Mengenal Aksara Bali

Balinese Script game education based on mobile application

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***Abstract*— Balinese Scriptwriting, as one of Balinese cultural richness, is going to extinct because of its decreasing use. Governor of Bali, I Wayan Koster, expressed concern about the increasingly diminishing interest of the community, especially among the younger generation using it. This research focused on the development of a Balinese Script game education based on a mobile application called Mengenal Aksara Bali. In this research area, Mengenal Aksara Bali offered a solution as an application that is not only for playing, but also provided features for learning Balinese Script glyphs (Aksara Wresastra and numbers). Mengenal Aksara Bali was implemented by using Construct 2 (a powerful game creator designed especially for 2D games). Through Black Box testing, its functions in the application was running as expected.**

Keywords—Balinese Script; game education; young generation; mobile; glyphs

I. INTRODUCTION

The Balinese Script, or *Aksara Bali*, is used for writing the Balinese language, the native language of the people of Bali, known locally as basa Bali. It is a descendant of the ancient Brahmi script of India and so many similarities with a modern script of South Asia and Southeast Asia which are also members of that family [1]. Though everyday usage of the script has largely been supplanted by the Latin alphabet [2]. The script is mainly used today for copying *lontar* or palm leaf manuscripts containing religious text [3].

The existence of the Balinese Script has a position and an important function. Along with globalization, its presence is experiencing a dynamic, such as the decrease in the use of language through quantity and quality [4]. The Bali Governor, I Wayan Koster [5] expressed his concerns regarding the increasingly diminishing interest of the community, especially among the younger generation on the use of Balinese Script [6]. Based on Indonesia News Agency [7][8], Balinese Script is a script that will lead to extinction.

Previous investigation about the scope of Balinese Script by Indrawan is a Latin-to-Balinese Script transliteration method on robotic system [9] and mobile application [10] called *LBTrans*. Another research by Iswara produced a keyboard application to type Balinese Script [11] called *PaTik* [12]. To be able to use the applications, users must know and be able to read the Balinese Script. In this research another approach was taken to preserve Balinese Script through educational games where users can learn the glyphs of Balinese Script.

Gaming in education may be viewed as an interference to learning but its role in education is to increase students motivation and engagement, to enhance visual skills, to improve students interaction, to enable them to apply gaming values in a reals-world situation [13]. As Mazzo predicts that Millenials preferences for gamified education is greater than traditional learning formats [14]. By creating educational game that can be played in daily activity, it is expected could help people, especially young generation [15].

This research focused on the development of Balinese Script game education based on mobile application that was called Mengenal Aksara Bali. In the future, this game can be used for learning Balinese Script as a medium favored by the young generation.

II. DESCRIPTION AND SYSTEM FLOW

This game is implemented on the Android platform [16] created using the Construct 2 [17] application which is based on visual programming [18]. The development phase consists of several stages, namely the general description of the system, program flow, and visual game flow.

A. General Description

This game is officially called Mengenal Aksara Bali which means in English as Knowing Balinese Script. This game contains images, sounds, and animations and of course, there are rules to win it.

This game challenges players to read basic syllables, also known as Aksara Wresastra [19] and numbers, and type it on Latin version. There is also a menu which is for learning, for players who have not encountered Balinese Script before. More complete information about Balinese Script glyphs can be found at The Balinese Alphabet document by Sudewa [19]. When the game starts, the player's score is zero and the player will have three lives chances symbolized by three red heart icons. If the player succeeds in typing the Latin version of the Balinese Script glyph that appears in the game, the player's score will increase by one. If the Latin version is typed incorrectly, the player's life will decrease by one. When the life runs out or zero, the game will be over.

Gamers can simultaneously able to compare their scores with other gamers. The game provides ranking system for a player who gets the highest score. Survival and mastery of reading the Balinese Script glyph is the key in getting the high score for the game. Mengenal Aksara Bali will use the leaderboard feature that has been provided by Google Play Services [20] where each player can log in with his Google account [21] to connect to each other so that the player with the highest ranking can be known.

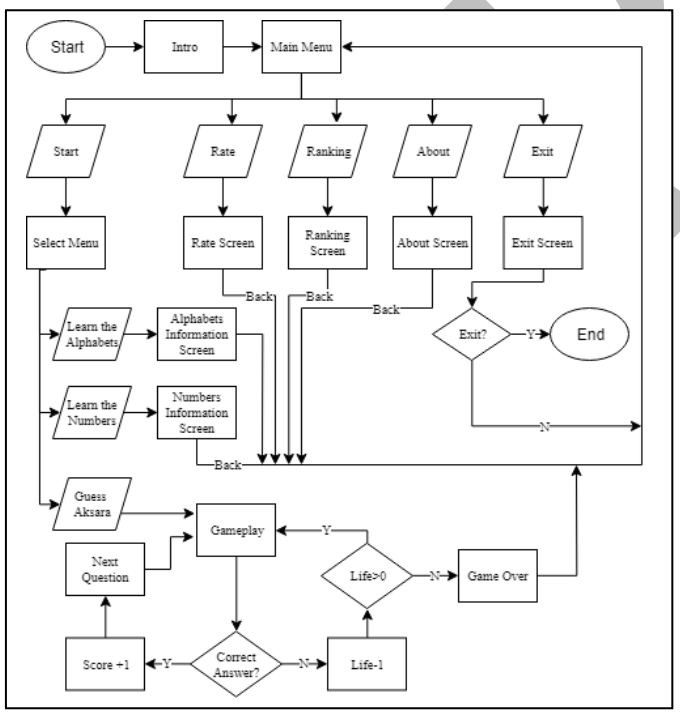

Fig. 1. Program Flow

B. Program Flow

This section displays the overall flow of Mengenal Aksara Bali. The application starts from the Main Menu where there are five buttons namely: *Mulai* (Start); *Beri Rating* (give a Rate, for future versions); *Peringkat* (Ranking); *Tentang* (About the developer); and the Exit button. Program flow is shown in Fig. 1.

On the start button, players have their options whether to Start the Game (choose Guess Aksara) or Learn the Balinese Script (choose Learn the Alphabets/Numbers). On the Ranking button, players can check their highest scores achieved throughout their game journey as well as with other players. While on the Developer button, players can see the profile of the researchers to create a friendly application impression.

C. Visual Game Flow

Mengenal Aksara Bali is consists of several visual games where each visual displays a different menu. Under Game visual, players can find the Intro, Main Menu, Learn, Main Game, Win or Lose, Ranking, Rate (for future versions), and About the Developer. The visual game flow is shown in Fig. 2

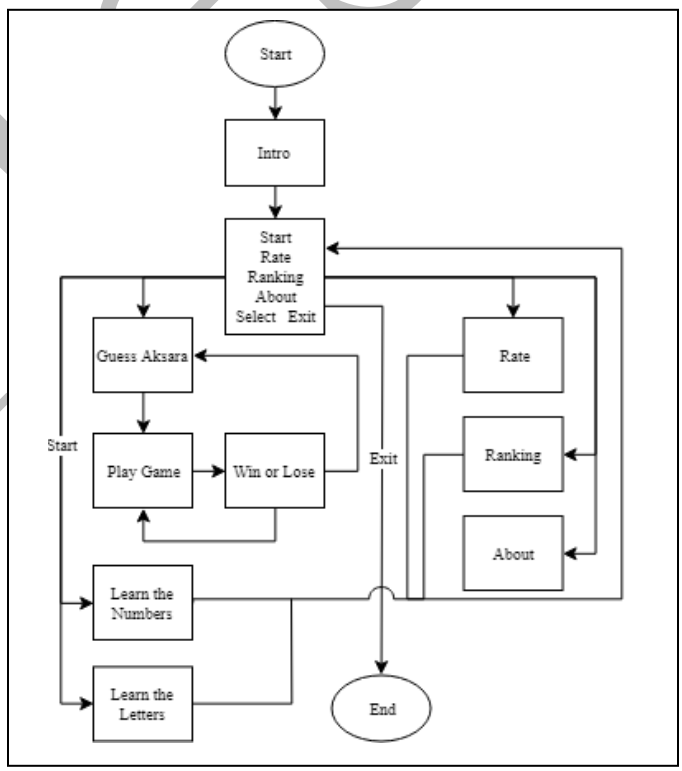

Fig. 2. Scene Flow

III. RESULTS

Mengenal Aksara Bali is 11 MB in size and its minimum requirements runs on the Android 5.0 (Lolipop), CPU Quad-core 1.2 GHz, RAM 512 MB and 4 inches display. In this time of study, Mengenal Aksara Bali was tested on devices with Qualcomm MSM8917 Snapdragon 425 Chipset, Quad-core 1.4 GHz Cortex-A53 CPU, Adreno 308 GPU, IPS 5.0 inches LCD with 720 x 1280 pixels, and Android 7.1.2 (Nougat).

Fig. 3. Intro Scene (top) and Main Menu Scene (bottom) Scene with Red Pointer to show Red Cross Icon

A. Game Interface

Fig. 3 shows the Intro (top) which is the initial display when opening the application, and Main Menu that appears after the Intro. There are five buttons that are available in the Main Menu (buttom) named *Mulai* (Start); *Beri Rating* (give a Rate); *Peringkat* (Ranking); *Tentang* (About the Developer); and Close button that is symbolized by the red cross icon in the top right corner of the application. To make it easier to see the position of red cross icon, Fig. 3 have been added a red pointer.

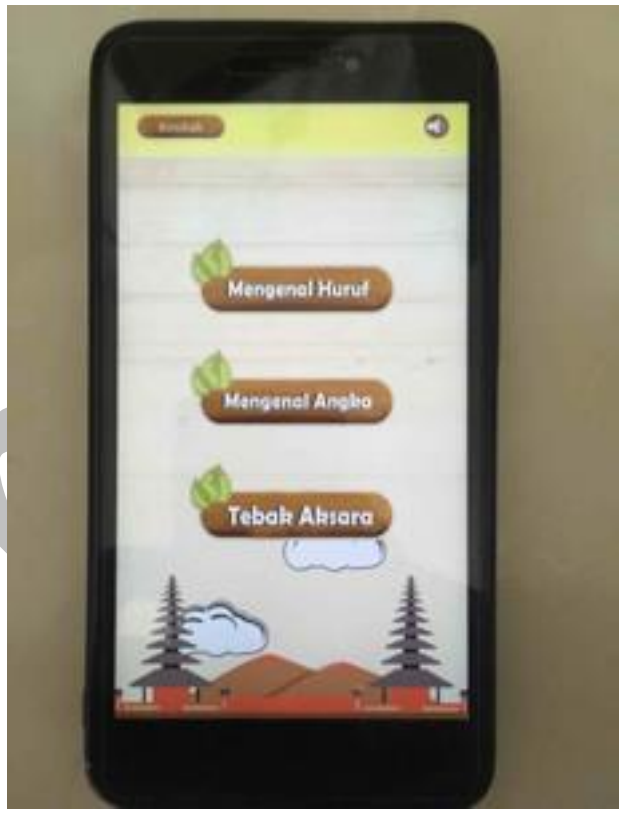

Fig. 4. Start or Learn Scene

Fig. 4 shows the Start or Learn, will appear if *Mulai* (Start) button is pressed. There are three buttons in this namely *Mengenal Huruf* (Learn the Alphabets, in this application is *Aksara Wresastra*), *Mengenal Angka* (Learn the Numbers), and *Tebak Aksara* (Guess Aksara).

Fig. 5 shows *Mengenal Huruf* (top) and *Mengenal Angka* (bottom) are a feature on how to learn Balinese Script. There are totally eighteen buttons in Learn the Alphabets, each represents glyphs of *Aksara Wresastra* [19]. Ten buttons in Learn the Numbers, and each represents glyphs of numbers [19]. Players can see the Latin version of the Balinese Script glyphs at the top part of the application. *Tebak Aksara* will go to main game.

Fig. 6 shows the main game (top) where players will immediately start the game. The player will have three lives and the initial score are zero can be seen at the top. The score will increase by one for each correct Latin input, the opposite, lives will decrease by one. When lives run out, the game will end and players can see their latest score (bottom). Also, in Fig.

7 there is a confirmation when the player wants to exit the game by pressing the red cross button.

Fig. 5. Learn the Alphabets Scene (top) and Learn the Numbers Scene (bottom)

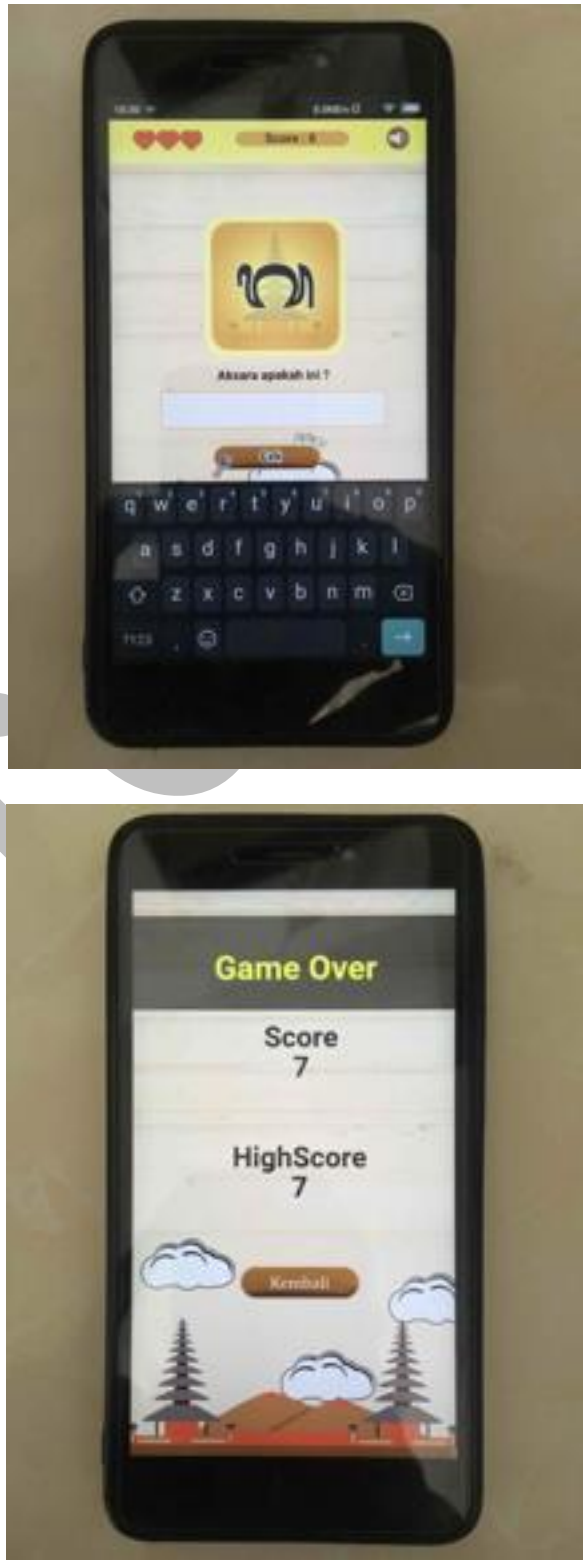

Fig. 6. Main Game Scene

Fig. 7. Exit Scene Confirmation

B. System Evaluation

The test conducted in this study used the black box testing. Black box testing is performed on the functionality of the Mengenal Aksara Bali. Table 1 shows the results contains the functions tested, scenarios performed, expected results, and suitability.

TABLE I. BLACK BOX TESTING MENGENAL AKSARA BAL

No	Functions Tested	Scenarios Performed	Expected Results	Suitability
1	Application installation	Install the application into an Android smartphone	The application was installed successfully	Valid
2	Display the Intro	The Intro will appear after the application starts	The Intro appears	Valid
3	The application takes out the background sound	Background sound will be played as long as the application starts	Background sounds played	Valid
4	Display the Main Menu	Main Menu will appear after the Intro	The Intro appears	Valid
5	Display Learn or Start	Press *Mulai* button	The Learn or Start appears	Valid
6	Display Learn Alphabets	Press *Mengenal Huruf* button	The Learn Alphabets appears	Valid
7	Display the Latin version of Balinese Script	Press Balinese Script glyphs button in learn alphabets	Latin appears	Valid
8	Display the Learn Numbers	Press *Mengenal Angka* button	The Learn Numbers appears	Valid
9	Display the main game	Press *Tebak Aksara* button	The main game appears	Valid
10	Score increased	Type in corrected Latin version of Balinese Scripts glyph in Main Game	Score increased by one	Valid
11	Lives decreased	Type in wrong Latin version of Balinese Scripts glyph in Main Game	Lives decreased by one	Valid
12	Back button	Press Back Button in each	Back to previous	Valid
13	Exit (red cross) button	Press red sross button in main menu	Exit confirmation from application	Valid

IV. CONCLUSIONS

A Balinese Script Game education was based on a mobile application; Mengenal Aksara Bali has been developed and has presented a game which contains features on how to learn the Balinese Script. Through the usage of black box testing, its functions in the application was running as expected. This game can be a new solution in the field of preservation of Balinese culture, especially Balinese Script for the young generation. In the future work, Mengenal Aksara Bali could be improved by: 1). Accommodating more Balinese Script glyphs because this application only displays Aksara Wresastra and numbers; 2). Testing to the younger generation to get feedback and doing analysis after that; 3). Making it available at Google Play Store and other platforms such as iOS or web applications, so that, it can reach & cater more people to play the game.

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