DESIGNING 3D ANIMATED GAMES AS LEARNING MEDIA FOR LONTARA (EDULONTARA) BASED ON ANDROID

Suci Rahma Dani Rachman[1], Ardimansyah[2], Baso Arfan Efendy[3], Riyan Alfian Syarif[4]
Program Studi Teknik Informatika, Universitas Dipa Makassar, Makassar, Indonesia[1,2,3,4]
E-mail address: sucirachman@undipa.ac.id[1], arrdiman@gmail.com[2],
basoarfane@gmail.com[3], riyanalfian562@gmail.com[4]

Received: 05, December, 2022 ***Revised: 12, December, 2022*** ***Accepted: 29, December, 2022***

ABSTRACT

At this time it is known that many children, especially students, have played games, both through computers and mobile phones. Students think that games can fill their spare time. The use of media that involves technology can affect student achievement and motivation, one of which is game play. The background of the research is that learning in schools still uses learning methods that use guidebook media, which causes a lack of interest and attention from students to take part in ongoing learning, for that it is necessary to develop an educational game that can be used as a medium of learning and can motivate students to be interested in study. The purpose of making 3D animation game applications for learning lontara script is so that students can easily understand and be interested in learning lontara script. The system development method used is waterfall starting from data collection, system analysis, application design, system testing and implementation. Black-box testing method that focuses on the functional requirements of the software. The programming language used is the Visual C programming language. With the application of the 3D animation game for learning the Lontara script, it is hoped that it can provide information and help students understand and be interested in learning the Lontara script.

Keywords: *3D Animated Game, Lontara Script*

1. INTRODUCTION

At this time it is known that games both through computers and mobile phones have been widely played by children, especially students. Students complete that the game can fill spare time. However, in reality games have become a bad influence for students due to the excessive use of games so that students lose track of time (López-Faican & Jaen, 2020). The nature of challenging games is addictive and fun for students who like modern games can have a negative impact if the games that are player are not educational (Nielsen & Kardefelt-Winther, 2018). In addition, current most learning in schools still uses learning methods that use manual media, which causes a lack of interest and attention for students to take part in on going learning for this reason it is necessary to develop an educational game that can be used as a learning medium and can motivate students. To be interested in learning.

This study aims to make a 3D animation game application for learning the Lontara script so that students can easily understand learning the Lontara script. The game presented is a learning media game application for elementary school children, have a vocabulary that includes verb vocabular and animal name vocabulary and has verb and animal animation animations. It is

hoped that this application can increase student learning interest and can hone intelligence and imagination. In addition, the 3D animation game application for learning the lontara script is an educational game-based learning media that can be used as a reference for learning media at school or at home.

2. THEORY

a. The Basic Concept of the Lontara Script

Lontara is a traditional Bugis-Makassar script. The form of the Lontara script, according to Prof. Mattulada comes from "sulapa eppa wala suji". Wala suji comes from the word wala which means separator/fence/guard and suji which means princess. Wala suji is a kind of bamboo fence in a ritual event in the form of a rhombus. Sulepa eppa (four sides) is a mystical form of classical Bugis-Makassar belief which symbolizes the composition of the universe, fire-water-wind-soil. Lontara letters are generally used to write government and social regulations. Manuscripts are written on palm leaves using a stick or kalam made of coarse palm fiber.

The term lontara also refers to literature on the history and genealogy of the Bugis people. Lontara script has existed since the 12th century. This script consists of 23 letters (including consonants and vowels a) which are arranged according to their own rules. In this script system, there are known vowel markers for u, e, o ae. However, the Lontara script does not recognize letters or symbols to turn off letters, for example, jokka becomes joka (jok) (Bintoro & Harjoko, n.d.).

b. Game Education

The Game comes from the English word which has the basic meaning of "game". The game in this case refers to the notion of intellectual agility (intellectual playability). Games can also be interpreted as an arena for the decisions and actions of the players. There are targets and missions for players to achieve. Intellectual agility, at a certain levels, is a measure of the extent to which the game is interesting to play optimally (Limbong & Matondang, 2021).

c. Animation

Animation it self comes from the word to animate which means to move, animate. For example, an object that is in animate, then moved through gradual and regular changes so that it gives the impression of being alive. Animation is also a technique of displaying sequential images in such a way that you feel an illustration of motion in the displayed image. This definition means that inanimate objects can be animate. This understanding is only a similar term, in the sense that it does not have to be translated denotatively, but rather as a symbol that expresses an element of closeness (Waeo et al., 2016).

d. Three Dimension (3D)

Three-dimensional (3D) is an animation that has space. If it refers to a "3D object", it means that the object has volume space. 3D objects also have locations in X, Y, and Z coordinates. If in a 2-dimensional plane, you can only move the object sideways. Three Dimensions (3D) is a shape of an object that has length, width, and height. The term is usually used in the fields of art, animation, computers, and mathematics. Each three-dimensional shape has its capacity, also known as volume (Khairin & Ariani, 2022).

e. Android

Android is an operating system for mobile phones based on Linux. Android provides an open platform for developers to create their had applications for use by a variety of mobile devices. Then to develop Android, the Open Handset Alliance was formed, a consortium of 34 hardware, software, and telecommunications companies including Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, and Vidia then on December 9, 2008, there were 14 new members who participate this android project include Toshiba Corp, Asustek Computer Inc, Vodafone Group Inc (Kusumandari et al., 2019).

f. Related research

Research conducted by Munirah Muin and Sulfasyah using the kashen theory shows that Bugis speakers in South Sulawesi have experienced a decline, especially among the younger generation which has resulted in this language being categorized as an endangered language and has the potential to become extinct. Therefore, efforts to suppress the rate of shift of the Bugis language are very urgent to be carried out so that it remains sustainable. One of them is by optimizing regional language learning using learning methods that are attractive to students (Liébana et al., 2019).

In line with the research conducted by Arif Widodo, et al., with data analysis using descriptive statistics, it shows that PGSD students' interest in learning local script is very low. Indicators that show low interest in student learning include: not all students have studied local script, the number of students who are interested in learning local script is small, the number of students who want to read literature is small, the number of students who like local script is small and the use of local script is also small and there is the assumption that the local script is not important to learn. The reason for the low interest in learning local scripts is because local scripts are difficult to learn and are no longer needed in practical life (Nugraha & Mansoor, 2021).

Besides that, Yusring Sanusi's research used a hypertext-based Lontara script development model design that refers to Yusring's Lontara script application. The Lontara Yusring application itself was developed in the form of a True Type Font. This hypertext-based Lontara application has been adapted to the characteristics of the Lontara script itself. In addition, the characteristics of software, hardware, and human ware are still considered (Baso, 2018); (Baso & Agussalim, 2021). Muhammad Sabri in his research on car-based Lontara Bugis Makassar script learning applications created an application that has the feature of being able to scan catalogs, quizzes/games, hear the pronunciation/mention of letters or sentences, and wise words. Application testing is done with a questionnaire to determine the suitability of the application to user needs. The results obtained are in the form of an Android-based mobile application. Based on the test results on 23 users, a value of 85.4% was obtained which was included in the very good category (Sabri et al., 2020). Based on some of these studies, the 3D animation game application for learning the Lontara script is so that students can easily understand and be interested in learning the Lontara script. The novelty in this study is that the game application presented is a learning

media game application for elementary school children, has a vocabulary that includes verb vocabulary and animal names, and has verb and animal animation animations.

3. METHOD

The stages of the research method used to realize the research are in the form of literature studies, data collection methods, needs analysis, system design, implementation, and testing (Rudi et al., 2022).

a. Data collection

The data needed from SD Inpres Gunung Sari Baru Makassar in this research is in the form of vocabulary which includes a vocabulary of verbs and vocabulary of animal names from learning materials for Lontara script in regional language subjects, population size, and sample at the research location.

b. Analysis

Hardware and software requirements in system design and manufacture include:

1) Hardware
   a) Laptop with specifications AMD Ryzen 5 3500U with Radeon Vega Mobile Gfx 2.10 GHz RAM DDR 4 : 8 GB SSD : 512 GB Windows 10
   b) Smartphone Realme 6, OS Android 10
2) Software
   a) Windows 10 Ultimate 64-bit
   b) Unity 2019.4.16f1 (64-bit)
   c) Visual Studio 2019

c. System Planning

In system design, the system design is described in the form of activity diagrams, sequential diagrams, and class diagrams using the Unified Modeling Language (UML), designing interface designs including input-output to data in the system database.

d. Programming

At this stage, the algorithm and flowchart are made according to the system design, and the programming language used is the C# visual programming language.

e. Implementation

Implementation of the method into a system that has been designed with actual data in the form of vocabulary which includes verb vocabulary and animal names and has verb animations and animal animations

f. Testing

The testing technique used is Black Box testing, which aims to test the functionality of the system according to requirements, free from interface errors and data structures.

4. RESULTS AND DISCUSSION

a. System Analysis

This research is how to make it easier for students to understand and be interested in learning Lontara script learning material at school, with the Lontara script learning 3D game application can display Lontara script learning material and a 3D object along with the Lontara script from the 3D object, so that in In using and providing information from this game application it

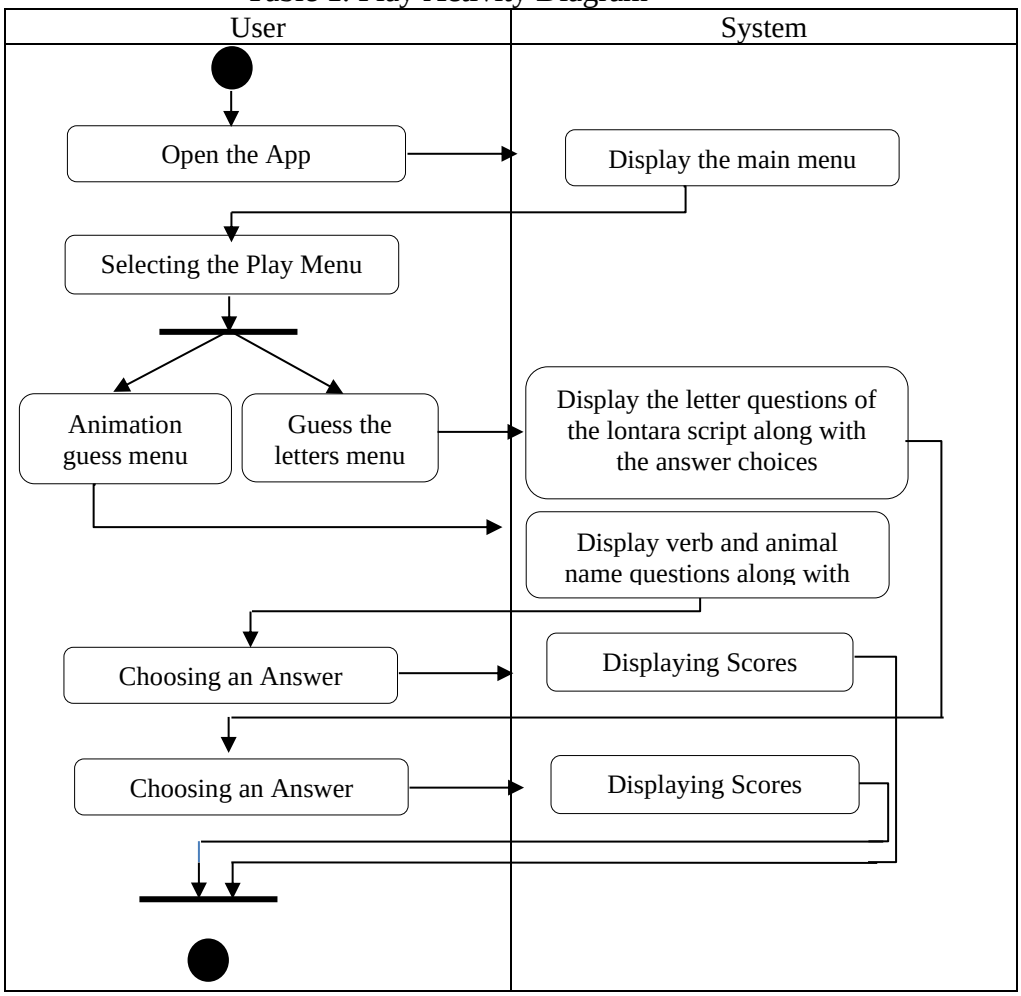
becomes more interesting, so students become more interested in learning Lontara script learning material.

1) System Design

a) Activity Diagram

When the user selects the animated guess menu, the system will display a multiple choice question. Then when the user selects the guess letter menu, the system will display a question in multiple choice form which contains questions about the Lontara script.

Table 1. Play Activity Diagram



2) Design of Question Randomization Method

As for the system design, the method used to randomize the questions is the Random Shuffle method, and what is randomized is an array with a total of 50 questions on the animated guess menu and 50 questions on the Lontara script guess menu. For example, suppose A is an array of 50 x 1, so A = [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50] then the Random Shuffle process will randomize the index arrangement of array A to A1 = [3 7 35 8 45 22 4 2 27 40 31 16 33 14 26 11 20 29 10 18 46 6 23 48 42 15 17 28 19 32 13 30 12 34 5 50 47 38 44 41 9 25 43 49 1 21 37 24 39 36] or into another array.

As for clarifying the randomization of the position of the questions using the Shuffle Random system, it is carried out in the following stages:

a) Determine the number of questions

In table 2 below, the initial stages of the position of the questions have not been randomized, so the questions are still sequential.

Table 2. The position of the question that has not been randomized

Question [1]	Question [2]	Question [3]	Question [4]	Question [5]
Question [6]	Question [7]	Question [8]	Question [9]	Question [10]
Question [11]	Question [12]	Question [13]	Question [14]	Question [15]
Question [16]	Question [17]	Question [18]	Question [19]	Question [20]
Question [21]	Question [22]	Question [23]	Question [24]	Question [25]
Question [26]	Question [27]	Question [28]	Question [29]	Question [30]
Question [31]	Question [32]	Question [33]	Question [34]	Question [35]
Question [36]	Question [37]	Question [38]	Question [39]	Question [40]
Question [41]	Question [42]	Question [43]	Question [44]	Question [45]
Question [46]	Question [47]	Question [48]	Question [49]	Question [50]

b) The number of questions that have been scrambled

In table 3 below is the position of the questions that have been randomized using the random shuffle method so that the questions are no longer sequential.

Table 3. The position of the question that has been scrambled

Question [3]	Question [7]	Question [35]	Question [8]	Question [45]
Question [22]	Question [4]	Question [2]	Question [27]	Question [40]
Question [31]	Question [16]	Question [33]	Question [14]	Question [26]
Question [11]	Question [20]	Question [29]	Question [10]	Question [18]
Question [46]	Question [6]	Question [23]	Question [48]	Question [42]
Question [15]	Question [17]	Question [28]	Question [19]	Question [32]
Question [13]	Question [30]	Question [12]	Question [34]	Question [5]
Question [50]	Question [47]	Question [38]	Question [44]	Question [41]
Question [9]	Question [25]	Question [43]	Question [49]	Question [1]
Question [21]	Question [37]	Question [24]	Question [39]	Question [36]

After getting the position of the random questions in table 3 above, then the system will display 20 questions starting from the 1st order to the 20th order in an array, which can be seen in table 4 below.

Table 4. Random question displayed

Question [3]	Question [7]	Question [35]	Question [8]	Question [45]
Question [22]	Question [4]	Question [2]	Question [27]	Question [40]
Question [31]	Question [16]	Question [33]	Question [14]	Question [26]
Question [11]	Question [20]	Question [29]	Question [10]	Question [18]

b. System Testing

1) Testing the main menu button

Table 5. Testing the main menu button

Test Factor	Description	Results
Press the Main Menu button	✓	Successfully pressed the Main Menu button and returned to the main menu

Screenshoot

Description:✓= Succeed X=Not Successful

In table 5 it can be seen that when pressing the main menu button it will return to the main menu.

2) Testing the lontara script button

Table 6. Release Button Testing

Test Factor	Description	Results
Release Button Testing	✓	Successfully pressed the Escape button and entered the escape menu

Screenshoot

Description:✓= Succeed X=Not Successful

In table 6 it can be seen that when pressing the Lontara button it will display the Lontara menu which contains Lontara letters and punctuation.

3) Exit button test

Table 7. Exit Game Button Testing

Test Factor	Description	Results
Press the Exit Game button	✓	Successfully pressed the Quit Game button, and it will display a score display and the Main Menu button, and the Play Again button.

Screenshoot

Description:✓= Succeed X=Not Successful

In table 7 it can be seen that when pressing the exit button the game will display the value display, and the main menu button, and the play button again.

4) Recapitulation of Test Results

Table 8. Recapitulation of Black Box Testing Results

No	Scenario Testing	Expected Results	Test Result	Conclusion
1.	Opens the Main Menu view of the application	Successfully displays the Main Menu of the application	According to expectations	Success
2.	Open the Study Form	Successfully Displays the Learn Menu	According to expectations	Success
3.	Open the Lontara Form	Successfully Display the Lontara Menu	According to expectations	Success
4.	Open the Vocabulary Form	Successfully Displays the Vocabulary Menu	According to expectations	Success
5.	Open the Verb Form	Successfully Displays the Verb Menu	According to expectations	Success
6.	Open the Animal Name Form	Successfully Displays the Animal Name Menu	According to expectations	Success
7.	Open the Play Form	Successfully Displays the Play Menu	According to expectations	Success
8.	Open the Animated Guess Form	Successfully Displays the Animated Guess Menu	According to expectations	Success
9.	Open the Letter Guess Form	Successfully Displays the Guess Letter Menu	According to expectations	Success

In table 8 it can be seen that this game application has worked well starting from the function of the buttons on the main menu to the appearance of 3D objects and lontara script learning materials.

5. CONCLUSIONS AND SUGGESTIONS

a. Conclusions

1) Using the random shuffle method can make each question unable to be repeated.

2) With the 3D animation game application for learning the Lontara script, students are expected to more easily understand and be interested in learning the Lontara script.

b. Suggestions

1) It is hoped that the 3D animation game application for learning the Lontara script will be added with more 3D animation in it.
2) This lontara script learning 3D animation game application is further developed to meet future needs.
3) Game applications that are made in the future contain Lontara script material in the form of sentences

REFERENCES

Baso, Y. S. (2018). Model Aplikasi Aksara Lontara Berbasis Html Sebagai Salah Satu Solusi Pemertahanan Bahasa Daerah. *Jurnal Kata: Penelitian Tentang Ilmu Bahasa Dan Sastra*, *2*(1), 1–12.

Baso, Y. S., & Agussalim, A. (2021). Computerization of Local Language Characters. *International Journal of Advanced Computer Science and Applications*, *12*(12).

Bintoro, P., & Harjoko, A. (n.d.). Lampung Script Recognition Using Convolutional Neural Network. *IJCCS (Indonesian Journal of Computing and Cybernetics Systems)*, *16*(1).

Khairin, U., & Ariani, Y. (2022). Pengembangan Media Pembelajaran Berbasis Softwere Blender Materi Jaring-Jaring Bangun Ruang di Kelas V Sekolah Dasar. *Jurnal Pendidikan Tambusai*, *6*(2), 14317–14322.

Kusumandari, R. B., Wibawa, B., & Muchtar, H. (2019). Game Learning to Optimize Learning in Disaster Area. *KnE Social Sciences*, 530–543.

Liébana, D. P., Lucas, S. M., Gaina, R. D., Togelius, J., Khalifa, A., & Liu, J. (2019). General Video Game Artificial Intelligence. *Synthesis Lectures on Games and Computational Intelligence*, *3*(2), 1–191.

Limbong, T., & Matondang, Z. A. (2021). Implementation Of The Linear Congruent Method In Interactive Quiz Games Application. *INFOKUM*, *10*(1), 332–336.

López-Faican, L., & Jaen, J. (2020). EmoFindAR: Evaluation of a mobile multiplayer augmented reality game for primary school children. *Computers \& Education*, *149*, 103814.

Nielsen, R. K. L., & Kardefelt-Winther, D. (2018). Helping parents make sense of video game addiction. In *Video game influences on aggression, cognition, and attention* (pp. 59–69). Springer.

Nugraha, A. A., & Mansoor, A. Z. (2021). Essential Elements In The Development Of Educational Games For Language Scripts. *ICON ARCCADE 2021: The 2nd International Conference on Art, Craft, Culture and Design (ICON-ARCCADE 2021)*, 403–412.

Rudi, A., Iskandar, A., & others. (2022). Development of Teaching Methods Using Infographic Media and Comic Life Practice Towards Students Learning Interests. *Ceddi Journal of Education*, *1*(1), 1–5.

Sabri, M., Nurhayati, N., & Syahrir, S. (2020). Rancang Bagun Aplikasi Pembelajaran Aksara Lontara Bugis Makassar Berbasis Mobile. *Seminar Nasional Teknik Elektro Dan Informatika (SNTEI)*, 116–122.

Waeo, V., Lumenta, A. S. M., & Sugiarso, B. A. A. (2016). Implementasi Gerakan Manusia Pada Animasi 3D Dengan Menggunakan Menggunakan Metode Pose to pose. *Jurnal Teknik Informatika*, *9*(1).