Design and Build Serious Games
The Legend Of Calonarang as a Media for Learning Balinese Culture and Language

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Abstrak

Permainan serius, yang dirancang khusus untuk pendidikan, telah terbukti menjadi sarana yang efektif dalam berbagai bidang pembelajaran. Penelitian ini bertujuan untuk merancang dan mengembangkan The Legend of Calonarang sebagai media pembelajaran Budaya dan Bahasa Bali. Legenda Calonarang dipilih untuk meningkatkan pemahaman dan apresiasi budaya Bali serta penguasaan bahasa Bali, terutama bagi generasi muda. Game ini menggabungkan elemen permainan menarik dengan konten budaya dan bahasa yang mendalam, di mana pemain berperan sebagai karakter utama, memecahkan teka-teki, menghadapi tantangan, dan belajar budaya Bali sepanjang perjalanan. Proses pengembangan meliputi desain permainan dan implementasi perangkat lunak. Hasil penelitian diharapkan mendukung pelestarian budaya Bali, mempromosikan penggunaan bahasa Bali, dan memberikan kontribusi pada pembelajaran yang interaktif. Selain itu, penelitian ini akan mengevaluasi tingkat keterlibatan pengguna, efektivitas pembelajaran, serta dampak positif penggunaan game ini sebagai media edukasi.

Kata kunci: Serious game, Budaya Bali, Bahasa Bali, Pembelajaran, Pendidikan.

Abstract

Serious games, specifically designed for education, have proven to be an effective means in various fields of learning. This study aims to design and develop The Legend of Calonarang as a medium for learning Balinese culture and language. The legend of Calonarang was chosen to enhance understanding and appreciation of Balinese culture and improve proficiency in the Balinese language, especially among younger generations. The game combines engaging gameplay elements with deep cultural and linguistic content, allowing players to take on the role of the main character, solve puzzles, face challenges, and learn about Balinese culture throughout the journey. The development process includes game design and software implementation. The results are expected to support the preservation of Balinese culture, promote the use of the Balinese language, and contribute to interactive learning. Additionally, this study will evaluate user engagement, learning effectiveness, and the positive impacts of using this game as an educational tool.

Keywords : Serious game, Balinese Culture, Balinese Language, Learning, Education.

1. Introduction

The development of technology has become an integral part of daily life, affecting aspects such as education, entertainment, social interaction, business, and health. One of the innovations that has been widely adopted is digital games. [1].

The era of information globalization has made it easier for foreign cultures to enter which affect the lifestyle of the Indonesian people. Many overseas games present their culture-based characters and stories, which the younger generation adopts in everyday life. In response, local developers with a spirit of nationalism created games that uplifted Indonesian culture. This cultural

identity is reflected in the story, characters, setting, sounds, and animations of the game. It is hoped that this effort can promote Indonesian culture, especially among the younger generation of game enthusiasts [2].

Traditionally, in Bali there are various types of games played by children and adults. Bali also has various kinds of folklore or legends that have been known for generations, such as Jayaprana, Rajapala, Cupak Gerantang, Calonarang, and so on. Unfortunately, these folklore and legends have not been widely developed in the form of ICT-based games (Information and Communication Technology) [3].

The research entitled "Design and Build Serious Game The Legend of Calonarang as a Media for Learning Balinese Culture and Language" developed an RPG-based serious game using RPG Maker MZ. This game is designed to educate players about the Balinese language through cecimpedan (puzzles in the Balinese language) and raises the Balinese folktale, Calonarang. The story features iconic characters such as Barong and Rangda, with the goal of introducing gamers to the epic Balinese culture and folklore. In addition to entertainment, this game also provides learning of Balinese culture and language. It is hoped that users can get to know, love, and be educated about Bali through the experience of playing.

2. Research Methodology

The method used to develop the serious game The Legend of Calonarang as a medium for learning Balinese Culture and Language is the waterfall. method waterfall. This method is a software development method in which the process flows gradually from one phase to the next, Waterfall provides a systematic approach in the software development lifecycle, including requirements analysis, system design, implementation, and testing [4]. The following is the research flow applied in this study.
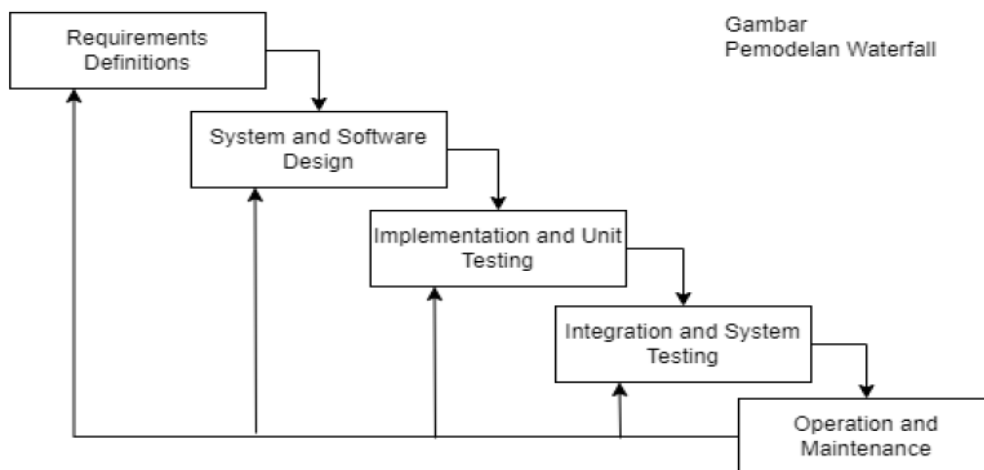

Figure 1. Research Flow

Figure 1 is the stage of the waterfall model used in this study to develop the serious game The Legend of Calonarang. This method consists of sequential stages, starting from the need analysis to determine the goals and features of the game, followed by design to create the storyline, characters, and game mechanics. The implementation stage involves creating a game using RPG Maker MZ, followed by testing to ensure the game runs according to specifications. After that, a maintenance stage is carried out for repairs and enhancements based on user feedback. This approach ensures that each phase is completed first before moving on to the next, resulting in a game that is well organized and aligned with the learning objectives of Balinese culture and language.

2.1 Overview

An overview of the Design and Development of The Legend of Calonarang Game as a Media for Learning Balinese Culture and Language is a comprehensive system modeling to make it easier to see how the system works in general.
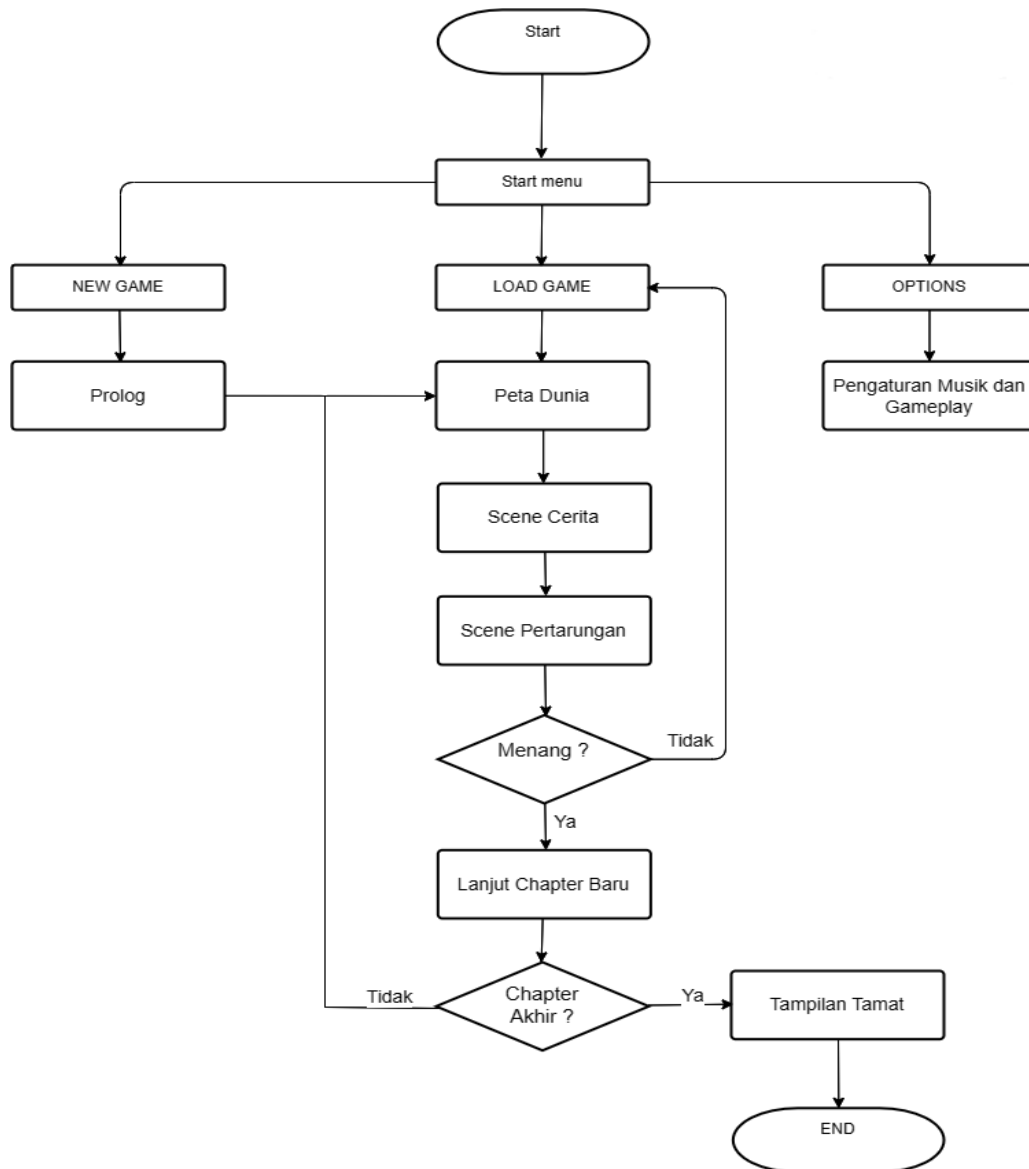
Figure 2. System Overview

Figure 2 shows an overview of The Legend of Calonarang, which has three main menus: new game, load game, and options. The options menu provides gameplay and sound settings, while the new game starts the game from scratch with a prologue before moving on to story exploration. The game load menu allows players to resume the game from the last save point without repeating progress. Gameplay begins after the prologue, with the main character moving to the world map to explore and continue the story in each chapter. If you encounter an enemy, a battle mode will appear. Defeat brings the player back to the final save point, while victory continues the story until the next chapter. Exploration allows players to interact with NPCs (Non-Playable Characters), carry out missions, and answer Balinese puzzles given by NPCs. This enriches the player's experience with elements of Balinese culture.

2.2 Hardware Suite Schematic

Use Case Diagram refers to a diagram that describes the relationship between a software system and a user or actor. This diagram serves to identify and illustrate key functions and scenarios that involve user interaction with the system.
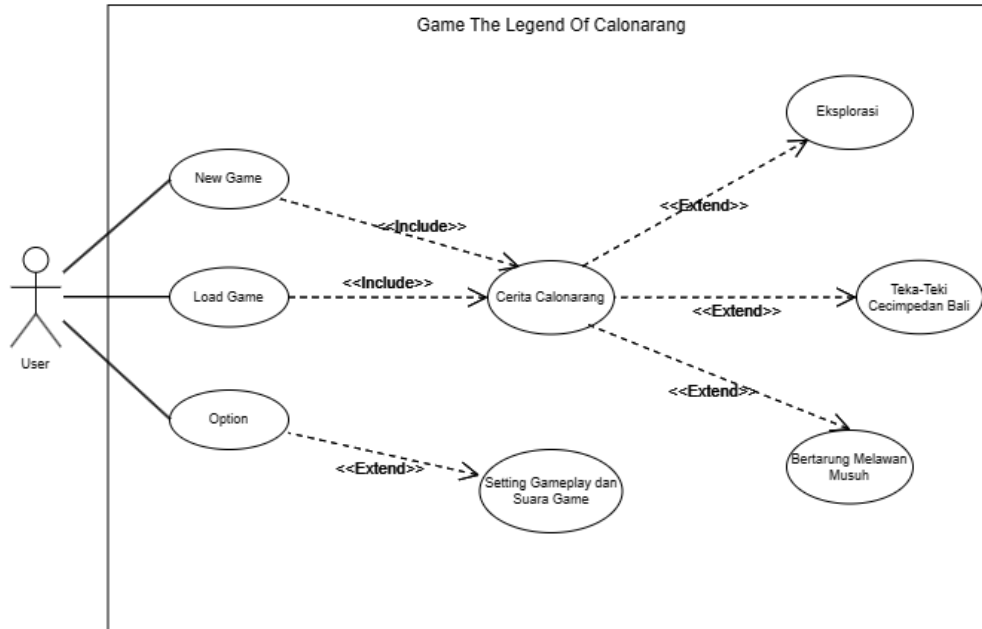

Figure 3. Tool Network Schematics

Figure 3 is a use case diagram from The Legend of Calonarang. The use case diagram shows that there is one actor, namely the user. When the user first opens the game, three main menus will appear, namely new game, load game, and option. Users can choose the three menus, when the user selects the option menu the user can change the settings of the gameplay and also the sound in the game. Users select the new game menu or load game to be able to enter the story of the candidate. When the user has selected the new game menu or load the game, the user can explore the game, solve the puzzles of the Balinese cemetery, and also fight against enemies.

3. Literature Review
Literature reviews include different types of sources related to ongoing research. Relevant resources for Design research Serious Game The Legend of Calonarang as a Media for Learning Balinese Culture and Language is explained as follows.

3.1 Serious Game
Serious games are considered an effective approach in training and education, as they are able to complement traditional learning methods in a way that can maintain participant motivation. In order for serious games to be more widely accepted in the world of education and training, it is important to measure their success in a measurable and quantitative way. Although technically, both entertainment games and serious games share similarities, serious games are designed specifically to support learning and skill development. The word "serious," it refers to whether the game is designed to address real-world problems, such as developing abilities or insights, recovery, medical therapy, skill development, or the learning process. [5].

3.2 Role Playing Game
RPG stands for Role Playing Game, which is a type of game that requires players to play as if they are part of a story and its background. This type of game often presents an imaginative story or background, which the player must go through through a series of tasks or missions. When players complete these missions, they will earn rewards or unlock previously inaccessible areas. To add to the excitement, RPGs usually present NPC (Non-Player Character) characters, which are characters that cannot be controlled by the player, but have a role to interact with for

certain purposes. RPGs also generally provide support items such as weapons, protection, clothing, food, or other items that can help improve progress in the game. [6].

3.3 RPG Maker

RPG Maker is an app that allows users to create custom RPG games. The app provides a tileset-based editor, a simple programming language for organizing in-game events, and tools for editing the combat system. All versions of RPG Maker come with a built-in collection of tilesets, characters, and events that make it easy to create games. Although it is designed for RPGs, the app also supports the creation of games from other genres, such as adventure or graphic novels, with some customizations. The app is popular for its ease of creating games without requiring advanced programming skills [7].

3.4 Cecimpedan Bali

Cecimpedan is a puzzle game in Balinese that is interesting for children because it involves questions and clues related to the surrounding environment. The word "cecimpedan" comes from "cimped" which means "guess," with the suffix "-an." The game is not only humorous but also educational, teaching about everyday plants, animals, or objects. Originally played between parents and children to strengthen their relationship, cecimpedan is now part of Balinese language lessons in schools. Playing cecimpedan helps children improve their imagination, cognitive intelligence, and Balinese vocabulary. This game trains children to connect answers with their surroundings, learn in a fun way, and improve social skills and competition with peers [8].

3.5 Calonarang

Calonarang is a well-known figure in East Java and Balinese culture, whose story has been known since the reign of King Airlangga in the Hindu-Buddhist era. This legend is closely related to the traditions of the people of East Java and Bali, depicting the social thinking of the time that was influenced by Hindu culture and animism. Calonarang, a widow of the ruler of Girah village in Kediri, became a symbol of magical character with religious and mystical nuances. The conflict in this story began from Calonarang's disappointment because no one wanted to marry his daughter, Ratna Manggali. This made him angry and violent, to spread pageblug or disease outbreaks in the Kahuripan area. This legend not only reflects personal conflicts but also describes the social dynamics of the society at that time, making it a story that remains relevant and interesting to the people of East Java and Bali to this day [9].

3.6 Black Box Testing

Black Box testing is a software evaluation method that assesses the functionality and specifications of a system without considering its internal structure or source code. These tests aim to find errors such as inappropriate functionality, data errors, interface issues, database access, and performance. Software engineers test devices based on input conditions that meet functional requirements without looking at the internal structure of the program [10].

4. Results and Discussion

The results and discussion outline in detail the implementation and testing of both hardware and software, as well as the evaluation of the research Design Serious Game The Legend of Calonarang as a Media for Learning Balinese Culture and Language Thoroughly.

4.1. Game Interface Design Results

The design results discussed the appearance of The Legend Of Calonarang game. The display of The Legend Of Calonarang game application includes the following.

4.1.1. Village Map Display

The Village Map is the village display in The Legend Of Calonarang. The village map is a location that can be explored by players while playing the game. The village map is the location of the residents or NPCs in the game, in addition to the village map there are also other places that can be explored by players when playing the game.

Figure 4. Village Map Display

Figure 4 is the display of the Girah Village map in The Legend Of Calonarang game. Girah Village is the first village that is shown when the player starts a new game, because in the story of the game The Legend Of Calonarang the player comes from this village. Maps of villages and other locations in the game are displayed in a two-dimensional format with a three-quarter camera perspective, where the camera's angle of view is tilted down to create a three-dimensional illusion, although the objects displayed remain two-dimensional assets.

4.1.2. Character Dialogue Display

Character dialogue is a display of dialogue between players and NPCs in The Legend Of Calonarang. The character dialogue display will appear when the player interacts with NPCs in the game.

Figure 5. Character Dialogue Display

Figure 5 shows the character dialogue. The character dialogue display will display the name of the character who is speaking and will also display the dialogue text of the character. The character dialogue display is at the bottom of the game display screen. The display will appear if the player interacts with NPCs in the game, by approaching the NPC or triggering by clicking on an available NPC on a map.

4.1.3. View of Cecimpedan Bali

Cecimpedan Bali is a Balinese cecimpedan or puzzle display which is one of the features available in The Legend Of Calonarang game. The Cecimpedan display will appear when the player interacts with NPCs in the game.

Figure 6. View of Cecimpedan Bali

Figure 6 shows the Balinese cecimpedan feature in the game, which is active when the player talks to a specific NPC.NPCs will provide a number of Balinese puzzles, and players must choose the answer from the three available options to get the reward. If the player answers incorrectly, the NPC will offer the option to repeat the question. Players can choose "yes" to try again only on the wrong question without starting over, or "no" to stop answering and leave the NPC. This feature is designed to provide an interactive and educational experience to players.

4.1.4. Battle Display
Battle is one of the features available in The Legend Of Calonarang, in this battle feature players can fight with enemies available in the game. The Battle Display will appear when the player encounters enemies that will randomly appear on a map, the type of enemies faced by the player will randomly appear according to the ones available on a map.

Figure 7. Battle View

Figure 7 shows the battle features in The Legend of Calonarang, which uses a turn-based mechanism. Players and enemies attack in turn according to their turns. In the fight scenes, the main character is shown with the team involved, the enemies faced, as well as several action

options: attack, special, guard, and item. The attack option allows players to attack enemies using their weapons, while special is used to activate special skills. The guard option serves to defend against enemy attacks, and items are used to utilize items such as potions that can restore health or heal themselves. This feature is designed to provide a strategic and challenging fighting experience for players.

4.1.5. Game Control Display

The in-game controls of The Legend of Calonarang use virtual buttons or Dpad which are used to move characters in the game and interact with in-game events.
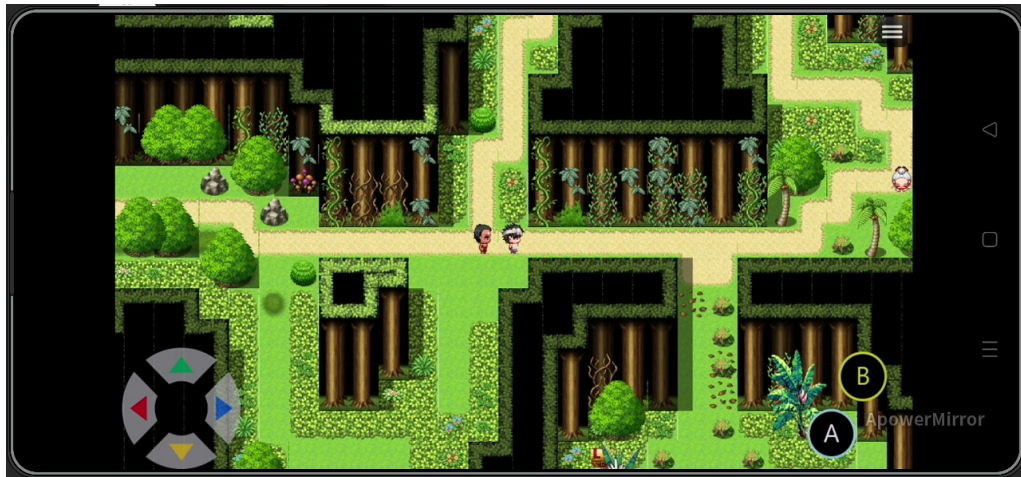
Figure 8. Game Control Display

Figure 8 shows the in-game controls of The Legend Of Calonarang. Controls are used to move the characters in the game. There are 4 directions of arrows that are used to direct the character up, down, left, and right. There is also a button at the bottom right, the A button as an in-game action button or a button that is useful for starting in-game interactions, and the B button which is useful for in-game pause.

4.2. Black Box Testing

Application testing with the Black Box Testing method will be carried out according to the planned test scenario, with the aim of verifying whether the application can operate optimally. The following are the results of the tests carried out using the Black Box Testing technique.

4.2.1. Black Box Testing Results

The Black Box test evaluation is conducted to assess the overall performance of the system. This process focuses on the test results of the scenarios that have been applied by 11 testers. The following are the results of the tests that have been carried out.

Table 1. Black Box Testing Questionnaire Questions

No	Question
1	The story view appears when starting the *game*
2	The story display is clearly visible and displays text and images
3	Displays the village map after the story view
4	Can run freely on *the game map*
5	Can interact with *NPCs* on a *map*
6	Can access the village map in all *chapters*
7	The appearance of the stunt appears when interacting with NPCs
8	Players can repeatedly answer the wrong question

9	Players can answer all the questions given
10	The player answers the question incorrectly and may decide to stop answering
11	Players can interact with *NPCs* in the *game*
12	Players can speed up dialogue by *tapping* on the screen
13	When *cutscene,* the character dialogue display appears automatically
14	Players walk several steps on a *map* and encounter enemies
15	The player meets the enemy and the battle view begins
16	Players can attack, defend, and defeat enemies when *the battle* begins
17	Players can press *virtual* or *Dpad* buttons to move the character
18	Players can press the A button to interact with *NPCs* or in-game *events*
19	Players can press the B button to access the *game pause menu*

Table 1 is a list of questions contained in the black box testing questionnaire which consists of 19 questions with multiple choices in the form of success and failure. The list of questions is used to get satisfactory results in the game that has been created.

Figure 9. Black Box Testing Results

Figure 9 is the result of the Black Box test that has been carried out. The test was carried out with 11 testers. The test results are obtained from the google form questionnaire that has been previously given and will be filled in by the tester after completing the game test. From the results of the google form questionnaire, the results of the test using black box testing have been successful and the game can function properly.

5. Conclusion

The implementation of The Legend of Calonarang as a serious game shows success in making a positive contribution as a medium for learning Balinese Culture and Language. This game is designed by combining interesting game elements and in-depth educational content, especially related to the legend of Calonarang, so that it is able to convey cultural and language learning in a fun way. Based on testing using the Black Box Testing method, every key feature, such as navigation and map exploration display, Balinese language quizzes, character dialogues, and turn-based combat mechanics, successfully functioned according to the initial design without any technical problems. The test results showed that the game ran smoothly at every stage, ensuring a smooth gaming experience for users. This success confirms that The Legend of Calonarang not only meets functional and technical standards, but also becomes an effective tool to preserve and promote Balinese culture and language through interactive digital media.

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