Advancement in ICT: Exploring Innovative Solutions (AdICT)

Series 3/2025

Editors
Elin Eliana Abdul Rahim
Noor Azura Zakaria
Dini Oktarina Dwi Handayani
Ahmad Fatzilah Misman

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Kulliyyah of Information and Communication Technology (KICT)

Preface

It is our great pleasure to present Advancement in ICT: Exploring Innovative Solutions (AdICT), Series 3/2025. This publication brings together diverse and forward-looking ideas in ICT, showcasing innovative approaches that not only address current challenges but also shape future opportunities. The contributions in this volume reflect the dedication, creativity and perseverance of KICT lecturers and students, whose hard work continues to push the boundaries of knowledge and application. Their commitment highlights the spirit of innovation that drives both academic inquiry and practical solutions in the ever-evolving field of ICT.

We would like to extend our sincere appreciation to all authors, reviewers, editors and the organising team for their invaluable efforts in making this series possible. It is our hope that this volume will serve as both an inspiration and a useful reference for scholars, students and professionals. By sharing these innovative perspectives and solutions, we aim to contribute meaningfully to the ongoing discourse in ICT, offering fresh insights and encouraging further exploration in advancing the discipline for the benefit of society.

Editors
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Ahmad Fatzilah Misman

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Hang Dewal: Learn History Through Role Playing Game

Wan Mohd Nazim Wan Muhamad
Saidin
Department of Information Systems
Kulliyyah of Information and
Communication Technology,
International Islamic University
Malaysia,
Kuala Lumpur, Malaysia
t.nazim1998@gmail.com

Faizal Akhtar Azhar
Department of Information Systems
Kulliyyah of Information and
Communication Technology,
International Islamic University
Malaysia,
Kuala Lumpur, Malaysia
faizalakhtarazhar@gmail.com

Nor Azura Kamarulzaman
Department of Information Systems
Kulliyyah of Information and
Communication Technology,
International Islamic University
Malaysia,
Kuala Lumpur, Malaysia
norazurakz@iium.edu.my

Abstract— The "Hang Dewal RPG" is a 2D interactive role-playing game designed as an educational tool to promote historical knowledge of the Kesultanan Melayu Melaka. Leveraging the Mechanics-Dynamics-Aesthetics (MDA) framework, the game integrates Sejarah Form 2 content into engaging gameplay through quizzes embedded within the storyline. Developed using the Godot Engine, Adobe Photoshop, and Aseprite, this project addresses the lack of interactive educational tools for Malaysian history. The game provides players with challenges that require both strategy and historical understanding, supported by interactive NPCs and exploration. A cumulative grading system evaluates the player's learning progress. Targeted at secondary school students, the "Hang Dewal RPG" combines entertainment and education to foster appreciation for Malaysian history.

Keywords—Educational Games, Role-Playing Games, Malaysian History, Gamified Learning, Interactive Quizzes

I. INTRODUCTION

The "Hang Dewal RPG" project is an innovative approach to integrating education with entertainment. As a 2D role-playing game (RPG) rooted in the Mechanics-Dynamics-Aesthetics (MDA) framework, it aims to enhance historical education by creating an interactive and engaging learning environment. The project targets the gap in educational tools for Malaysian history, specifically focusing on Sejarah Form 2 topics related to the Kesultanan Melayu Melaka.

The lack of engaging and interactive educational tools for Malaysian history leaves students disinterested in learning about their heritage. Existing tools either lack interactivity or fail to balance educational value with entertainment [1][2]. This project addresses this issue by combining an RPG format with quiz-based learning mechanisms.

Therefore, the objectives of this project are to create an engaging 2D RPG with a captivating storyline and gameplay mechanics, to integrate quizzes based on Sejarah Form 2, focusing on the Kesultanan Melayu Melaka, and to evaluate players' learning progress using a cumulative grading system tied to their quiz performance.

The project will develop a single-player 2D RPG set in a fictional historical world inspired by the Hang Tuah era. Quizzes on the Kesultanan Melayu Melaka are incorporated as a core game mechanic.

II. LITERATURE REVIEW

The literature review is a crucial component in the development of the Hang Dewal RPG project. This preliminary research enhances the understanding of the project's focus by reviewing, identifying, and analyzing the existing educational content in other developed games. The aim of this literature study is to conduct thorough research on game designs that effectively promote historical learning, specifically Malaysian history, through interactive gameplay.

To achieve game design objectives, eight prominent educational games have been selected for analysis: May's Journey [3], uAdventure [4], Story Game-Based Learning [5], Math Blaster [6], Inanimate Alice [7], Culture Buff Games [8], Civilization VI [9], and Assassin's Creed: Discovery Tour [10].

May's Journey effectively integrates narrative and educational content, teaching basic programming concepts through engaging storytelling [11]. This approach enhances student engagement and learning outcomes, demonstrating the importance of a cohesive narrative in educational games.

The uAdventure framework simplifies the development of narrative-driven serious games, making it easier for educators to create engaging educational experiences [4]. This framework can inform the design of Hang Dewal RPG by providing tools for effective narrative integration.

This approach combines storytelling with game mechanics to create immersive learning environments. By leveraging narrative elements, Hang Dewal RPG can enhance engagement and foster active learning, like the experiences offered in this model.

Math Blaster employs fast-paced gameplay to teach mathematics, integrating educational content into interactive challenges [6]. This approach can inspire Hang Dewal RPG to incorporate problem-solving mechanics that require quick thinking and application of knowledge.

Inanimate Alice uses cultural storytelling and gaming mechanics to enhance narrative engagement [7]. By drawing on cultural elements, Hang Dewal RPG can create a rich, immersive experience that promotes understanding of Malaysian history.

These games enhance cultural intelligence through gamified learning experiences. The principles of cultural engagement can be applied in Hang Dewal RPG to foster a

ddeeper understanding of diverse cultural values within Malaysian history.

Civilization VI combines strategic gameplay with historical education, allowing players to explore ancient civilizations [3]. This model can inform Hang Dewal RPG's design by integrating strategic elements that encourage exploration and learning about historical events.

This interactive mode allows players to explore detailed historical settings, providing educational experiences through guided exploration. Hang Dewal RPG can adopt similar mechanics to offer players an immersive historical journey.

By analyzing these games, key aspects of game design that effectively promote educational engagement can be identified. This review highlights the strengths and weaknesses of various approaches, guiding the development of Hang Dewal RPG to create an immersive educational experience that promotes Malaysian history through interactive gameplay. The insights gained will help ensure that the game design aligns with educational objectives while providing engaging user experience.

TABLE I.   GAME ADAPTION TABLE [3], [4], [6] [7], [8]

Feature	May's Journey	uAdventure	Math Blaster	Inanimate Alice	Culture Buff Games	Hang Dewal RPG
Integration of Educational Content	✓	✓	✓	✓	✓	✓
Narrative and Storytelling	✓	✓	✗	✓	✓	✓
Quiz-Based Learning Mechanic	✗	✗	✓	✗	✗	✓
Cultural or Historical Education	✗	✗	✗	✓	✓	✓
Replayability for Knowledge Retention	✗	✓	✓	✓	✓	✓

III.   METHODOLOGY

A. Development Approach

The development approach chosen for the project is the Agile methodology, which enables iterative development and incorporates regular feedback. This flexible and adaptive method allows teams to respond effectively to changing requirements throughout the project lifecycle.

The Agile methodology promotes collaboration among cross-functional teams and emphasizes customer involvement, ensuring that the end product aligns closely with user needs. Its iterative nature facilitates continuous improvement, allowing for frequent reassessment of project goals and deliverables [11]. This approach is particularly beneficial for the project, as it encourages innovation and creativity while maintaining a focus on delivering high-quality results.

By breaking the project into smaller, manageable increments, the Agile methodology not only enhances productivity but also simplifies project management. Regular reviews and feedback loops ensure that any necessary adjustments can be made promptly, fostering a dynamic and responsive development environment.

Fig. 1. Agile Development Model [7]

1) Pre-production stage: The activities in this phase included documenting feedback on building game rules and mechanics and confirming the tools and software to be used for development. This stage was vital for setting a clear direction for the project, ensuring that all subsequent stages were aligned with the project's goals and expectations.

2) Production stage: The process began with system design. After gathering requirements, the game mechanics and rules were developed based on the collected data. This phase included designing nodes, challenges, and resources in the game, creating a table to organise all entities properly, and developing an activity diagram to ensure the game design was clear and aligned with the project's objectives. This comprehensive design phase served as a blueprint for the coding phase, preventing potential issues during implementation.

The next phase in production was implementation, where actual coding was performed using the Godot game engine. During this phase, the developer referred to the design documents to decide what to implement in the game. The development environment was set up by installing the required software, and the code was tested based on the design documents. The developer aimed to optimise the code and ensure that the features of the game engine were used appropriately for various game components. This phase involved translating design documents into a working product, focusing on implementing features correctly and efficiently.

Following implementation, the integration and testing phase ensured that all game components functioned seamlessly and were free of bugs. This phase included thorough testing of each game component and integration tests to ensure that the modules interacted as designed. Bugs encountered during this phase were fixed, and if necessary, the project revisited the design phase. Additional testers were engaged to expedite the testing process. This phase was crucial for identifying and resolving issues before deployment, ensuring a smooth and bug-free user experience.

3) Post-production stage: The focus was on deployment. Once the game was completed with all components and successfully tested, it was ready for public release. It was published on the chosen platform, ensuring accessibility to the target audience. This final stage marked the culmination of the development process, making the game available to users and confirming that it functioned as expected in a real-world environment.

B. Structure

1) Story Plot

a) Beginning: The Sultan and his armies are struggling to defeat Raja Laut, a notorious pirate captain who has been wreaking havoc on the Sultan domain. Despite their best efforts, the Sultan's forces are unable to capture him. In response, the Sultan places a bounty on Raja Laut's head, offering a reward of granting any wish to the hero who successfully captures or defeats the pirate. Dewal, a brave and ambitious young man, embarks on this perilous quest with the hope of claiming the reward and realizing his dream of becoming the Sultan's trusted admiral, Laksamana.

b) Middle: Thus begins Dewal's adventure. As he journeys through the Sultan's kingdom, Dewal faces numerous challenges and encounters a variety of characters. Along the way, he searches for legendary equipment, ancient weapons and armours that will give him the strength needed to confront the pirate. Dewal's journey is filled with battles, puzzles, and exploration, as he collects powerful items that will aid him in his ultimate mission to defeat Raja Laut.

c) Ending: Thus After collecting all the legendary equipment, Dewal is ready to face Raja Laut in an epic final battle. Armed with his new gear and unwavering determination, he confronts and defeats the pirate captain. True to his word, the Sultan promises to grant Dewal any wish as a reward for his bravery. Without hesitation, Dewal requests to become the Sultan's Laksamana, fulfilling his lifelong dream of leading the Sultan's navy and ensuring peace for the kingdom.

2) Character Design

Fig. 2. Dewal the protagonist

a) Dewal: Dewal is a brave and ambitious young man from the Sultan's kingdom. Known for his courage and determination, he sets out on a dangerous quest to capture the infamous pirate Raja Laut. Dewal dreams of becoming the Sultan's Laksamana, a trusted admiral, and is willing to face any challenge to achieve his goal. He is skilled in combat and resourceful, using his wit and newly acquired legendary equipment to overcome obstacles.

Fig. 3. Sultan the ruler

b) The Sultan: The Sultan is the wise and powerful ruler of the kingdom. Despite his strength, he faces challenges from the ruthless pirate Raja Laut, whose raids have caused widespread fear. The Sultan is a fair and just leader, determined to protect his people. To inspire hope and reward bravery, he offers a bounty for anyone who can defeat Raja Laut, promising to grant any wish to the hero who succeeds.

Fig. 4. Enemy

c) Enemy: The enemy refers to the various threats Dewal faces throughout his journey. These include pirates crew loyal to Raja Laut, wild beasts, rival treasure hunters, and mercenaries who challenge Dewal as he seeks legendary equipment. They test Dewal's combat skills and resourcefulness, making his journey more perilous but ultimately helping him grow stronger.

C. Storyboard

This storyboard shows the early planned design for the game and probably will undergo several changes in the progress.
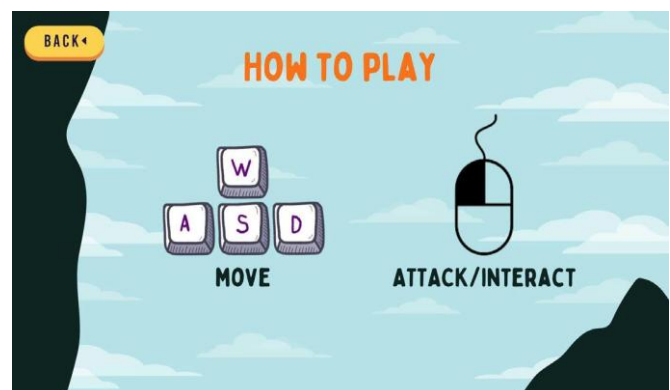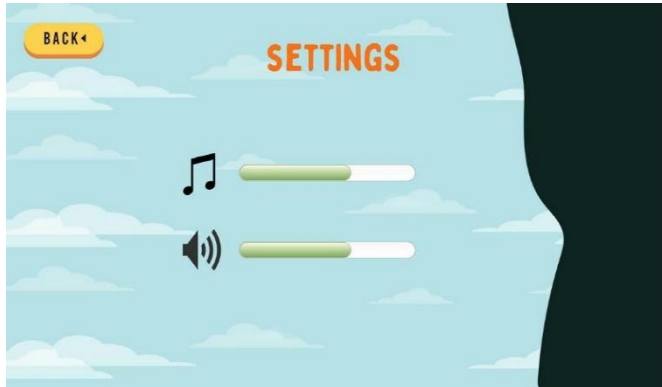

Fig. 5. Main Menu

Fig. 6. How to play

Fig. 7. Setting Menu

Fig. 8. Credits

Fig. 9. Pause Menu

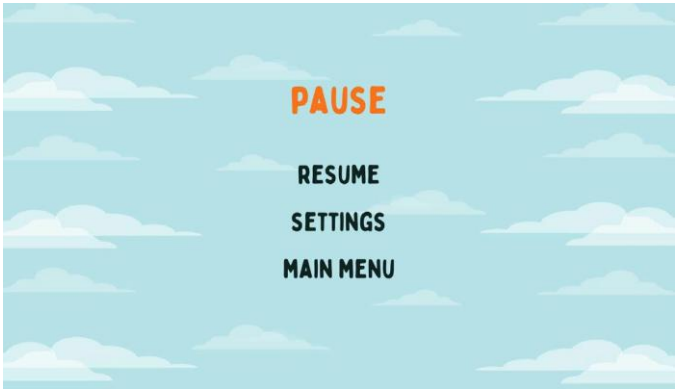Fig. 10. Defeat Menu

Fig. 11. Explore World

Fig. 12. Combat

Fig. 13. Outcom

Fig. 14. Quiz Inteface

D. Logical Design

Figure 15 and 16 shows the basic flows of the game including the flow between pages and the gameplay.
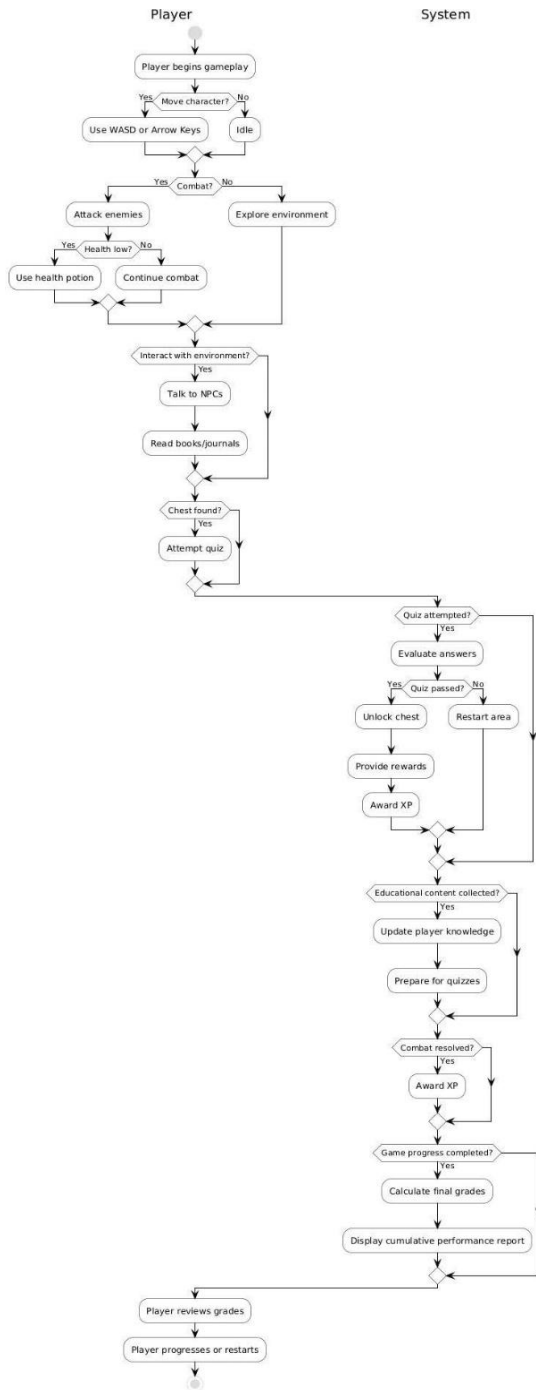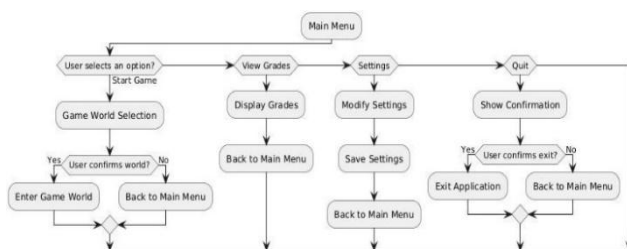

Fig. 15 Activity Diagram for the gameplay

Fig. 16 Flowchart for the game menus and UI

IV. Discussion

The Hang Dewal RPG project represents a significant advancement in the integration of education with entertainment, specifically targeting the historical education of Malaysian students. By leveraging the Mechanics-Dynamics-Aesthetics (MDA) framework, the game is designed to create an immersive and engaging learning environment that addresses the existing gaps in educational tools for Malaysian history, particularly in the context of the Kesultanan Melayu Melaka.

One of the primary challenges in contemporary education is the lack of interactive and engaging resources that capture students' interest. The traditional methods of teaching history often fail to resonate with younger generations, leading to disinterest and disengagement. Hang Dewal RPG confronts this issue head-on by incorporating a role-playing format that blends gameplay with quiz-based learning mechanisms. This innovative approach not only makes learning more enjoyable but also reinforces historical knowledge through active participation.

The literature review conducted as part of the project was instrumental in shaping the design and mechanics of Hang Dewal RPG. By analyzing successful educational games such as May's Journey, uAdventure, and Civilization VI, the team identified effective strategies for integrating narrative and gameplay. These insights highlight the importance of storytelling in educational games, demonstrating that a compelling narrative can significantly enhance student engagement and learning outcomes.

For instance, May's Journey showcases how a cohesive storyline can teach complex concepts, while Civilization VI allows players to explore historical contexts through strategic gameplay [3]. Adopting similar strategies in Hang Dewal RPG will not only promote deeper understanding of Malaysian history but also encourage critical thinking and strategy development among players. The incorporation of cultural storytelling, as exemplified by Inanimate Alice [5], further enriches the gaming experience, allowing players to connect with their heritage on a personal level.

The choice of the Agile methodology for the development process is particularly beneficial for this project. Agile's iterative nature allows the development team to remain flexible and responsive to feedback, which is crucial in creating a product that meets the needs of its target audience—secondary school students. Regular reviews and adjustments throughout the development process ensure that the game evolves in alignment with user expectations and educational objectives. This collaborative approach promotes innovation and creativity, ultimately contributing to a high-quality educational tool.

The implementation of a cumulative grading system to evaluate players' learning progress is another vital aspect of Hang Dewal RPG. This feature not only

motivates students to engage with the content but also provides educators with valuable insights into their students' understanding of historical concepts. By linking gameplay performance to educational outcomes, the game fosters a sense of achievement and encourages continuous learning.

In conclusion, Hang Dewal RPG stands as a promising solution to the challenges of teaching Malaysian history. By combining engaging gameplay, effective educational strategies, and a focus on user feedback, the project aims to instill a greater appreciation for Malaysian heritage among students. As the game continues to develop, ongoing evaluation and refinement will be essential to ensure that it meets its educational objectives while providing a captivating and immersive experience for players. Through this innovative approach, Hang Dewal RPG has the potential to redefine how history is taught and learned in Malaysian classrooms.(Tetteh, 2024)

V. CONCLUSION

The Hang Dewal RPG project represents a pioneering effort to fuse education with entertainment, specifically within the context of Malaysian history. By utilizing the Mechanics-Dynamics-Aesthetics (MDA) framework, the game not only engages players through interactive storytelling but also effectively imparts historical knowledge related to the Kesultanan Melayu Melaka. The integration of quizzes within the gameplay creates a dynamic learning environment that encourages critical thinking and application of knowledge.

The comprehensive literature review conducted during the development process informed the design choices and gameplay mechanics, drawing on successful elements from existing educational games. This informed approach ensures that Hang Dewal RPG not only captivates players but also meets educational objectives, fostering a deeper appreciation for Malaysia's rich heritage.

The adoption of the Agile methodology has proven to be instrumental in facilitating a responsive and collaborative development process. By allowing for iterative improvements based on regular feedback, the project is well- positioned to adapt to the needs of secondary school students, ensuring a relevant and engaging educational experience.

In summary, Hang Dewal RPG is poised to make a meaningful impact on the landscape of educational tools in Malaysia. By bridging the gap between learning and play, the game aims to inspire a new generation of students to explore and appreciate their cultural history. As the project moves forward, continuous evaluation and enhancement will be key to maximizing its educational effectiveness and overall player engagement.

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