

INTERNATIONAL JOURNAL
OF HERITAGE, ART
AND MULTIMEDIA
(IJHAM)www.gaexcellence.com/ijham**RENTAK WARISAN: USER PERCEPTIONS OF A 2D
MOBILE GAME FOR LEARNING MALAYSIAN
TRADITIONAL DANCE**Abdul Wafiy Muhklis Md Nasir¹, Norhana Yusof^{2*}, Ruziana Mohamad Rasli³¹School of Multimedia Technology and Communication, Universiti Utara Malaysia abdulwafiy505@gmail.com <https://orcid.org/0009-0003-6112-8147>²School of Multimedia Technology and Communication, Universiti Utara Malaysia ynorhana@uum.edu.my <https://orcid.org/0000-0003-1675-2250>³School of Multimedia Technology and Communication, Universiti Utara Malaysia ruziana@uum.edu.my <https://orcid.org/0009-0006-7187-513X>

*Corresponding Author

Article Info:**Article history:**

Received date: 30.07.2026

Revised date: 17.08.2026

Accepted date: 06.09.2026

Published date: 15.09.2026

To cite this document:

Nasir, A. W. M. M., Yusof, N., Rasli, R. M. (2026). *Rentak Warisan: User Perceptions of A 2D Mobile Game for Learning Malaysian Traditional Dance*. *International Journal of Heritage, Art and Multimedia*, 9(30), 19-33.

DOI: 10.35631/IJHAM.930002**Abstract:**

The declining interest in Malaysian traditional dance among young people poses a challenge to the continuity of the country's cultural identity and values. Therefore, this study explores the potential of a 2D mobile game called *Rentak Warisan* to promote interest in Malaysian traditional dance among youth. A questionnaire was used to evaluate users' perceptions of the game based on three dimensions: usability, perceived effectiveness, and engagement. The game was evaluated by 30 students from Universiti Utara Malaysia with diverse academic backgrounds. The collected data were analysed using descriptive statistical analysis. The findings showed that participants had positive perceptions of *Rentak Warisan* in terms of its usability, perceived effectiveness, and engagement. Participants also perceived that the game could improve their awareness, knowledge, and appreciation of Malaysian traditional dance while providing an enjoyable learning experience. Overall, the study suggests that mobile game-based learning has the potential to support cultural education and contribute to the preservation of Malaysian traditional heritage.

Keyword:

Cultural Education, Malaysian Traditional Dance, Mobile Game-Based Learning, *Rentak Warisan*



© The authors (2026). This is an Open Access article distributed under the terms of the Creative Commons Attribution (CC BY NC) (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact ijham@gaexcellence.com.

Introduction

According to Radzuan et al., (2024) Malaysia possesses a diverse intangible cultural heritage encompassing traditional music, dance, ceremonial rituals, and artisanal crafts that is fundamentally tied to the nation's historical identity. It is important to preserve cultural heritage through efforts to recreate, document and transfer knowledge to the next generation so that it continues to remain a living heritage (Harun & Abdullah, 2023). Malaysia has a rich variety of traditional dances, which reflect the country's history, identity and multiculturalism. These dances are not just works of art, but also symbols of cultural values, customs, and traditions that have been passed down through the generations. But as digital technology and modern entertainment have grown and developed, young people's contact with traditional performing arts has also been gradually reduced. Younger generations are spending more time on digital media and more time engaging with entertainment interaction, which means that they are not as interested in traditional dances as they used to be and the cultural awareness and appreciation have been decreased. With technology making traditional face-to-face cultural transmission less effective, social media has become a new cultural arena, transforming modern communication and creating novel ways for people to interact (Alam et al., 2025; Gu et al., 2025).

Furthermore, this ever-changing situation has become a serious challenge for cultural preservation. As the economy, society, and technology have rapidly modernized, cultural elements have steadily diminished, leading directly to the loss and degradation of traditional dance heritage (Lobo, 2023). The modern dance styles are more noticeable to the younger generation credit to social media, online video platforms and digital entertainment compared to traditional dances. Many young people have a limited opportunities to learn about the various Malaysian traditional dances, thus reducing their knowledge and appreciation of the country's cultural heritage. Without effective initiatives to encourage cultural learning, traditional dances may become increasingly disconnected from future generations. By keeping the dance young people not only preserve the culture but also maintain the growth (Mendoza et al., 2025)

The challenge can be met in new, more interactive ways, using advances in multimedia technology, which allow the presentation of cultural content in more engaging and interactive ways. The use of educational games is becoming more common these days, and they are used in way that the user can become active in the learning process, instead of just receiving it. Educational games have the potential to captivate learners through multimedia components like animation, graphics, audio, video and interactive gameplay, enhancing their learning and making cultural knowledge accessible and enjoyable. By allowing students to interact with virtual game mechanics, digital educational games create a meaningful environment that heavily drives learning motivation (Gui et al., 2023).

In order to preserve the cultural heritage of Malaysia, a 2D mobile game application name *Rentak Warisan* was created by utilizing Unity. The application is based on traditional dances of Malay, Chinese and Indian communities, using interactive games and learning materials through multimedia. Zapin, Bharatanatyam, and Lion Dance are among the traditional dances highlighted in this application. This application not only uses conventional learning methods, but also adds elements of explorations, cultural information and learning videos so that the user can learn about traditional dances in a fun learning environment. It was developed to promote awareness on Malaysian traditional dance among students of Universiti Utara Malaysia (UUM) is explored in this study. This study aims to assess the user perception of *Rentak Warisan*, a 2D mobile game application on cultural learning among university students in terms of usability, perceived effectiveness, and engagement.

Literature Review

2D Mobile Games for Learning Traditional Dance

Mobile gaming refers to digital games that are developed to be played through mobile devices such as smartphones and tablets (Putratama & Retnowardhani, 2025). Vallejo-Imbaquingo et al. (2025) found that mobile games can support positive pedagogical outcomes that allow learning content to be flexibly accessed as well as presented through a combination of text, graphics, animation, audio, video and interactive activities. 2D visual-based games are suitable for the development of educational applications because their design is simpler, easier to understand and does not require too complex interactions. The use of elements such as game levels, points, challenges, rewards, and feedback can also encourage users to actively interact with the learning content. Previous studies have shown that game-based learning has the potential to improve cognitive outcomes, motivation, and user engagement when game elements are aligned with clear learning objectives (Alotaibi, 2024).

In traditional dance-related learning, mobile games can convey information about dance history, origins, clothing, music, movements, and cultural values in a more interactive form. Instead of simply delivering via text or video, players can explore content, answer questions, complete tasks, and receive rewards based on their progress. However, studies that specifically develop 2D mobile games for traditional dances are still limited. Therefore, the following comparative analysis includes traditional dance-related games, prototypes, and mobile applications that use several approaches, including gamification, visual novels, rhythm games, adventures, and 3D role-playing.

Game-Based Learning in Education and Cultural Heritage Preservation

Game-based learning is an approach that uses the entire gaming experience to achieve specific learning outcomes (Alotaibi, 2024). In this approach, educational content is integrated with rules, goals, challenges, levels, feedback, and rewards. Users need to make decisions or complete tasks to continue playing, thus encouraging active learning. Systematic studies show that game-based learning can have a positive impact on knowledge, motivation, social engagement, and learning experiences, but its effectiveness depends on the fit between game mechanics, challenge levels, and learning objectives (Alotaibi, 2024).

The use of digital games is gaining attention in cultural heritage education as games allow users to explore cultural content through more active experiences. In a recent study by Camuñas et. al, (2024), an analysis of 100 cultural heritage-based games shows that narrative, exploration, character, challenges, interaction with cultural objects, and emotional engagement are among the important characteristics that can support heritage learning. According to Camuñas et. al, (2024) digital games not only serve as a medium of entertainment but can also provide a space for users to get to know the stories, identities, practices and values of a society.

In the Malaysian context, animation and digital games have the potential to increase the introduction and appreciation of cultural identity among the younger generation. However, the cultural content used needs to be presented accurately and not just as a decorative element. Information about the origins of dance, clothing, music, movement, and symbolic value should be verified through authoritative sources or cultural experts. Rahman and Sidek (2023) point out that visual, narrative and cultural artifacts in animation and digital games can help strengthen appreciation for Malaysia's heritage, especially when the content is close to the experiences and identities of young users.

Based on this principle, *Rentak Warisan* uses game-based learning to introduce traditional Malay, Chinese and Indian dances. Each section can convey information through videos, illustrations, short texts, and music, followed by activities such as quizzes, object matching, clothing identification, item collection, or dance-related challenges. The activity helps to reinforce the information that has been presented as well as provide feedback to the players. However, mobile apps should be seen as a support medium to raise awareness and interest, rather than replacing the experience of learning dance moves directly from teachers or cultural practitioners. Cultural games are best suited to function as part of a learning experience that also involves explanations, demonstrations and interaction with real cultural resources.

User Perception of Usability, Perceived Effectiveness and Engagement

User ratings are important to determine whether educational games can be easily used and provide an appropriate experience to the target group. In this study, user perceptions were assessed based on three dimensions, namely usability, perceived effectiveness, and engagement. The three dimensions are interrelated but measure different aspects. A systematic review of game-based learning assessment also identified learning, engagement and usability as among the key constructs used to assess educational games (Gris, & Bengtson, 2021).

Usability refers to the extent to which users can interact with the app in a simple, clear, and satisfying manner (Weichbroth, 2024). In mobile games, usability can involve ease of understanding navigation, clarity of instructions, simplicity of controls, smoothness of applications, and the ability to complete tasks without encountering significant problems. The System Usability Scale (SUS) (Lewis, 2018) is often used to assess the general perception of the usability of a system. However, if studies use self-constructed or modified questionnaire items, the results are more accurately reported as users' perceptions of usability, and not as SUS scores unless all items and actual SUS calculation methods are used.

Perceived effectiveness, on the other hand, refers to the belief or view of the user that the game helps increase their knowledge, awareness, interest or appreciation. For example, users may feel that the videos and information in *Rentak Warisan* help them understand traditional

Malaysian dances. However, the responses to the questionnaire did not prove that the increase in knowledge actually happened. A systematic study by Gris and Bengtson (2021) distinguishes direct measures, such as knowledge tests, from indirect measures obtained through user perception. Therefore, studies using only questionnaires need to use the term perceived effectiveness. The use of the term "learning effectiveness" or the claim that games have improved knowledge requires additional evidence through pre- and post-tests or comparisons with control groups.

User engagement includes aspects such as enjoyment, interest, concentration of attention, and desire to continuously interact with the game (Park & Yap, 2025). Even if a game is easy to use, it is not always able to keep the player's interest because the level of engagement is also influenced by the design and experience of the game. Challenges that are appropriate to the player's abilities, clear goals, immediate feedback and rewards can encourage active participation and maintain the player's attention and motivation (Pattemore & Gilabert, 2025). In addition, various interactions, rewards, and gaming activities have been found to increase users' enjoyment, motivation, and engagement in digital game-based learning (Zakaria & Zakaria, 2025). Therefore, for Legacy Pace, an assessment of the enjoyment of playing, the ability of the activity to maintain interest and the willingness to propose the app to other users can provide an early idea of the level of user engagement.

Overall, the use of questionnaires to assess usability, perceived effectiveness and engagement is appropriate for studies that focus on users' perceptions of *Rentak Warisan*. Descriptive analysis using frequency, percentage, min score and standard deviation can provide an overview of user acceptance. However, the findings should be interpreted as participants' views on their experiences and not as definitive evidence that the app has improved dance knowledge or skills. Stronger learning measurements can be implemented in future studies through pre- and post-application knowledge tests.

Methodology

The data collection and the analysis method in this research was quantitative research method used for the evaluation of *Rentak Warisan: A 2D Mobile Game Application*. Dehalwar & Sharma, (2024) claimed structured instruments such as surveys, questionnaires, and experiments are effective methods that can be utilized to gather numerical data. The quantitative approach was selected because it allows for collecting numerical data from participants and have a structured collection, which is appropriate for comparing the user's response based on the predefined evaluation criteria. Quantitative methodology involves collecting and analyzing numerical data to address scientific questions by summarizing information, identifying patterns, testing causal relationships, making predictions, and generalizing findings to broader populations (Rana et al., 2023). The gathered data was then analysed to get objective results in accordance with the user's perception of the develop application.

A total of 30 students of Universiti Utara Malaysia (UUM) in the range of 18-25 years were participated in this study. Participants were given approximately 20 - 30 minutes (to use the *Rentak Warisan* and familiarize themselves with the features of the 2D mobile game before they could answer the questionnaire so that they could get sufficient experience before providing their feedback.

The evaluation technique in this study used the data collection method in the form of a structured questionnaire through Google Forms that was adapted by Lewis (2018). The questionnaire was divided into six parts aimed to gather specific information pertaining to the assessment of the application. The demographic data of the participants such as age, gender and educational background were collected in section A. Section B highlighted usability testing which was done with respect to ease of use, navigation, and functionality of the application.

Meanwhile, the effectiveness of *Rentak Warisan* was assessed in Section C, especially for enhancing awareness and understanding in the Malaysian traditional dances among the users. In Section D, the game experience and engagement of participants were measured through various components of the game, including play experience, play interaction and play motivation. Lastly, Section E comprised open-ended questions which enabled the participants to offer comments, suggestions and recommendations to make improvements to the application. Items in Section B, C, and D of the questionnaire were rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). This scale allowed participants to report their degree of agreement with each statement, and open-ended questions in Section F gave qualitative feedback to enrich the quantitative results. The integration of quantitative and qualitative methodologies yields a synergistic outcome, offering a more robust understanding than either approach alone, (Pyo et al., 2023). Table 1 summarises the dimensions and items in the questionnaire.

Table 1: Dimensions and Items in the Questionnaire

Dimensions	Items
Section A: Demographic	Gender Age
Section B: Usability	The application is easy to use. The navigation buttons are easy to understand. The tasks and challenges given are clear and understandable. The game controls are simple and responsive. The application runs smoothly without major problems.
Section C: Perceived Effectiveness	The videos and information provided in the game are helpful for learning. The game increased my interest in traditional dances. The application increased my knowledge of Malaysian traditional dances. I learned information about Malaysia cultural heritage from this game.
Section D: Game Experience and Engagement	The game is enjoyable to play. The activities in the game keep me interested. I would recommend this application to others.

After all responses were collected, the data were organised and analysed using descriptive statistics. The findings were summarised using frequency, percentage, mean scores, and standard deviations to provide an overview of the participants' responses to each questionnaire item. The questionnaire data provided a systematic basis for interpreting the participants' perceptions and identifying patterns related to the usability, perceived effectiveness, and engagement of the application. The evaluation findings were then used to support the discussion and to formulate recommendations for the future improvement of *Rentak Warisan*.

The Proposed 2D Mobile Game: *Rentak Warisan*

Rentak Warisan is a 2D mobile game developed to introduce Malaysian traditional dances through an interactive and engaging learning experience. Figures 1 and 2 illustrate examples of the game interfaces in *Rentak Warisan*. The game focuses on the traditional dances of the three major ethnic groups in Malaysia: Malay, Chinese, and Indian. Through this cultural representation, the mobile game aims to increase players' awareness and understanding of Malaysia's diverse cultural heritage. The use of a mobile game platform also allows cultural information to be presented in a form that is more accessible and appealing to younger users.

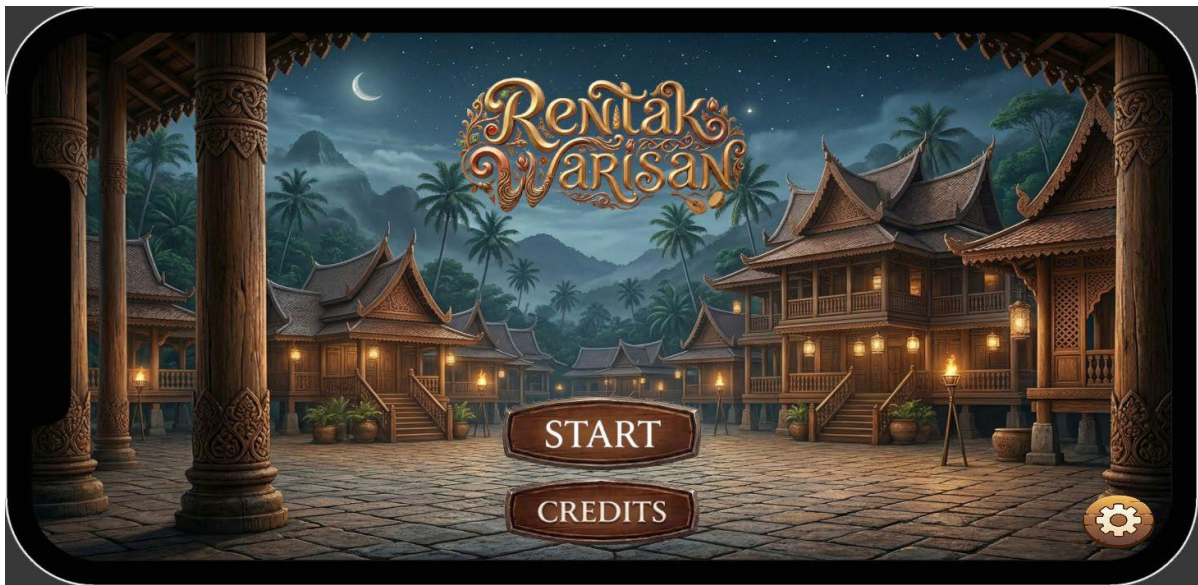


Figure 1: Start Screen of *Rentak Warisan*



Figure 2: Reward Screen in the Malay Traditional Dance Section

To maintain players' interest, each section includes game-based activities related to the traditional dance content. These activities may include quizzes, matching exercises, object collection, movement identification, puzzles, and challenges that require players to recall the information presented in the game. The activities encourage active participation rather than passive reading and allow players to interact directly with the cultural content. By combining educational information with enjoyable gameplay, *Rentak Warisan* has the potential to enhance engagement, promote cultural appreciation, and support the preservation of Malaysian traditional dances among younger generations.

Result & Discussion

This section presents and discusses the findings obtained from the evaluation of *Rentak Warisan*. The results are based on questionnaire responses from 30 students of Universiti Utara Malaysia and focus on three main dimensions: usability, perceived effectiveness, and engagement. The collected data were analysed using descriptive statistics, including frequency, and percentage. The findings are discussed to identify participants' perceptions of the game, determine its potential to support learning about Malaysian traditional dance, and highlight areas for future improvement.

Demographic

Table 1 presents the demographic profile of the 30 participants involved in the evaluation of *Rentak Warisan*. In terms of gender, 16 participants (53.3%) were female, while 14 participants (46.7%) were male, indicating a relatively balanced gender distribution. Regarding age, the majority of participants were between 21 and 23 years old, accounting for 23 participants (76.7%). Meanwhile, six participants (20.0%) were above 23 years old, and only one participant (3.3%) was under 20 years old. Overall, the findings show that most participants were young adults within the typical university student age range.

Table 1: Demographic

Information		Total	Percentage
Gender	Male	14	46.7 %
	Female	16	53.3 %
Age	Under 20	1	3.3 %
	21 – 23	23	76.7 %
	Above 23	6	20 %

Usability

Table 2 and Figure 3 indicates that participants generally perceived *Rentak Warisan* as highly usable, with an overall mean score of 4.11 and individual mean scores ranging from 4.00 to 4.23. The ease of using the application recorded the highest mean score ($M = 4.23$, $SD = 0.626$), followed by the clarity of the navigation buttons ($M = 4.20$, $SD = 0.610$), with 90.0% of participants responding positively to both statements. Participants also viewed the application as running smoothly ($M = 4.10$, $SD = 0.803$) and considered the game controls simple and responsive ($M = 4.03$, $SD = 0.765$). The clarity of the tasks and challenges received the lowest

mean score ($M = 4.00$, $SD = 0.871$), although 76.7% of participants still agreed or strongly agreed with the statement, suggesting that some instructions may require further clarification. Overall, the findings demonstrate that Rentak Warisan was perceived as easy to learn, navigate, and operate, which corresponds with the concept of usability as users' ability to achieve intended goals effectively, efficiently, and satisfactorily within a specific context of use (International Organization for Standardization [ISO], 2018). These findings may be influenced by the simple interface design, clear navigation, and easy-to-understand and responsive game controls. The positive responses are also consistent with Yadav and Oyelere (2021), who identified ease of use, ease of learning, usefulness, and satisfaction as important elements in evaluating users' perceptions of mobile game-based learning applications. However, a slightly lower score for task clarity indicates that instructions and challenge descriptions can still be improved to reduce user confusion

Table 2: Descriptive Statistics for the Usability Dimension of Rentak Warisan

No.	Usability item	Mean (M)	Standard deviation (SD)
1	The application is easy to use.	4.23	0.626
2	The navigation buttons are easy to understand.	4.20	0.610
3	The tasks and challenges provided are clear and understandable.	4.00	0.871
4	The game controls are simple and responsive.	4.03	0.765
5	The application runs smoothly without major problems.	4.10	0.803
Overall mean		4.11	

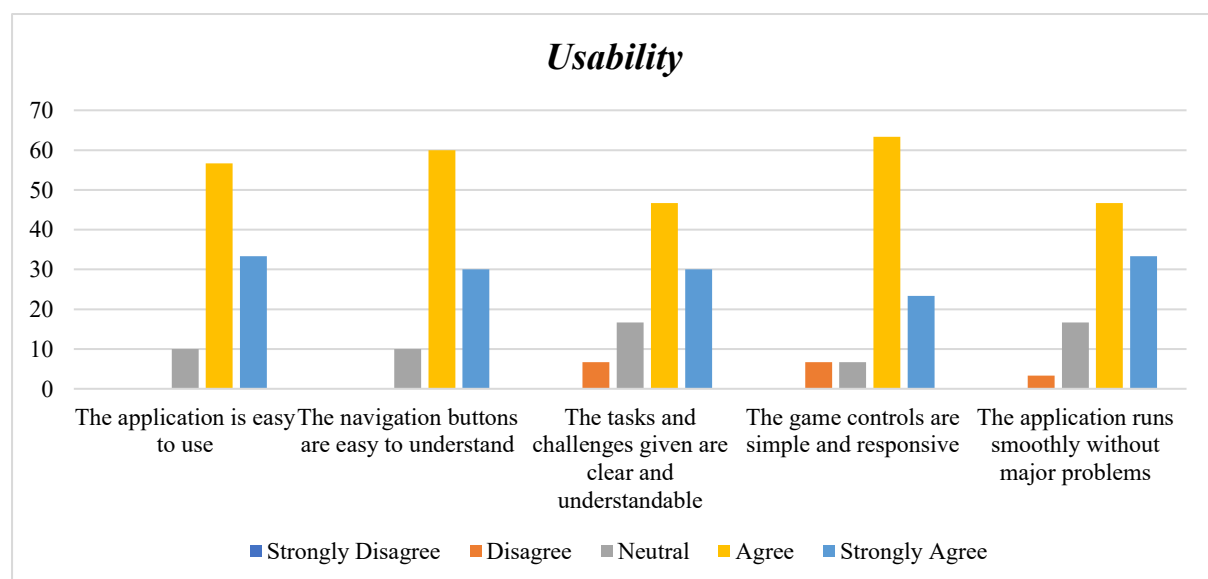


Figure 3: User Perceptions of the Usability of Rentak Warisan

Perceived Effectiveness

Table 3 and Figure 4 show that participants generally perceived *Rentak Warisan* as effective, with mean scores ranging from 4.03 to 4.20 and an overall mean of 4.12. For the statement that the videos and information were helpful for learning, 63.3% of participants agreed and 26.7% strongly agreed, giving a total positive response of 90.0% ($M = 4.17$, $SD = 0.592$). Regarding increased interest in traditional dances, 53.3% agreed and 26.7% strongly agreed, while 16.7% were neutral and 3.3% disagreed ($M = 4.03$, $SD = 0.765$). Similarly, 56.7% agreed and 26.7% strongly agreed that the application increased their knowledge of Malaysian traditional dances, producing a positive response of 83.3% ($M = 4.07$, $SD = 0.740$). The highest mean score was recorded for learning about Malaysian cultural heritage, where 60.0% agreed and 30.0% strongly agreed, while only 10.0% selected a neutral response ($M = 4.20$, $SD = 0.610$). These positive findings may be due to the use of videos, cultural information, and game elements that help participants understand traditional dances more easily and interestingly. The combination of visual and interactive content is also likely to increase their knowledge and awareness of Malaysia's cultural heritage.

Table 3: Descriptive Statistics for the Perceived Effectiveness Dimension of *Rentak Warisan*

No.	Perceived effectiveness item	Mean (M)	Standard deviation (SD)
1	The videos and information provided in the game are helpful for learning.	4.17	0.592
2	The game increased my interest in traditional dances.	4.03	0.765
3	The application increased my knowledge of Malaysian traditional dances.	4.07	0.740
4	I learned information about Malaysian cultural heritage from this game.	4.20	0.610
Overall mean		4.12	

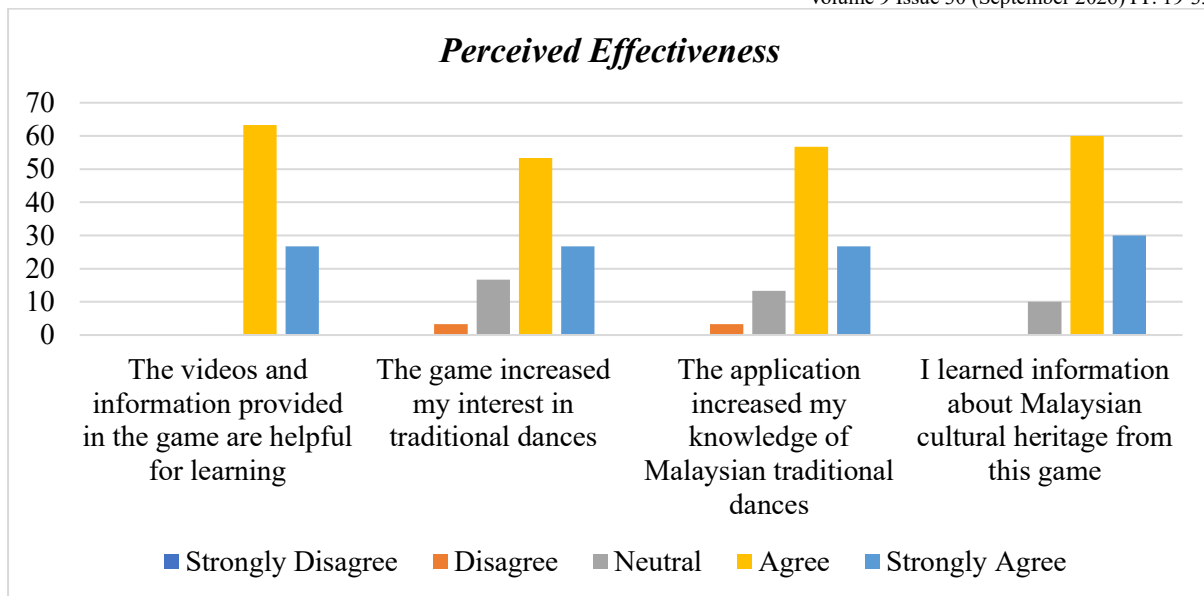


Figure 4: User Perceptions of the Perceived Effectiveness of *Rentak Warisan*

Engagement

Table 4 and Figure 5 indicate that participants generally demonstrated a positive level of engagement with *Rentak Warisan*, with mean scores ranging from 3.63 to 3.70 and an overall mean of 3.67. The statement that the game was enjoyable to play recorded the highest mean score ($M = 3.70$, $SD = 1.055$), with 23.3% of participants agreeing and 30.0% strongly agreeing, resulting in a total positive response of 53.3%. Meanwhile, 23.3% agreed and 26.7% strongly agreed that the activities in the game kept them interested, giving a total positive response of 50.0% ($M = 3.63$, $SD = 1.033$). For the recommendation item, 33.3% agreed and 23.3% strongly agreed that they would recommend the application to others, producing the highest total positive response of 56.6% ($M = 3.67$, $SD = 0.994$). However, between 30.0% and 36.7% of participants selected neutral responses across the three statements, while 13.3% disagreed with each statement. These findings may be influenced by variations in activity, challenge levels, and still limited reward elements, causing some participants to respond neutrally. Improvements to the interactivity and gameplay diversity aspects have the potential to increase user engagement levels.

Table 4: Descriptive Statistics for the Engagement Dimension of *Rentak Warisan*

No.	Engagement item	Mean (M)	Standard deviation (SD)
1	The game is enjoyable to play.	3.70	1.055
2	The activities in the game kept me interested.	3.63	1.033
3	I would recommend this application to others.	3.67	0.994
Overall mean		3.67	

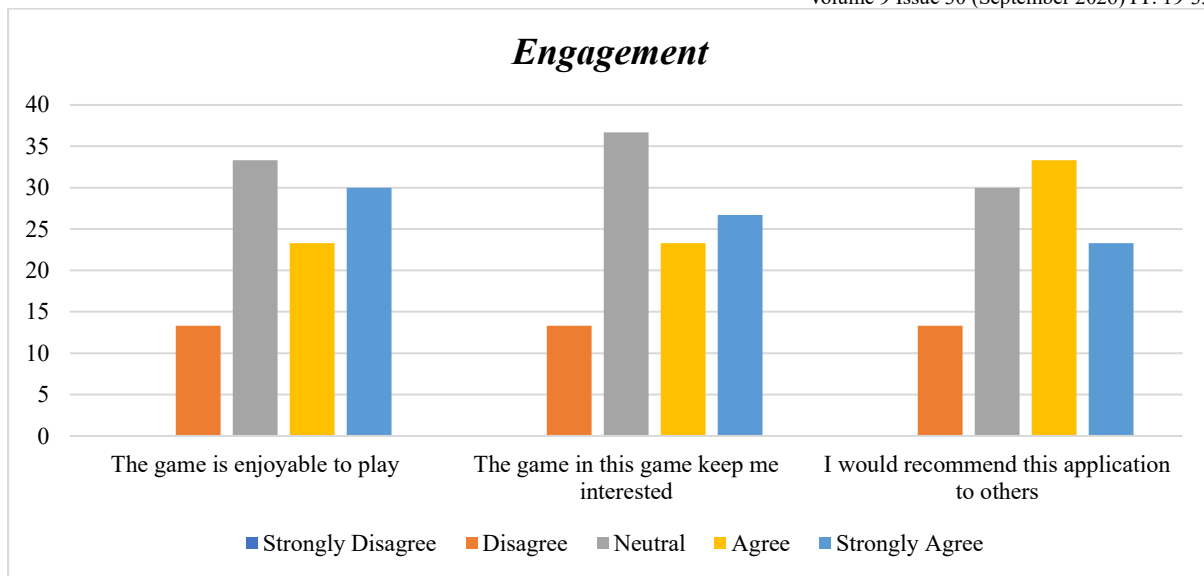


Figure 5: User Perceptions of the Engagement of *Rentak Warisan*

Conclusion

Overall, this study shows that *Rentak Warisan* has potential as a digital learning medium to introduce traditional Malaysian dances to young people. Based on the evaluations conducted, participants gave a positive perception of usability, perceived effectiveness and engagement. The 2D mobile game is easy to use, has clear navigation and delivers information related to traditional Malay, Chinese and Indian dances in a more interesting and interactive form. Content in the form of videos, cultural information and game activities also help increase users' knowledge, awareness and appreciation of Malaysia's cultural heritage.

However, the level of user engagement could still be improved as some participants responded neutrally to the fun and ability of the game to maintain their interest. Therefore, improvements in the future can focus on the variety of activities, challenge levels, reward systems, interactive elements, and clearer delivery of instructions. Follow-up studies can also involve a larger number of participants and use pre- and post-tests to measure knowledge change more objectively. As for mobile game improvements, *Rentak Warisan* can be enriched with more traditional dance content, variations of game activities, and different levels of difficulty. In addition, animation elements, music, and in-game rewards can be improved to make the user experience more engaging and interactive. With these improvements, *Rentak Warisan* has the potential to become a more effective play-based learning approach in supporting cultural education and efforts to preserve traditional Malaysian dance.

-
- Acknowledgements:** The authors would like to express their sincere gratitude to Universiti Utara Malaysia for providing the necessary resources and support throughout the course of this research. Special appreciation is extended to colleagues and peers who contributed valuable insights and constructive feedback, which greatly enhanced the quality of this paper. The authors also acknowledge the use of ChatGPT by OpenAI as an AI-assisted tool for language refinement and academic writing support during the preparation of this manuscript.
- Funding Statement:** This research received financial support from Multimedia Innovation and Digital Humanities (MIDH-SMMTC). The funding body had no role in the design of the study, data collection, analysis, interpretation of results, or the decision to publish this manuscript.
- Conflict of Interest Statement:** The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the International Journal of Heritage, Art and Multimedia (IJHAM).
- Ethics Statement:** This study was conducted in accordance with established ethical research guidelines. Participation in the study was entirely voluntary, and all respondents provided informed consent prior to data collection. The confidentiality and anonymity of participants were strictly maintained throughout the research process, with all data being used solely for academic purposes. No personal identifiers were collected, and participants were assured that their responses would not be disclosed individually or used for any purposes beyond this study.
- This study did not involve any human participants, animals, or sensitive data requiring ethical approval. The authors confirm that the research was conducted in accordance with accepted academic integrity and ethical publishing standards.
- Author Contribution Statement:** All authors contributed significantly to the development of this manuscript. Norhana Yusof was responsible for the conceptualization, methodology, and overall supervision of the study. Abdul Wafiy Muhklis Md Nasir handled data collection, analysis, and interpretation of results. Ruziana Mohamad Rasli contributed to the literature review, drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission.
-

References

- Alam, T. M., Stoica, G. A., Sharma, K., & Özgöbek, Ö. (2025, February). Digital technologies in the classrooms in the last decade (2014–2023): A bibliometric analysis. In *Frontiers in Education* (Vol. 10, p. 1533588). Frontiers Media SA.
- Alotaibi, M. S. (2024). Game-based learning in early childhood education: A systematic review and meta-analysis. *Frontiers in Psychology*, 15, 1307881. doi:10.3389/fpsyg.2024.1307881
- Alotaibi, M.S. (2024) Game-based learning in early childhood education: a systematic review and meta-analysis. *Front. Psychol.* 15:1307881. doi: 10.3389/fpsyg.2024.1307881
- Camuñas-García, D., Cáceres-Reche, M. P., Cambil-Hernández, M. E., & Lorenzo-Martín, M. E. (2024). Digital game-based heritage education: Analyzing the potential of heritage-based video games. *Education Sciences*, 14(4), 396. doi:10.3390/educsci14040396
- Chiotaki, D., Pouloupoulos, V., & Karpouzis, K. (2023). Adaptive game-based learning in education: A systematic review. *Frontiers in Computer Science*, 5, 1062350. doi:10.3389/fcomp.2023.1062350
- Gris, G., & Bengtson, C. (2021). Assessment measures in game-based learning research: A systematic review. *International Journal of Serious Games*, 8(1), 3–26. doi:10.17083/ijsg.v8i1.383
- Gu, H., Mohd Muhaiyuddin, N. D. B., & Shaari, N. B. (2025). Narrative-driven virtual reality serious game to support type 1 diabetes self-management in children. *Scientific Reports*.
- Gui, Y., Cai, Z., Yang, Y., Kong, L., Fan, X., & Tai, R. H. (2023). Effectiveness of digital educational game and game design in STEM learning: a meta-analytic review. *International Journal of STEM Education*, 10(1), 36.
- Harun, H., & Abdullah, N. A. (2023). The Song of the Kedidi: The embodiment of a hero in a Malay folktale as an intangible cultural heritage. *Journal of Communication, Language and Culture*, 3(1), 1–16. <https://doi.org/10.33093/jclc.2023.3.1.1>.
- International Organization for Standardization. (2018). Ergonomics of human-system interaction - Part 11: Usability: Definitions and concepts (ISO Standard No. 9241-11:2018)
- Lewis, J. R. (2018). The System Usability Scale: Past, present, and future. *International Journal of Human-Computer Interaction*, 34(7), 577–590. doi:10.1080/10447318.2018.1455307
- Lobo, J. (2023). Protecting Philippine dance traditions via education of tomorrow's pedagogues. *Journal of Ethnic and Cultural Studies*, 10(1), 98–124.
- Mendoza, D. M., Panganiban, T. D., Santos, J. E., San Miguel, M. H., Revuelta, M. A. K. A., Cumal, J. I. V, Ona Jr, M. M., & Lobo, J. (2025). The multidimensionality of situational interest on engagement: Philippine traditional folk dances as a sustainable form of exercise and its preservation as an intangible cultural heritage. *Sportis. Scientific Journal of School Sport, Physical Education and Psychomotricity*, 11(3), 1–25.
- Park, H. E., & Yap, S.-F. (2025). A dualistic approach to harmonious and obsessive passion: The impact of game mechanics on mobile gaming engagement. *Electronic Commerce Research*, 25, 4923–4946. <https://doi.org/10.1007/s10660-024-09886-7>
- Pattemore, M., & Gilabert, R. (2025). Enjoyment, engagement, and success in children's digital EFL games. *ELT Journal*, 79(4), 554–569. doi:10.1093/elt/ccaf041
- Putratama, D. A., & Retnowardhani, A. (2025). An Empirical Study of In-App Purchase Intention Behavior of Generation Z in Mobile Games. *Journal of Information Systems Engineering and Business Intelligence*, 11(3), 433-444.

- Radzuan, A. W., Osman, N. I. M., Mohd Norazman, M. S., & Mohd Shaari, S. N. D. (2024). Community-driven approaches to safeguarding intangible cultural heritage of Malaysia. *Journal of Tourism, Hospitality and Environment Management*, 9(37), 94–103.
- Rahman, S. N. A., & Sidek, H. A. (2023). Fostering cultural heritage appreciation through folklore-themed animation and digital games within Malaysian educational institutions. *The International Journal of Arts, Culture & Heritage*, 10, 107–144.
- Vallejo-Imbaquingo, R., Villacrés, R., & Torres-Toukoumidis, A. (2025). Game-Based Learning and Mobile Learning: An Umbrella Review on Pedagogical Foundations and Outcomes. In *International Workshop on Learning Technology for Education Challenges* (pp. 196-207). Springer, Cham.
- Weichbroth, P. (2024). Usability testing of mobile applications: A methodological framework. *Applied Sciences*, 14(5), 1792. <https://doi.org/10.3390/app14051792>
- Yadav, A. K., & Oyelere, S. S. (2021). Contextualized mobile game-based learning application for computing education. *Education and Information Technologies*, 26(3), 2539-2562.
- Zakaria, A., & Zakaria, N. Y. K. (2025). The impact of digital game-based learning tools on motivation, engagement, and performance in language education: A systematic literature review. *International Journal of Academic Research in Progressive Education and Development*, 14(1), 2235–2251. doi:10.46886/IJARPED/v14-i1/17552