KUPAS SENI: *Jurnal Seni dan Pendidikan Seni*
ISSN 2289-4640 /eISSN 0127-9688 ***Jilid 13 Isu 2, 2025*** *(92-103)*

Maklumat Artikel:
Peroleh: *18 April 2025* ***Semak:*** *10 Oktober 2025* ***Terima:*** *18 Oktober 2025* ***Terbit dalam Talian:*** *28 Oktober 2025*
**Corresponding Author: sarifah.hasan@mmu.edu.my*

Reviving *WAU*: Enhancing cultural understanding through instructional design in game applications

Nur Sarifah Hasan[1], Aminah Abd Karim[2], Mohd Hafnidzam Adzmi[3]

[1]Faculty of Creative Multimedia, Multimedia University, Jalan Multimedia, 63100 Cyberjaya, Selangor, Malaysia
[2] The School of Media, Art & Design (SMArD), UNITAR International University, Tierra Crest, Jalan SS6/3, Kelana Jaya47301 Petaling Jaya, Malaysia
[3]College of Creative Arts, University Teknologi MARA, 40450, Shah Alam, Selangor, Malaysia

To cite this article (APA): Hasan, N. S., Abd Karim, A., & Adzmi, M. H. (2025). Reviving WAU: Enhancing cultural understanding through instructional design in game applications. *KUPAS SENI: Jurnal Seni Dan Pendidikan Seni*, *13*(2), 92-103. https://doi.org/10.37134/kupasseni.vol13.2.8.2025

ABSTRACT

Traditional Malaysian games such as *Wau* have been losing their significance with young people because modern digital games are dominating their lives. This quantitative research was done to see the effectiveness of integrating Gagne's Nine Events of Instruction into a *Wau* game application in terms of facilitating learning about these traditional games. The approach involved structured learning on how to play a *Wau* before introducing cultural content, aligning with Gagne's model. The general analytical approach to designing, developing, implementing, and evaluating instructional content in this game followed the ADDIE framework. From the study, it is surmised that the use of instructional events such as "Gain Attention" and "Elicit Performance" would have effectively helped in the mastering of the gameplay and further facilitate understanding of the *Wau* traditional game. Some recommendations are made to refine the instructional content to enhance appeal and effectiveness. Future research will focus on wider user testing and iterative design to ensure both educational outcomes and cultural relevance.

Keywords: Gagne's Nine Events, *Wau* game application, Instructional Design, ADDIE Model, Cultural Preservation, Game application.

INTRODUCTION

Malaysia is a culturally diverse country and therefore we rely on the culture and natural resources to support tourism (MASTIC, 2023). It is under the 10-10 MySTIE Framework for Malaysian Science, Technology, Innovation, and Economy that efforts are made to conserve cultural heritages by using the technologies and creative content (MASTIC, 2023). Traditional games in Malaysia, like *Wau* Bulan, depict a very rich cultural heritage through their aesthetic displays of creative skills by the Malays (Oh Hui Kun & Shahreen Mat Nayan, 2019). Unfortunately, most of these traditional games, like *Wau* Bulan, stand to be lost due to different factors at play, which include the fact that most of the younger generation may not be interested in these games (Isa, 2021). Thus, the adaptation of traditional games in Malaysia is presenting new opportunities to engage with the younger generation, with growth regarding online gaming very prominent in Southeast Asia, especially in Malaysia (Ali et al., 2020; Tim Fields, 2022).

RESEARCH OBJECTIVE

The main objective of this study is to evaluate the effectiveness of instructional content on the understanding of the *Wau* traditional game.

Research Question

How does the instructional content in the *Wau* game application facilitate understanding of the *Wau* traditional game?

Literature Review

The *Wau* Traditional Game

The *Wau* Bulan has become an integral part of the Malaysian sociocultural symbolism especially the people of Kelantan (Rahman, 2016). As used figuratively on the body and tail of the kite, the crescent moon's symbolism and the pattern selected naturally put the artistic ingenuity of the Malay into the limelight (Vinothini Kasinathan, 2024). The *Wau* kites differ from one another in each state of Malaysia, and each design reflects the region's distinctiveness. These are *Wau* Lang of Perlis, *Wau* Puyuh of Kelantan, and *Wau* Kapal of Selangor (Nadzari, 2020). Other common types are *Wau* Merah originated from Johor, *Wau* Kang Kang of Kedah, and *Wau* Seri Bulan of Perak (Rahman, 2016). All of these varieties are characterized by the local Malay artisans and artists' aesthetic and cultural distinctiveness, which are embedded in *Wau* (Othman & Musa, 2024). Enthought, the *Wau* is often used as decoration, but it is also frequently played for leisure and competitive purposes (Rahman, 2016).

Digitalization of Traditional Games

The recent trend of translating traditional games of Malaysia into digital form proves helpful in sustaining Malaysia's cultural values in a technological society. Converting these games into digital form has not only helped maintain the practices but also ensured that they are introduced to the younger generation (Salman et al., 2024). (Eck et al., 2018; Izzati et al., 2023) highlighted that when the game application is developed to mimic the actual games, it will help the younger generation become familiar with their cultural heritage. (Salman et al., 2024) also pointed out in recently conducted research that the shift to new technologies has shown that the digital environment may enhance the reliability and the level of immersion in the process of preservation of the cultures' heritage. (Sun & Ch'ng, 2024) future emphasizes aligning digital applications with learning objectives to boost engagement and interaction while preserving and disseminating cultural heritage through technology. To effectively facilitate players' understanding of the *Wau* traditional game, players will first learn the game mechanics through interactive tutorials and gameplay (Brazie, 2024). Gradually introducing mechanics in low-pressure contexts helps build mastery, training player reflexes, and knowledge to handle more complex challenges in future levels (Melnic, 2024). In the context of the *Wau* game application, once the player is comfortable with the mechanics, the cultural significance of the *Wau* will be introduced. This approach prioritizes gameplay mechanics as the foundation of learning before introducing cultural education, providing a structured learning experience aligned with instructional design principles. However, while games are known for their educational benefits, there is still a lack of instructional theory and practical advice on how to effectively utilize them as educational tools (Eck et al., 2018).

Instructional Content in Game Applications

The integration of instructional content into game applications is particularly valuable in enhancing learning outcomes (Eck et al., 2018). The application of Gagne's nine events of instruction ensures that each step of the learning process is supported, by structuring instruction in this way, learners are more likely to achieve deeper understanding and successfully apply new skills (Gagne et al., 1992). Moreover, applying the ADDIE (Analysis, Design Development Implementation, and Evaluation) model in the design process can lead to enhanced learner engagement structured learning experiences, and better

educational outcomes (Abuhassna et al., 2024). The following sections further define each of Gagne's nine events from the previous research.

Gain Attention

According to (Gagne et al., 1992), the first step in the instructional process involves capturing learners' attention to prepare them for learning. This can be accomplished by incorporating engaging elements, such as videos or interactive content, to captivate learners and prepare them for the learning process (Sreelakshmi & Jayakrishnan, 2015). In-game environments can be enhanced with well-chosen vibrant color palettes, which naturally attract and hold players' interest, regardless of technical specifications or resolution (Dillon, 2020).

Informing Learners Objective

The learning objectives are useful for the learners as they enable them to know what the expectation is from the lesson (Gagne et al., 1992). In the digital game, aligning the objectives within the narrative of the game or before setting out on a mission, leads players toward learning outcomes (Vandercruysse & Elen, 2017). Effective game onboarding experience since it balances instructional assistance with a more engaging, accessible approach that doesn't overwhelm, challenge, or weary the players (Dillon, 2020).

Recall of Prior Learning

By engaging learners to self-search for what they already know regarding the content of the lesson, they can easily associate this new knowledge with prior learning (Gagne et al., 1992). This can be incorporated into games through narratives that build on previous knowledge (Molnar & Kostkova, 2023). Additionally, adapting visual cues in educational games can optimize learning outcomes based on learners' prior knowledge (Lin & Atkinson, 2011).

Presenting Content

In this step, new content or material is presented to learners, marking the actual delivery of the instructional content (Gagne et al., 1992). In game design, this can be done by deliver learning contents through seamless tutorials and hints without disrupting the gameplay (Vandercruysse & Elen, 2017). Also, it should be pointed out that learning objectives could benefit from the use of text and interactive mechanics, along with interactive approaches (Molnar & Kostkova, 2023). At this phase, the game starts with a well-organized introduction to the content, gradually introducing players to new concepts (Sreelakshmi & Jayakrishnan, 2015).

Learning Guidance

Learning guidance can be provided through contextual hints, such as pictures or dramatic episodes, which help encode information effectively for learners (Gagne et al., 1992). Contextualized feedback using characters in games, such as relevant prompts and responses, guides players through challenges without giving direct answers, enhancing their learning experience (Eck et al., 2018). This makes it easier for players to navigate the challenges and gain an understanding while engaged with the game quickly (Dillon, 2020).

Elicit Performance

After learners have received adequate guidance, they are ready to demonstrate their understanding of the material (Gagne et al., 1992). At this point, they should be able to perform the task on their own without confusion. The goal is for them to not only prove it to the instructor but also to themselves (Gagne et al., 1992). According to (Kai Ren et al., 2022), this can be accomplished by asking the players

to demonstrate what they have learned through their actions in the game. Applying more challenges and obstacles in new complex levels can increase the difficulty.

Provide Feedback

When players progress through this game, they try to surpass a challenge or an objective set by that game, usually through an important sequence of failures, successes, and rewards (Dillon, 2020). Immediate feedback on players' actions helps reinforce learning and correct errors, aligning with the seventh event of Gagne's model (Dempsey et al., 1994). In the game, this is achieved through the use of scores and rewards that are given immediately after completing tasks or levels (Kai Ren et al., 2022).

Assessing Performance

In this phase, learners should demonstrate what they have learned without receiving additional coaching or hints (Gagne et al., 1992). Player interactions often result in changes to specific game variables, such as health, inventory, and level progression, which can be seen as assessments, reflecting the eighth event (Shute & Ke, 2012). A level progression can be integrated to allow players to advance independently to the next level, without guidance (Dillon, 2020).

Retention and Transfer

In this phase, the study emphasized the importance of increasing activity frequency to improve students' ability to apply learned knowledge in new problem-solving situations, enhancing retention and transfer (Tonbuloğlu, 2024). To help recall intellectual skills, it's important to include regular practice and review (Gagne et al., 1992). However, this only can be evaluated by long-term evaluation and observation of the learners (McNeill & Fitch, 2023). Although, Gagne's model gives a systematic structure to align instructional content into games, balancing learning objectives with entertainment still remains important to sustaining the player engagement (Kai Ren et al., 2022). In the context of *Wau* game application applications, applying Gagne's model can help the younger generation understand and learn while playing the game application. In the *Wau* game application, Table 2.1 demonstrates the implementation of Gagne's model.

Table 2.1. Gagne's model is implemented in the *Wau* game application

Gagne's model	**Implementation in the *Wau* game application**
Gain Attention	Use vibrant colors, engaging visuals, and interactive content such as *Wau* illustrations, sound effects, and environmental challenges like wind and clouds.
Inform Learners of Objectives	Provide clear objectives before each level or challenge, aligning learning goals with the mechanics of *Wau* flying, and avoiding obstacles.
Recall of Prior Learning	Use cultural references such as visual illustrations of traditional *Wau*, at the beginning of the game helping players recall what they have learned about *Wau*.
Presenting Content	Presenting tutorials on *Wau* maneuvering and obstacle avoidance using text and images for seamless gameplay.
Learning Guidance	Use hints, tooltips, and in-game tutorials to guide players as they fly *Wau*.
Elicit Performance	Allow players to demonstrate their knowledge by controlling the *Wau*, and avoiding obstacles like clouds to complete levels.
Provide Feedback	Scores, rewards, or cultural facts after tasks are completed to reinforce learning.
Assessing Performance	Assess players through level completion and progression.
Enhance Retention and Transfer	Incorporate regular challenges that require players to apply what they have learned.

METHODOLOGY

This research was conducted using the quantitative method and a survey approach was adopted. A set of questionnaires was designed and used to evaluate the effectiveness of instructional content on the understanding of the *Wau* traditional game.

Participants

Using convenience sampling, participants were selected and because of successive approvals from faculty, access to this population was granted. The study participants comprised 27 students majoring in art and design courses. They were specifically chosen due to their background, which offers relevant insights into the visual and creative aspects of the *Wau* game application. Before the testing happened, the researchers did not expose the participants to Gagne's nine events of instruction.

Setting

The study was carried out in two private universities: MMU and UNITAR in Selangor. The modality for the focus group discussion was a large classroom in the art and design faculty building of both universities.

Design phase: ADDIE Framework

In this research project, the ADDIE model serves as the framework for developing the *Wau* game application, integrating instructional content to enhance the learning experience of the traditional *Wau* game application. There are five key steps which include the Analyze phase, Design phase, Development phase, Implementation phase, and Evaluative phase (refer Figure 3.1). The following subtopics highlight the different phases as follows:

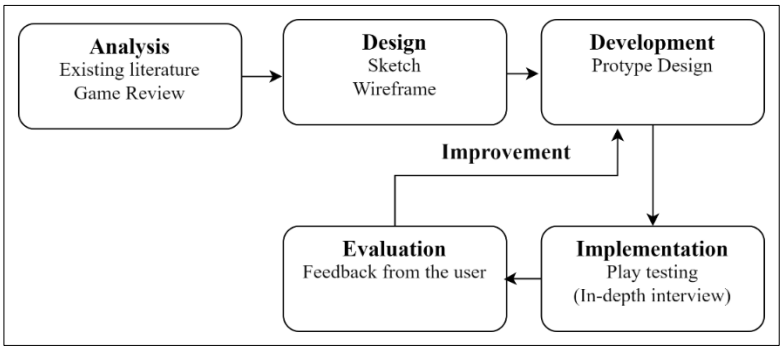

Figure 3.1 Game development process adapted from the ADDIE model.

ANALYSIS

The analysis phase focuses on reviewing scholarly work and understanding the history of the *Wau* traditional game. This involves exploring previous research on Malaysian traditional games and instructional content.

Design

In this phase, wireframes and sketches are created to outline the game structure, ensuring seamless integration of instructional content (refer Figure 3.2). Game elements such as challenges and rewards are incorporated to maintain engagement while delivering cultural knowledge.

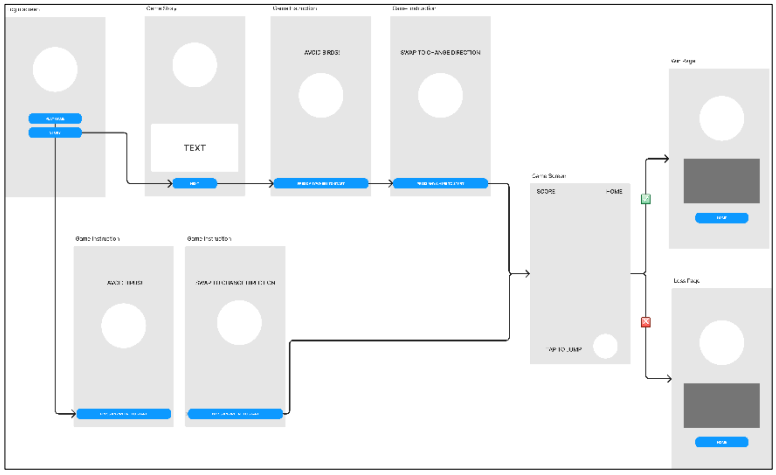

Figure 3.2 The game prototype is being developed using wireframes.

Development

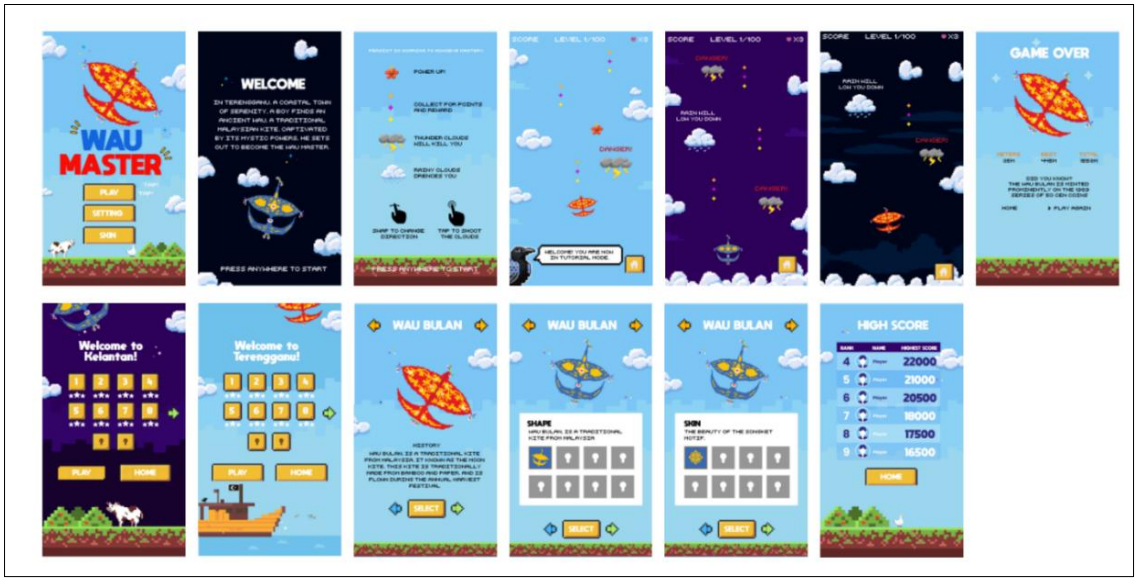

Figure 3.3 The game prototype is being developed using wireframes.

The development phase translates the design into a functional game prototype using Buildbox (refer Figure 3.3). The instructional content is embedded in the game, allowing for testing of both game mechanics and educational effectiveness. Iterative adjustments are made based on feedback from user testing.

Implementation

After developing the *Wau* game application app, it was released to the BBworld application for testing platforms. It was required to have a smartphone to test the prototype, for which the participants were given a QR code link to the apps. This platform was chosen to provide compatibility across the iOS and Android platforms so that all the participants could test the prototype on their smartphone. The participants navigated through the prototype for approximately 25-30minutes. Before then, the researcher had ensured the game was thoroughly debugged and compared to real live use through testing. Another important aspect of the testing phase was to obtain participants' feedback at the end of the game, to know of any remaining problems, and to improve the game even further.

Evaluation

This phase involves the evaluation of the game prototype by participants. The participants engage themselves in the game and fill in a Likert Scale questionnaire to give feedback on their experience as well as on the instructional contents. The satisfaction score was measured on a 5-point Likert scale, where each level corresponds to a specific meaning for analyzing user feedback:

Table 3.1 Likert Scale Categorization and Interpretation of Responses according to (Mumu et al., 2022)

Categorize	Interpretation
1.00 – 1.49	Not Suitable
1.81 – 2.60	Disagree
2.61 – 3.40	Neither agree nor disagree
3.41 – 4.20	Agree
4.21 – 5.00	Strongly agree

RESULT AND DISCUSSION

The analysis is then conducted using descriptive statistics. In this phase, the mean and standard deviation were used to quantitatively summarize the participants' responses and to assess the effectiveness of the game prototype. The mean was used since it gave an overview of the participant's feedback, and the standard deviation showed the variability of their responses. To analyze the data collected, the researchers used SPSS software, and the results are highlighted in the table below.

Gaining Attention

Table 4.1 Item's mean value and standard deviation based on instructional content

Question	*Mean*	*SD*	*Interpreted*
The game is very fun. The elements such as *Wau* illustrations, sound effects, and colors enhance the overall experience.	3.89	1.16	Agree
The game content makes learning the mechanics of how to fly the *Wau* more enjoyable.	3.81	0.97	Agree

The Game holds the respondents' attention, as indicated in Table 4.1, through the use of such elements as illustrations, sound effects, and enhancing game playing with color. The mean score for this was 3.89, showing that most participants found the game enjoyable and attention-getting, while its standard deviation was 1.16. However, a (SD of 1.16) indicates that responses are fairly variable, which means that while the majority of responses did agree, there is considerable variation in the opinion on how engaging these elements were. The second question is how much content of the game made learning about flying the kite fun and has a mean score of 3.81 with a (SD of 0.97). This already indicates a slightly lower, yet still positive, response compared to the overall enjoyment of the game. A much lower standard deviation of 0.97 denotes more coherent feedback provided by the participants, which means they generally enjoyed flying a kite. It evidences that gameplay mechanics indeed can engage players and positively add to the learning process.

Informing Learners of Objectives

Table 4.2 Item's mean value and standard deviation based on instructional content.

Question	*Mean*	*SD*	*Interpreted*
The game objective helps me learn more about Malaysia's cultural heritage. Especially how to play *Wau* traditional game.	3.81	0.962	Agree

The mean score of 3.81 (SD = 0.962) indicated that participants generally agreed that the objectives of this game helped them effectively in learning about Malaysia's cultural heritage, especially regarding how to play the *Wau* traditional game. The standard deviation was low; therefore, the response was consistent. Most players seemed to indicate that the objectives were clear and appropriate for the learning goals of this game. These are objectives in a game that reflect the real experience of playing *Wau* in simulations of handling the *Wau*. Future phases will refine these objectives to align more closely with level progression, enhancing the learning experience as players advance through the game.

Stimulating Recall of Prior Knowledge

Table 4.3 Item's mean value and standard deviation based on instructional content.

Question	*Mean*	*SD*	*Interpreted*
The game uses cultural references to *Wau*'s history, such as visual illustrations of traditional *Wau*, making the learning experience more enjoyable.	4.00	0.77	Agree

The mean score of 4.00 (SD = 0.77) in Table 4.3 shows that participants found the game's cultural references effective in making learning about Malaysian traditional kites more enjoyable. This supports Gagne's second event of instruction: "Stimulating Recall of Prior Knowledge," as the game helps learners connect with their prior knowledge of the *Wau* game application. Currently, the game incorporates fun facts about the *Wau* traditional game and visual illustrations of *Wau*. Future versions will include quizzes or puzzles for further assessment and stimulation of prior knowledge about the *Wau* traditional game before the commencement of the game itself.

Presenting the Content

Table 4.4 Item's mean value and standard deviation based on instructional content.

Question	*Mean*	*SD*	*Interpreted*
The in-game content, such as tutorials on playing the *Wau*, was very useful in enhancing my knowledge and appreciation of Malaysian traditional kites.	3.56	0.934	Agree

As shown in Table 4.4, the mean score of 3.56 (SD = 0.94) indicates that participants generally found the in-game content useful for enhancing knowledge of traditional kites. This aligns with Gagne's third event of instruction: "Presenting the Content." The game content is delivered through visual elements, such as *Wau* kite illustrations, along with guided movements on the tutorial page. In future iterations will implement interactive elements such as animations.

Providing Learning Guidance

Table 4.5 Item's mean value and standard deviation based on instructional content.

Question	*Mean*	*SD*	*Interpreted*
Navigating the game is straightforward.	4.19	0.83	Agree
The character provides hints and guidance throughout the game.	3.04	1.22	Neither agree nor disagree

As shown in Table 4.5, participants found navigating the game straightforward, with a mean score of 4.19 (SD = 0.83). However, the lower mean of 3.04 (SD = 1.22) for the usefulness of hints and guidance suggests that improvements are needed in providing clear support throughout the game. This relates to Gagne's fifth event of instruction: "Providing Learning Guidance." Players receive an initial tutorial with visual guidance at the start of the game, along with pop-up hints during the first level. While helpful, these features could be further developed to enhance clarity and support.

Eliciting Performance (Practice)

Table 4.6 Item's mean value and standard deviation based on instructional content.

Question	***Mean***	***SD***	***Interpreted***
I enjoy using the game to explore Malaysian traditional *Wau* by controlling the kite and avoiding obstacles such as clouds.	4.11	0.89	Agree
I can easily control the *Wau* and successfully pass all levels	4.41	0.747	Strongly Agree

Table 4.6 shows that the participants agreed they enjoyed controlling the *Wau* kite and avoiding obstacles such as clouds (mean = 4.11, SD = 0.89), thus indicating that the game mechanics were relatively engaging and appealing. They strongly agreed that they could control the *Wau* with ease and passed all the levels with ease (mean = 4.41, SD = 0.747), and therefore the instructional content was providing effective guidance through mastering the mechanics of the *Wau*. These findings are consistent with Gagne's sixth event, "Eliciting Performance," in that the successive levels allowed the players to practice and demonstrate their skills. Players should first master the game mechanics before learning about the cultural elements. As they become more skilled at playing the *Wau*, they are likely to appreciate the historical and cultural significance of the *Wau*, fulfilling both entertainment and educational goals. Further tests will involve even harder conditions, such as harder wind, to further challenge the player's navigational skills.

Provide Feedback

Table 4.7 Item's mean value and standard deviation based on instructional content.

Question	*Mean*	*SD*	*Interpreted*
The feedback provided through rewards (collecting *Wau* types) motivates me to continue exploring the game.	3.64	1.093	Agree

As seen in Table 4.7, the mean score of 3.64 (SD = 1.09) suggests that rewards motivate players to continue exploring the game. This supports Gagne's seventh event: "Providing Feedback."
Currently, feedback is given in the form of rewards, such as scores and *Wau* stickers. In the next phase, implement mini-games to allow players to collect more points and rewards and allow players to identify and correct their understanding of the game.

Assessing Performance

Table 4.8 Item's mean value and standard deviation based on instructional content.

Question	*Mean*	*SD*	*Interpreted*
I can easily remember how to play the *Wau* traditional game after playing the game.	4.78	0.51	Strongly Agree
I spend a significant amount of my gaming time interacting with this game to complete the level.	4.11	0.892	Agree

In Table 4.8, participants showed strong agreement that the flying and controlling procedure of the *Wau* kite was easy to remember after playing the game, M = 4.78 (SD = 0.51). In this case, the high mean value demonstrates the effectiveness of instructional content to facilitate long-term retention of the gameplay mechanics. The participants also agreed that they had spent a great deal of time interacting with the game to complete the levels, as evidenced by the mean score of 4.11 (SD=0.89). These findings support Gagne's eighth event of instruction: "Assessing Performance," since the game provided the player with many chances to show his mastery of the *Wau* game application mechanics. In the next testing phase, the game's difficulty will be increased progress with the game level without additional hints to further assess players' understanding and performance under more challenging conditions and obstacles.

Enhancing Retention and Transfer

Due to limited opportunities for multiple interactions with the participants, which restricted the ability to assess knowledge retention and application over time. To address this, the researchers plan to have multiple interactions during future testing sessions to more accurately estimate retention and skill application.

CONCLUSION

The effectiveness of the *Wau* game application prototype demonstrates that integrating Gagne's Nine Events of Instruction does indeed facilitate a player's cultural understanding through gameplay. Early prototyping accommodated feedback that helped make improvements in the next iteration (Reigeluth & An, 2020). The findings indicate that the game successfully captures players' attention (Gain Attention), facilitates recall of prior knowledge (Recall of Prior Learning), and promotes performance (Elicit Performance), serving as an effective tool for teaching Malaysian cultural heritage, especially traditional game. The current content requires further development, particularly in guided learning, with future adjustments aimed at adding challenges and quizzes to enhance knowledge retention and transfer. With continued refinement, learner engagement will improve, and the player will receive better support in mastering the mechanics and cultural significance of *Wau*.

Limitation of the study

One of the main limitations of this research is the small sample size that was used, which would not allow for a wider generalization of the results obtained. A sample of higher numbers and types participating in it could realize even better results about the *Wau* game application's instructional effectiveness. Besides, this study covers only eight out of nine events according to Gagne's theory of instruction, which indicates that there is potential for further testing in subsequent phases

REFERENCES

Abuhassna, H., Alnawajha, S., Awae, F., Mohamed Adnan, M. A. B., & Edwards, B. I. (2024). Synthesizing technology integration within the ADDIE model for instructional design: A comprehensive systematic literature review. *Journal of Autonomous Intelligence, 7*(5), 1546. https://doi.org/10.32629/jai.v7i5.1546

Bin Ali, M. F., 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 2020*, 1–6. https://doi.org/10.1109/GAME50158.2020.9315081

Brazie, A. (2024). Video game mechanics: A beginner's guide. Retrieved from https://gamedesignskills.com/game-design/video-game-mechanics/

Dempsey, J. V., Rasmussen, K., & Lucassen, B. (1994). Instructional gaming: Implications for instructional technology. Retrieved from https://eric.ed.gov/?id=ED368345

Dillon, R. (2020). *The digital gaming handbook*.

Eck, R. N. Van, Shute, V. J., & Rieber, L. P. (2018). *Leveling up: Game design research and practice for instructional designers.*

Gagne, R. M., Briggs, L. J., & Wager, W. W. (1992). *Principles of instructional design* (4th ed.).

Isa, M. S. M. (2021, February). Wau pungguk makin terpinggir, pupus? *Utusan Malaysia*. Retrieved from https://www.utusan.com.my/berita/2021/02/wau-pungguk-makin-terpinggir-pupus/#google_vignette

Izzati, N. S., Ahmad, S., Ismail, M., Diah, N. M., Rashdi, N. Y., & Bakar, S. A. (2023). Digital Malaysian tradition game: A case study of baling tin. *The International Journal of Multimedia & Its Applications, 15*(03), 17–26. https://doi.org/10.5121/ijma.2023.15302

Kai Ren, K., Mohd, N. I., Ali, K. N., Bandi, S., & Ismail, F. (2022). Design phase of gamification framework for hazard identification training in construction industry. *International Journal of Interactive Mobile Technologies (IJIM), 16*(02), 113–128. https://doi.org/10.3991/ijim.v16i02.27405

Lin, L., & Atkinson, R. K. (2011). Using animations and visual cueing to support learning of scientific concepts and processes. *Computers & Education, 56*(3), 650–658. https://doi.org/10.1016/j.compedu.2010.10.007

MASTIC. (2023, December 1). 10-10 Malaysian Science, Technology, Innovation & Economy (MySTIE) Framework. *Malaysian Science and Technology Information Centre*. Retrieved from https://mastic.mosti.gov.my/publication/10-10-malaysian-science-technology-innovation-economy-mystie-framework/

McNeill, L., & Fitch, D. (2023). Microlearning through the lens of Gagne's nine events of instruction: A qualitative study. *TechTrends, 67*(3), 521–533. https://doi.org/10.1007/s11528-022-00805-x

Melnic, V. (2024, July 8). Level design in games: Tips and best practices. *MamboServer*. Retrieved from https://www.mamboserver.com/blog/video-game-level-design/

Molnar, A., & Kostkova, P. (2023). A study exploring different modalities to integrate learning objectives in games. *International Journal of Game-Based Learning, 13*(1), 1–13. https://doi.org/10.4018/IJGBL.330427

Mumu, J., Tanujaya, B., Charitas, R., & Prahmana, I. (2022). Likert scale in social sciences research: Problems and difficulties. *FWU Journal of Social Sciences, 16*(4), 89–101. https://doi.org/10.51709/19951272/Winter2022/7

Nadzari, N. N. (2020, August 11). Pak Non Adiguru kraf wau. *Utusan Malaysia*. Retrieved from https://www.utusan.com.my/gaya/2020/08/pak-non-adiguru-kraf-wau/

Oh Hui Kun, & Shahreen Mat Nayan. (2019). Media literacy and academic research. *Media Literacy and Academic Research, 2*(2), 52–84.

Othman, J. A. B., & Musa, E. I. B. (2024). Productivity of the common as property in the context of the symbolic propertization of indigenous knowledge: The biopolitics of traditional Malay Wau Bulan and Wau Kucing Kelantanese kite making as state symbolic property. *Rethinking Marxism, 36*(1), 104–123. https://doi.org/10.1080/08935696.2024.2282412

Rahman, H. B. A. (2016). *The art of making Wau Bulan Shafie Jusoh.*

Reigeluth, C. M., & An, Y. (2020). *Instructional design: Merging theories, strategies, and systems development.* Routledge.

Salman, M. I., Zainurin, M. Z., Nukman, M., Burhanudin, H., & Ibrahim, Z. (2024). Malaysian traditional game (Tradesa Melayu) learning application. *Malaysian Advanced Research Innovation, 5*(1), 232–238. https://doi.org/10.30880/mari.2024.05.01.032

Shute, V. J., & Ke, F. (2012). Games, learning, and assessment. In *Assessment in Game-Based Learning* (pp. 43–58). Springer New York. https://doi.org/10.1007/978-1-4614-3546-4_4

Sreelakshmi, R., & Jayakrishnan, R. (2015). Gamification to enhance learning using Gagne's learning model.

Sun, X., & Ch'ng, E. (2024). Exploring Miao culture: The differential effect of traditional 2D and immersive 360° documentary formats on viewer learning. *Social Sciences & Humanities Open, 10,* 101061. https://doi.org/10.1016/J.SSAHO.2024.101061

Fields, T. (2022). *Game development 2042: The future of game design, development, and publishing* (1st ed.).

Tonbuloğlu, B. (2024). An evaluation of game-based computer science course designs: The example of MinecraftEdu. *Education and Information Technologies, 29*(4), 4843–4883. https://doi.org/10.1007/s10639-023-11996-y

Vandercruysse, S., & Elen, J. (2017). Towards a game-based learning instructional design model focusing on integration. In *Instructional techniques to facilitate learning and motivation of serious games* (pp. 17–35). Springer International Publishing. https://doi.org/10.1007/978-3-319-39298-1_2

Kasinathan, V. (2024). Exploring the cultural significance and economic potential of a Wau Bulan chatbot. *Journal of Electrical Systems, 20*(7s), 302–312. https://doi.org/10.52783/jes.3322