# Game-Based Learning Mobile Application About Orang Asli

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| ARTICLE INFO | ABSTRACT |
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| | This study presents the design and development of a mobile game-based learning application in the form of a visual novel, created to promote cultural understanding and empathy toward the Indigenous People *(Orang Asli)* in Malaysia. The application, entitled *16 Hari Bersama Orang Asli* (16 Days with the Indigenous People), integrates interactive storytelling, user decision-making, and visually engaging character designs to provide an immersive learning experience. A user persona was constructed to guide design decisions, while flowcharts and use case diagrams structured the narrative pathways and gameplay mechanics. The resulting application offers multiple story endings based on player choices, encouraging active participation and reflective learning. Although limitations remain in terms of graphics, language support, and representation of *Orang Asli* tribes, the application demonstrates significant potential as an educational platform. By combining entertainment with cultural education, this study highlights the role of mobile game-based learning in preserving indigenous heritage, fostering inclusivity, and enhancing cultural appreciation among young adults. Future improvements, including cross-platform expansion and closer collaboration with *Orang Asli* communities, will further enrich its authenticity and impact. |

## 1. Introduction

Game design features are important to promote engagement and learning in game-based learning [1]. Gamification is an important aspect of assisting learning [2], and learning engagement is interrelated in digital game-based learning [3-5]. Game-based learning (GBL) may be used to teach computational thinking [6-7] and support Higher-Order Thinking Skills (HOTS) [8]. There is evidence of the effects of GBL on enjoyment, engagement, and learning in higher education [9], and it is useful for teaching activities [10] and has achieved significant learning gains [11-12]. GBL can be used to encourage student interest in Science [13], Technology, Engineering [14], and Mathematics (STEM) [15-16]. Remote learning increases the need for mobile game-based learning to engage learners [17]. Mobile game-based learning methods effectively support education [18], and mobile game-based learning is in the era of "shifting to digital" [19], and game-based learning (GBL) is undergoing a rapid shift to mobile platforms [20]. Game-based learning (GBL) using Visual Novel (VN) has been used for learning purposes [21]. In general, a Visual Novel (VN) is a digital narrative-focused game that

requires interactions where the player must be able to impact the story world or the story's progression [22].

## 2. Methodology

The development of the mobile game-based learning application was undertaken to introduce and preserve the culture and traditions of the Indigenous People *(Orang Asli)* in Malaysia. A structured design and development approach was employed, guided by the principles of visual novel game design to ensure both educational value and user engagement. The application was conceptualized as an interactive visual novel, with the central aim of fostering cultural awareness and empathy among Malaysian young adults. The development process began with the identification of user needs, focusing on accessibility, interactivity, and cultural authenticity. These requirements were systematically translated into storyboards, flowcharts, and use case diagrams to map narrative progression, decision-making paths, and user interactions. Elements such as interactive storytelling, branching decisions, and visually appealing character designs were incorporated to create an immersive and engaging learning environment. A user persona was also constructed to inform design choices, while flowcharts and use case diagrams provided structural clarity for narrative pathways and gameplay mechanics. The technical development employed a combination of tools: Figma for interface design, iBis Paint X and Paint Tool SAI for digital artwork, and Ren'py as the primary game engine. This selection ensured a balance between aesthetic appeal and functional gameplay. Throughout the development, the design was consistently informed by the principles of game-based learning, with emphasis on user engagement, narrative immersion, and knowledge acquisition. The resulting application represents a collaborative effort to merge digital storytelling with cultural education in an accessible mobile format.

## 3. Results
### 3.1 User Persona

Figure 1 shows the user persona for this study. To guide the design and development process, the user persona was constructed to represent the target audience and ensure that the application met user expectations in terms of functionality, usability, and cultural relevance. The persona, named Sarah, is a 25-year-old marketing executive with a bachelor's degree in business administration who embodies the characteristics of a young adult keen to explore cultural diversity but with limited prior exposure to Indigenous People (*Orang Asli*). Growing up in an urban environment, Sarah has developed an emerging interest in cultural traditions, languages, and lifestyles, yet lacks accessible and engaging resources to pursue this curiosity. As a technologically literate individual, she frequently engages with mobile applications and games for both leisure and learning, which makes her an ideal representation of the intended user group. Her goals focus on gaining knowledge, immersing herself in interactive experiences, and broadening her appreciation for the unique identity of the *Orang Asli* community. By defining this persona, it is important to tailor the application to prioritize accessibility, interactivity, and engaging storytelling, ensuring that the final product aligned with the learning needs, motivations, and behavioral patterns of its intended users.

| Biodata: | |
|---|---|
| Name: Sarah<br>Age: 25<br>Occupation: Marketing Executive<br>Status: Single<br>Educational Level: Bachelor's degree in business administration | |
| **Background:**<br>Sarah is a young adult who is curious and enthusiastic about learning about different cultures and communities. Growing up in a city, she didn't have much exposure to indigenous communities like the Orang Asli. However, she has recently developed an interest in their unique traditions, languages, and way of life. | **Knowledge of Indigenous People *(Orang Asli)***<br>Sarah's knowledge about the Orang Asli is limited, as she has only come across some brief mentions in books and articles. She yearns to gain a deeper understanding of their rich heritage and values, but she lacks accessible resources to do so. |
| **Goals:**<br>Sarah's primary goal is to expand her knowledge and appreciation for the diverse cultures within her country. She seeks an engaging and interactive learning experience that will allow her to immerse herself in the world of the Orang Asli and gain insights into their traditions and customs. | **Behaviours:**<br>Being a tech-savvy young adult, Sarah enjoys spending her leisure time playing games on her Android mobile phone. She appreciates games that offer not only entertainment but also valuable insights and learning experiences. She is proactive in seeking new ways to learn and broaden her horizons, and she believes that a mobile game centered around the Orang Asli culture would be an ideal platform for her to achieve her goals. |

**Fig. 1.** User persona

## 3.2 Game-Based Learning Mobile Application About the Orang Asli Flowchart

A flowchart is important in designing a visual novel as it provides a visual representation of the branching paths and decision-making processes within the narrative. It helps creators map out different story routes, choices, and outcomes, allowing for a clear understanding of the story's flow and structure. By visually outlining the progression of events and interactions, a flowchart ensures logical coherence and consistency in the visual novel. It aids in identifying potential plot gaps, inconsistencies, or missing storylines, enabling creators to refine and improve the overall narrative experience. Figure 2 shows the flowchart for this study.
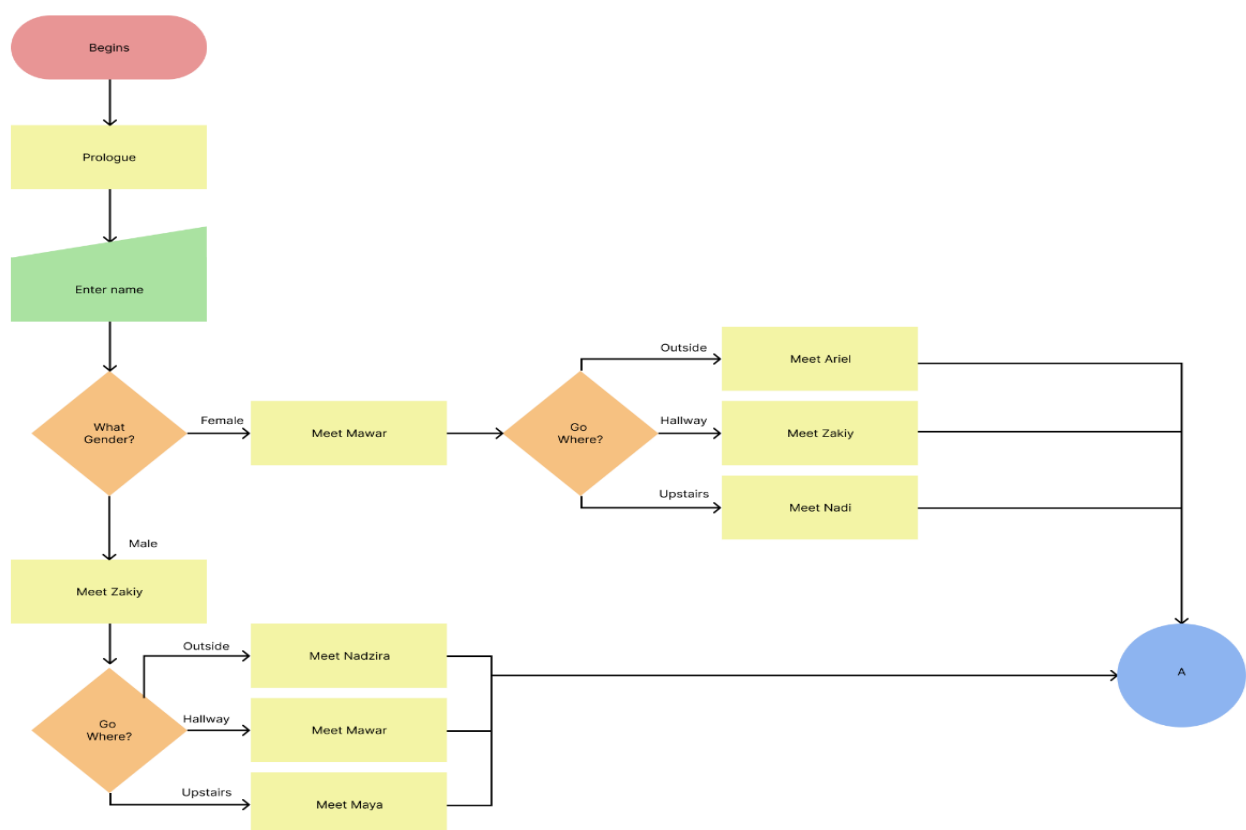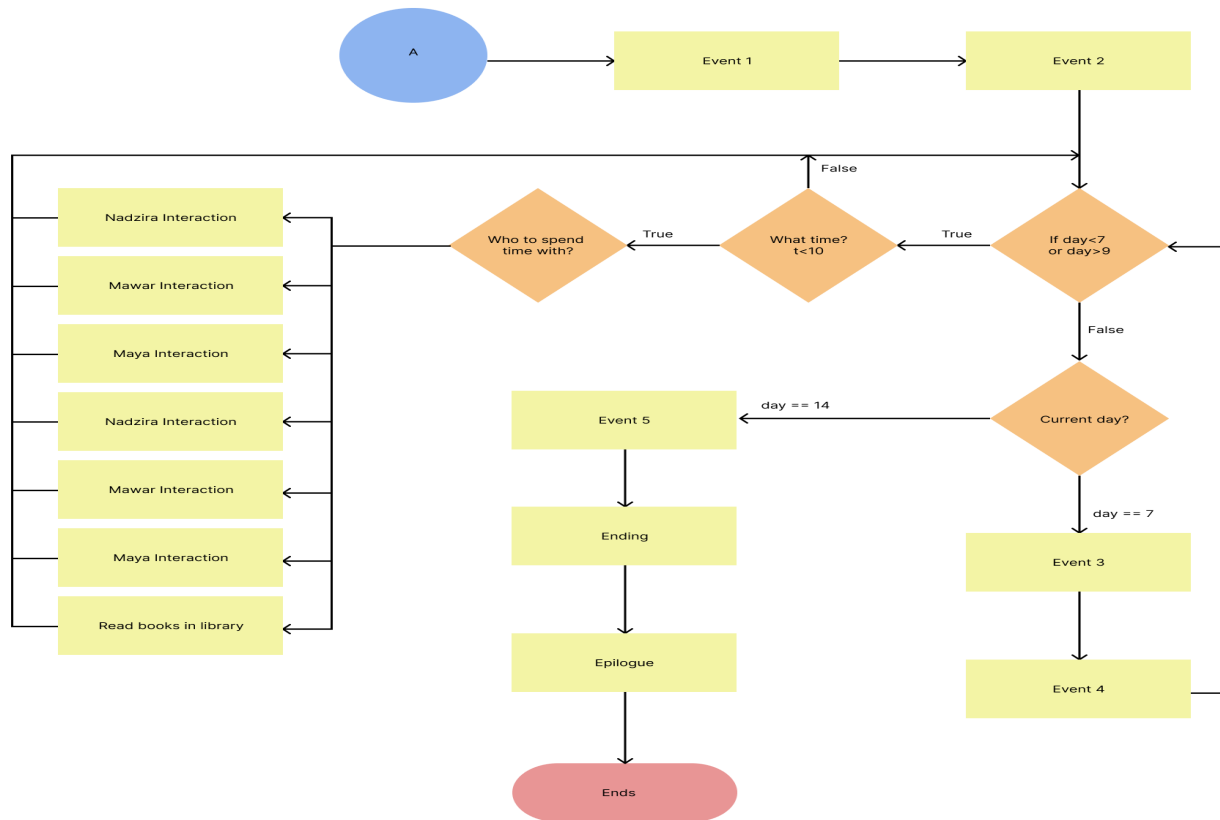
**Fig. 2.** Flowchart

Based on Figure 2, the flowchart for the visual novel is a graphical representation that outlines the sequential progression and decision-making structure of the game. Starting with the game's initiation and prologue, the user inputs their name and selects their gender, followed by encountering a character of the same gender. Choices regarding the next location led to encounters with characters of the opposite gender, accompanied by specific events. If certain conditions are met, the player can spend time with different characters or visit the library. Further events unfold, culminating in multiple endings based on the player's relationships with the characters. The flowchart serves as a valuable tool for the developer, ensuring logical coherence, identifying gaps, and facilitating effective communication throughout the design and implementation of the visual novel.

*3.3 Game-Based Learning Mobile Application About Orang Asli Use Case Diagram*

Figure 3 shows the use case diagram for the study. The use case diagram for the visual novel includes key interactions performed by the player. It begins with the user starting the game, initiating the visual novel's experience. Throughout the narrative, the user engages by making choices that influence the story's progression. They can also save their progress, allowing them to resume from where they left off later. Additionally, the user can load a previously saved game, retrieving their progress. The goal is for the user to reach one of the multiple endings, which are determined by the choices they make and the relationships they develop with the characters.
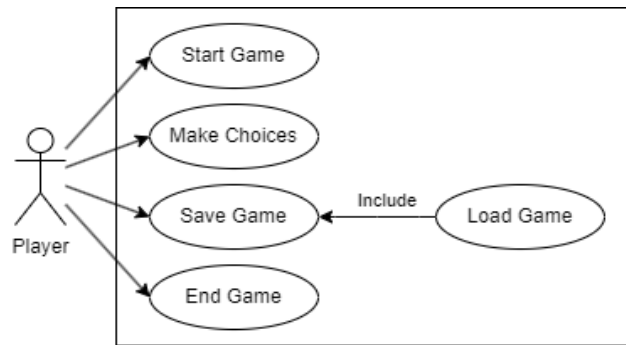
**Fig. 3.** Use case diagram.

## 3.4 Developing Game-based Learning Mobile Application About Orang Asli

This section explores the elements designed during the development of the project alongside its main features. Figure 4 shows the main menu and game menu screen.
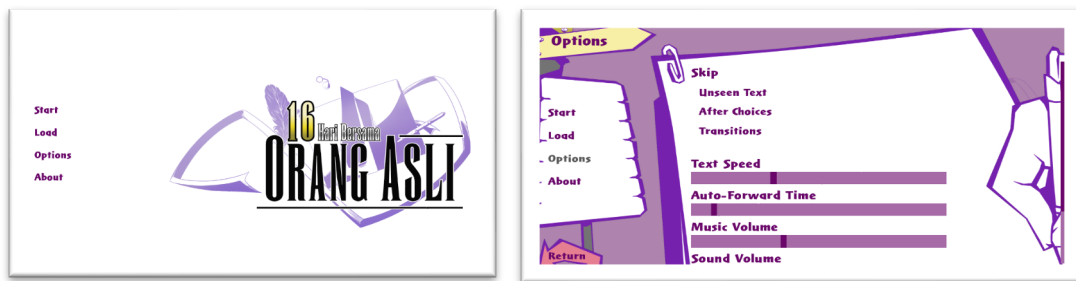


**Fig. 4.** Main menu and game menu screen



**Fig. 5.** Characters and computer graphics artworks

The main menu screen adopts a simplistic design with a white background. The game's logo is

prominently displayed, evoking a sense of familiarity and ease of navigation. The game menu screen for setting, '*save*', and *'load'* is the same to convey the feeling of similarity when the player navigates through the game. The menu design was crafted using Paint Tool SAI, iBis Paint X, and Figma, ensuring a visually stunning and appealing user interface.

Figure 5 shows the characters and computer graphics artworks. The fictional Indigenous People *(Orang Asli)* characters are thoughtfully designed to appeal to players of the opposite gender, following the style of anime characters commonly seen in Japanese visual novels. Each character boasts six distinct expressions, adding depth and emotion to their personalities. The computer graphics artworks serve to showcase these expressive moments and act as rewards based on players' choices. Created with precision using iBis Paint X on Samsung Tab S6, these artworks enhance player engagement and immersion in the game's narrative. The immersive and interactive visual novel artfully intertwines engaging narrative elements with a captivating journey of cultural exploration. The application is entitled *"16 Hari Bersama Orang Asli"* (16 days with Indigenous People).

## 4. Conclusions

This study has successfully developed and evaluated a mobile game-based learning application in the form of a visual novel to promote cultural understanding and empathy toward the Indigenous People *(Orang Asli)* in Malaysia. By integrating engaging narratives, interactive decision making, and visually appealing character designs, the application demonstrates its potential as an innovative educational tool that not only enhances user engagement but also deepens appreciation of cultural diversity. The findings confirm that game-based learning can serve as an effective medium for fostering awareness and preserving indigenous knowledge in a digital era where cultural heritage faces the risk of marginalization. Despite its promising outcomes, the study acknowledges several limitations, including constraints in graphic design, storytelling depth, representation of different *Orang Asli* tribes, limited language support, and platform exclusivity. Addressing these limitations in future development through improved multimedia elements, expanded cultural representation, and cross-platform accessibility will further strengthen the application's educational and cultural impact. Moreover, future active collaboration with cultural experts and *Orang Asli* communities remains essential to ensure authenticity, respect, and inclusivity in content design. In sum, this research contributes to the growing body of work on mobile game-based learning by highlighting its capacity to merge technology, education, and cultural preservation. With continued refinement, the application holds the potential to serve as a scalable model for integrating indigenous knowledge into digital learning environments while promoting cross-cultural empathy and inclusivity among young learners.

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