Hermawan, F., Arizona, K. I. & Yanfi, "Development of Garuda 45 An Android Gamification Application for Historical Education," 2024 3rd International Conference on Creative Communication and Innovative Technology (ICCIT), Tangerang, Indonesia, 2024, pp. 1-8, doi: <https://doi.org/10.1109/ICCIT62134.2024.10701178>
- Jondya, A. G., Susanto, K. F. & Cathleen, "Utilizing Simple Fuzzy Logic into An Adaptive Storytelling Mobile Game in Learning Historical Event of Indonesia's Independence Movement," 2023 7th International Conference on New Media Studies (CONMEDIA), Bali, Indonesia, 2023, pp. 33-38, doi: <https://doi.org/10.1109/CONMEDIA60526.2023.10428575>
- Liu, W., Gui, H., and Guo, Y. (2024). "Research on Gamification Education APP Design Based on Chu Culture," 2024 International Conference on Informatics Education and Computer Technology Applications (IECA), Beijing, China, 2024, pp. 105-111, doi: <https://doi.org/10.1109/IECA62822.2024.00027>
- Mcfettridge, G., & Iqbal, M. Z. (2024). CurioCity: Augmented Reality Gamification to Foster Recreational Learning. *Virtual Worlds*, 3(4), 586–598. <https://doi.org/10.3390/virtualworlds3040030>
- Moketar, N. A., Mat Zain, N. H., Johari, S. N., Abu Samah, K. A. F., Riza, L. S., & Kamalrudin, M. (2021). "Learning Cultural Heritage History in Muzium Negara through Role-Playing Game" *International Journal of Advanced Computer Science and Applications (IJACSA)*, 12(12), 2021. <http://dx.doi.org/10.14569/IJACSA.2021.0121253>
- Rubino, I., Barberis, C., Xhembulla, J., & Malnati, G. (2015). Integrating a Location-Based Mobile Game in the Museum Visit: Evaluating Visitors' Behaviour and Learning. *ACM Journal on Computing and Cultural Heritage*, 8(3), 15. <https://doi.org/10.1145/2724723>
- Souropetsis, M., & Kyza, E. A. (2025). CompARe: Design and Development of a Gamified Augmented Reality Learning Environment for Cultural Heritage Sites. *Journal on Computing and Cultural Heritage*, 18(1). <https://doi.org/10.1145/3703917>
- Yue, W. S. & Ying, C. Y. (2017). "The Evaluation Study of Gamification Approach in Malaysian History Learning via Mobile Game Application," 2017 IEEE 17th International Conference on Advanced Learning Technologies (ICALT), Timisoara, Romania, 150-152. <https://doi.org/10.1109/ICALT.2017.69>

Zaliluddin, D., Bastian, A., Siti Samira Yuliani, M., Firmansyah, E., Sarmidi, & Sumaryana, Y. (2024). Engaging Teens in History through a Mobile Game Utilizing the Fisher-Yates Shuffle Algorithm and Honeycomb UX Design. *International Journal of Interactive Mobile Technologies (IJIM)*, 18(22), pp. 35–49. <https://doi.org/10.3991/ijim.v18i22.50705>