CHAPTER I

INTRODUCTION

1.1. Background

Indonesia is known as a country rich in diverse cultures, traditions, and rites. One of the cultural heritages that has deep historical and philosophical value is Balinese culture. According to him, Bali is not only famous as a world tourism destination, but also as a center of tradition and rites that play an important role in the lives of its people. However, in the midst of technological developments and modernization, sustainability and understanding of this traditional culture are increasingly threatened. According to (Fahrurrozhi & Kurnia, 2024) (Siregar, et al., 2024) , The younger generation tends to be more exposed to foreign cultures through digital media and begins to lose interest in learning about their own local culture.

To overcome this challenge, one of the approaches that can be taken is to combine cultural education with modern technology. According to him, the use of digital-based games can be an effective and interactive learning medium for the younger generation. Educational games offer an interactive experience that blends entertainment and learning, making them an ideal medium for conveying materials related to culture and tradition. In this context, the development of educational quiz games about Balinese traditions and rites is expected to help increase the understanding and

appreciation of the younger generation for the richness of their local culture. (Dilla S & Putri, 2024)

As part of this effort to preserve local culture, this research was carried out in collaboration between the Computer Science study program of Ganesha Education University (Undiksha) and PT. Dago Engineering. This collaboration aims to develop a quiz game based on Balinese cultural education that integrates technology *Natural Language Processing (NLP)*, especially the features *Text-to-Speech (TTS)*, to improve the local cultural play and learning experience. In this case, the industry supports the development of games that aim to preserve culture while presenting digital-based education with an innovative approach.

Games are a type of entertainment that is loved by many people from children to adults. Quiz games are one of the popular genres among mobile game users because of their interactive, challenging, and educational nature. Quiz games have a simple but effective format in conveying information or learning materials through questions and answers. By incorporating NLP technology, quiz games can be more sophisticated and interactive, especially when it comes to automatic question reading using the TTS feature. This feature allows players to listen to the questions being read, making the gaming experience more immersive and inclusive, especially for those who have reading limitations or prefer to learn audio.

As technology develops, NLP has become an important element in software development that interacts with users naturally. NLP that can convert text to speech is now increasingly integrated into various platforms,

from mobile apps to virtual assistants. In quiz games, the implementation of TTS not only improves the user experience, but can also enrich learning by providing a more human touch of sound. In this case, TTS can be used to read quiz questions automatically, so players can focus on the answers without having to read the questions.

According to (Eriana & Zein, 2023) *Natural Language Processing (NLP)* is one of the branches of artificial intelligence *(Artificial Intelligence/AI)* which focuses on the interaction between computers and humans through natural language. NLP allows computers to process, understand, and generate human language in a meaningful way. One of the main applications of NLP in education is *Text-to-Speech (TTS)*, which converts written text into human-intelligible voice. The implementation of TTS in educational games has great potential to increase user engagement and enrich the learning process.

In the context of educational quiz games that raise the theme of Balinese traditions and rites, the use of *Text To Speech (TTS)* NLP-based is very relevant. Through TTS, quiz questions related to Balinese customs, traditions, or rites can be read automatically so that players can feel different interactions when playing quiz games. There are several pre train models that can be used in making Text To Speech, including Tacotron2. In the study, it was explored about the use of the Tacotron2 model to be superior to other models. The model combines an encoder-decoder and an attention mechanism to produce a natural synthetic sound from text, with the support of a WaveNet vocoder that converts a Mel-spectrogram into a sound wave.

Tacotron 2 achieved a MOS score of 4.5 ± 0.06, almost equivalent to a native human voice MOS of 4.46–4.55. Other models such as WaveNet achieving a MOS score of 4.21 and Transformer TTS achieving a MOS score of 4.39 are also close to the quality of human voice, but Tacotron 2 excels in language adaptation flexibility. Meanwhile, models such as Deep Voice 1-3 achieved a MOS score of 2.00–3.44 and FastSpeech achieved a MOS score of 3.83–3.84 were of lower quality. (Hasanabadi, 2023)

Balinese culture and rites encompass various aspects of life, from religious ceremonies, dance arts, music, to belief systems that are passed down from generation to generation. According to , to keep this culture alive in the midst of the digital era, media that is able to bridge the younger generation with this cultural heritage is needed. The use of educational games as a learning medium offers innovative solutions to convey cultural knowledge in an interactive and engaging manner. (Basalama, et al., 2024)

Educational quiz games that focus on Balinese traditions and rituals can help users get to know more about various aspects of Balinese culture through a challenging quiz format. By taking advantage of the *Natural Language Processing (NLP)* and *Text To Speech (TTS)*, this game also provides a richer and more meaningful gaming experience. Players not only learn about Balinese culture through reading, but also through listening to explanations of questions presented in a fun and interactive way. In addition, this approach can also increase player involvement in learning about Balinese culture, while creating awareness about the importance of preserving local cultural heritage.

Based on the background description, the author will make a game with the theme of Balinese culture and rites. Therefore, in this final project, the author took the title "DEVELOPMENT OF A BALINESE TRADITION AND RITE QUIZ GAME WITH TEXT TO SPEECH FEATURE" This research aims to preserve local culture while educating the younger generation so that local culture is not forgotten, with the support of collaboration from the Undiksha Computer Science study program and PT. Dago Engineering.

1.2. Problem Identification

1. The declining interest of the younger generation in local culture, especially Balinese culture, is due to the influence of foreign culture through digital media.

2. Lack of interactive and engaging learning media to educate the younger generation about Balinese culture

3. The limitation of effectively distributing cultural materials through text- and image-based means only.

4. The lack of use of *Natural Language Processing (NLP)* in educational games to provide a new and more interesting learning experience.

5. The limitations of developing educational games about Balinese culture that utilize the latest technology.

1.3.   Problem Limitations

Based on the identification of the problems that have been raised and to maintain the focus of research and development. The researcher establishes some necessary problem limitations as follows:

1. This game will use the automatic reading feature with a standard voice, without any special pronunciation for intonation or Balinese dialect.

2. This game will only cover questions related to Balinese traditions and rites, without going into other aspects of Balinese culture in depth.

3. This game will have a total of 135 questions stored in the database, which includes questions related to Balinese traditions and rites.

4. This game provides an automatic question reading feature that can be used by players. Players can choose to listen to questions read aloud automatically, but the game does not include any other interactive elements.

1.4.   Problem Formulation

Based on the limitations of the problem, the researcher can formulate the problem as follows:

1. How is the design and creation of an educational game about Balinese traditions and rites that is equipped with an automatic question reading feature to increase the appeal for players?

2. What are the results of user tests on the development of educational games in assessing the attractiveness and gaming experience produced?

1.5.   Development Objectives

In line with the formulation of the problem that has been raised, the development objectives are as follows:

1. Developing an interactive educational game about Balinese traditions and rites that is equipped with a Text-to-Speech (TTS) feature as an automatic question reading feature to increase attraction for players.

2. Analyze user test results to assess the level of appeal and gaming experience resulting from the development of the game.

1.6.   Development Benefits

The benefits of conducting this development and research can be classified into two, namely theoretical benefits and practical benefits. The expected benefits of this development and research are as follows.

1.6.1. Theoretical Benefits

This development and research contributes to the development of culture-based educational games, especially those that use technology *Natural Language Processing (NLP)* with features *Text To Speech (TTS)*. This game can enrich the existing literature on how sound technology can be applied in the context of cultural education.

1.6.2. Practical Benefits

Practically the results of the development and research of cultural education games using technology *Artificial Intelligence (AI)* Form *Natural Language Processing (NLP)* This can provide benefits to the younger generation, to PT. Dago Engineering and to other researchers.

1) **To the Younger Generation**

The research and development of this game contributes to providing a fun and interactive new approach as a medium to introduce them to Balinese traditions and rites.

2) **To PT. Dago Engineering**

The research and development of this game contributes to opening up opportunities and product innovations in the field of educational technology and contributing to cultural preservation. In addition, this game can potentially strengthen the company's image as a pioneer of educational games that combine advanced technology such as NLP with cultural content.

3) **To Other Researchers**

The results of this study can be useful for other researchers as motivation or reference in developing cultural educational games with the application of AI technology such as NLP.

1.7.   Expected Product Specifications

From this research and development, it will produce traditional and Balinese rite-based quiz game products. *Natural Language Processing (NLP)*. This NLP-based cultural quiz game product has the following specifications:

1) The product of this research is in the form of an educational quiz game about Balinese culture, especially on Balinese traditions and rites.

2) The product of this research is in the form of a game application with *the Android* platform.

3) This game product when played will contain as many as 15 questions in 1 game.

4) Players will be given 2 minutes to answer all questions and if time then the game will stop automatically and will start counting points.

5) This game product has a feature that players can use to read questions automatically.

1.8.   The Importance of Development

The importance of the development of this research lies in efforts to integrate modern technology, in particular *Natural Language Processing (NLP)*, in the preservation and introduction of local culture to the younger generation. In the midst of the rapid development of digital technology and the increasingly dominant influence of foreign cultures, this research offers innovative solutions to educate and arouse the interest of the younger generation in Balinese traditions and rites through interactive and fun

educational games. Feature usage *Text-to-Speech (TTS)* which allows automatic question reading to provide new space in learning. Thus, the development of this research not only contributes to the preservation of Balinese culture, but also to the development of digital learning media that is more effective, interesting, and relevant for today's young people.