Upgrade Games Cognitive And Literacy For Android - Based Kindergarten Children

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Abstract

The growth of children in kindergarten is crucial for developing their thinking patterns and creativity. Gadgets can influence children's cognitive and literacy abilities, so a cognitive game is needed to help improve these skills. The development of the game uses VAK and IMSDD methods to improve cognitive abilities and literacy better than conventional learning. The alpha testing showed that more than 90% of respondents agreed that the SITEKA game application met their needs and increased children's concentration and learning effectiveness by over 40%

Keywords : Kindergarten, cognitive game, VAK, Dastbaz, literacy

1. INTRODUCTION

Good early education and kindergarten have an important role in shaping the mindset, creativity, and cognitive abilities of children. In this digital era, gadgets and games can affect children's cognitive abilities and literacy. Therefore, appropriate cognitive games are needed for early childhood to improve their cognitive abilities and literacy. The game must be age-appropriate, educative, and can enrich the learning experience of children.

To overcome the problems of different cognitive abilities and literacy in kindergarten children, a cognitive game was created using the Visualization Auditory Kinesthetic (VAK) method. The Dastbaz Cycle Interactive Multimedia System Design & Development (IMSDD) method was used for game development because it fits this research study. Android-based games are designed to suit the target user's operating system. This game is expected to improve children's cognitive abilities, logic, visual skills, and literacy by 40% better than conventional learning. Educational games make learning more fun and increase children's interest in learning.

2. RESEARCH METHODS

Method study in development application This uses the method experimentally with ie use method Visualization Auditory Kinesthetic (VAK) to develop appropriate cognitive games For children aged early. Besides that, the Interactive Multimedia System Design & Development (IMSDD) Cycle Dastbaz method is used For game development because suitable for studies studying this. Study This use approach quantitative with use comparison results Study between learning conventional and learning through cognitive games that have been developed. Objective study This is To increase ability cognitive, logical, visual skills, and literacy of children through educational cognitive games.

2.1. Draft System

Draft systems use UML, and UML itself also provides standard writing A blueprint system, which includes business process concepts, writing classes in specific programming languages, database schema, and required components in software systems [1].

2.2. Use Case Diagrams

Use case diagrams are Suite design applications to be built in game upgrade app cognitive and literacy.
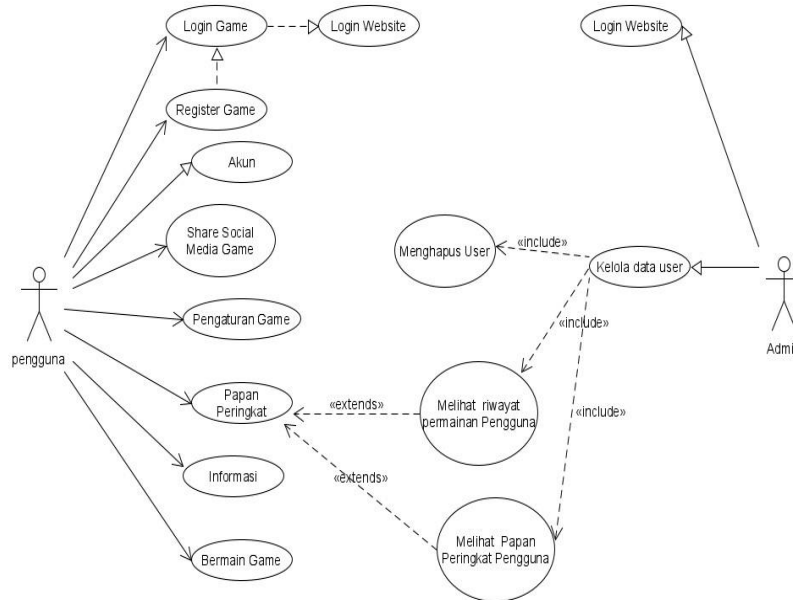

Figure 1. Use Case Diagram

2.3. Activity Diagrams

Activity diagrams are a chart used To describe channel Work or activity in the designed system. These diagrams can show How activities in the system begin, the decisions that occur, and how the process ended. As, the initial process in the activity diagram can be explained as a step beginning in a process or system, which is then followed by steps or must activities done To complete the process.
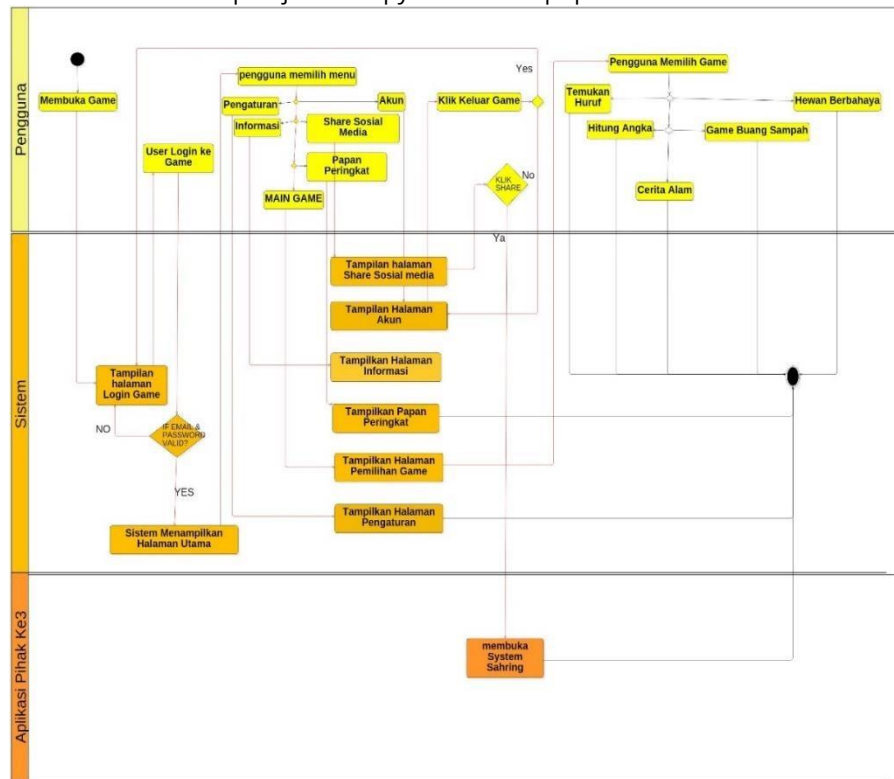
Figure 2. Activity Diagram

2.4. *Class Diagrams*

Can is known that each class is connected with databases that have channels each system can depict as follows:
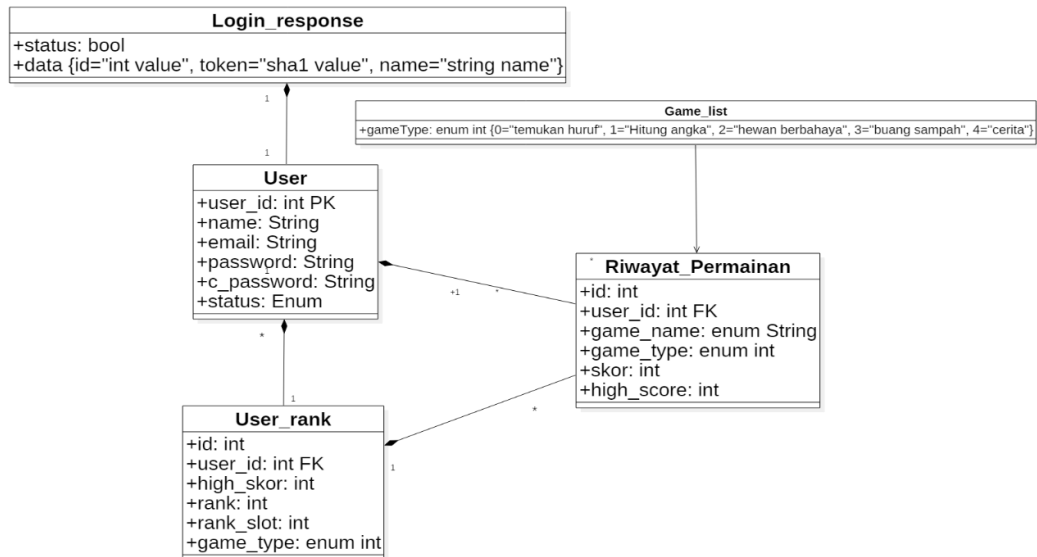

Figure 3. Class Diagrams

3. RESULTS AND DISCUSSION

Cognitive and literacy improvement games for kindergarten children based on Android are used to help children develop sustainable cognitive abilities and also help improve reading literacy skills.

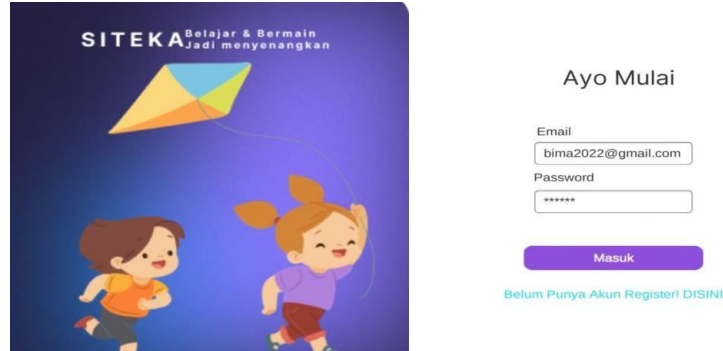*3.1. Program Implementation Results*

Figure 4. Login Display

The Siteka Login screen is used to enter an email and password to enter the main game page. Users can register if they don't have an account by clicking on the "Don't have an account register here" link.
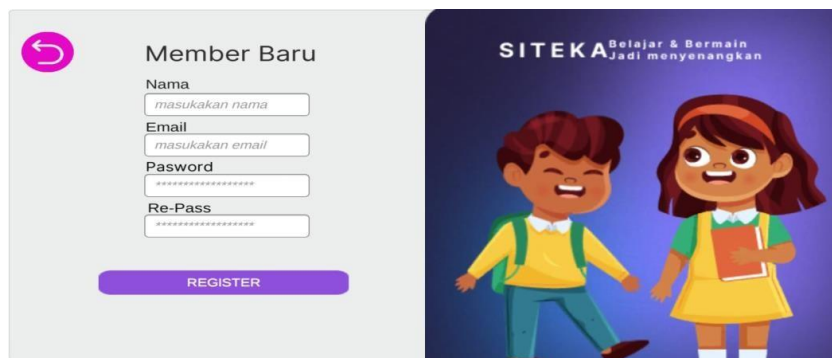

Figure 5. Display Registration

The register page on Siteka Games is used to register as a new user. Users are asked to enter their name, email, password, and re-password to create a user account and access game features

Figure 6. Display of Siteka Main Page

Siteka's main page displays the logo and various menus, including games, learning videos, settings, information, ratings, and game history. Users can access various types of games, such as drawing games and cognitive games. Siteka also provides a video menu containing learning videos and an account menu for managing accounts and exciting games. Users can also adjust the sound settings and game screen resolution. The sharing page allows users to invite others to play this game.

Figure 7. View of the sharing page Siteka

Siteka's sharing pages allow users to compare their game scores and achievements with other users, and motivate them to improve their results. This page also provides buttons to share game results on social media such as Facebook, Twitter, and Instagram.

Figure 8. Settings page Siteka

Siteka's settings page allows users to control the gaming experience. There are settings for screen resolution and sound on/off. Users can adjust the screen size and turn the sound on/off while playing games.

Figure 9. Rating and history page Siteka

Siteka's ratings and game history pages provide information about user achievements and how they compare to other users. Game history shows the user's game history and rating for each game. The information presented includes numbers, usernames, game names, and scores. With the implementation of this page, the gaming experience becomes more competitive and motivating.

Users can easily understand their achievements and compare them with other users. Users can also continuously strive to improve their achievements and share them with other users, making the playing experience even more fun and challenging. This page gives users full control over their gaming experience on Siteka.
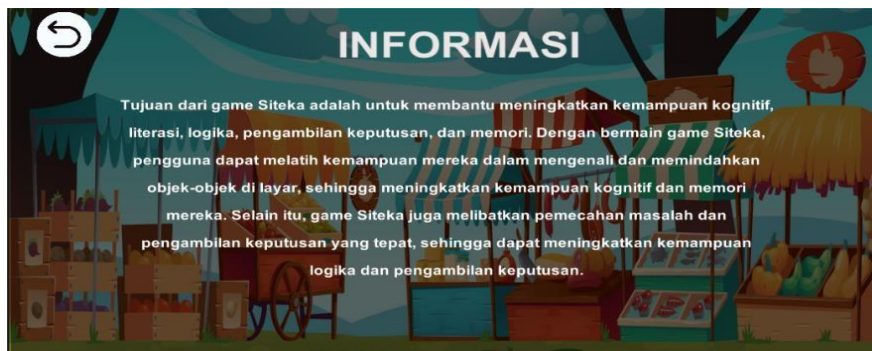

Figure 10. Information page Siteka

Siteka's Information page provides an explanation of the purpose and reason for creating the game. The game aims to create children's behavior to be able to use technology wisely.

Figure 11. Account Page

24

The Siteka Account page provides information about user identity and provides access to account settings. This page contains the user's username and email, which allows the user to ensure that the account information is up-to-date. A Siteka game exit button is also available on this page, giving users easier control to leave the game and access their other accounts.

Figure 12. Account Page

Dangerous animal drawing games on Siteka help users learn about and identify potentially dangerous animals. Users are asked to select one image from four options showing a dangerous animal. This game increases the user's skills and knowledge about dangerous animals and the importance of learning how to avoid harm from these animals.
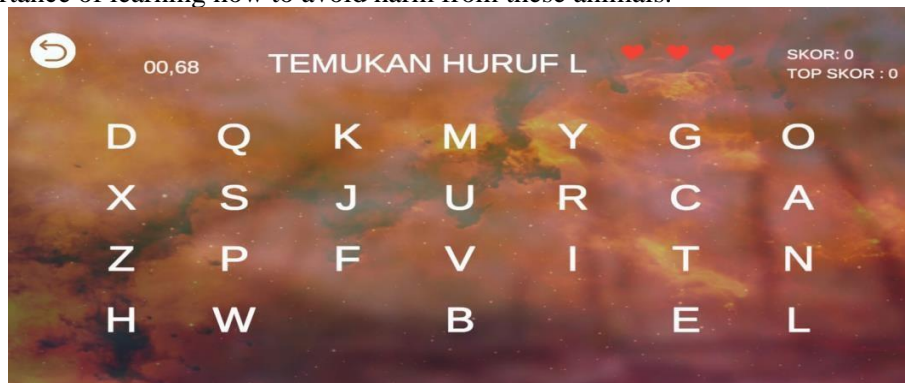

Figure 13. Cognitive game display

The display of cognitive game finds letters has an interactive and fun scene display. In this game, the letters will be shuffled and randomly placed, and a voice will make a request to find a certain letter. If the player chooses correctly, the system will give an "Exactly" system answer. However, if the player is wrong, the system will answer "Try again". This game also has a time limit of 10 seconds to choose a character and has a heart in the form of life as an indicator of the player's condition. If the life runs out, the game will end. The purpose of this game is to improve cognitive in making decisions and train the ability to find letters.

Figure 14. Sort Game Scene Display Rubbish

In the Sorting Garbage Game Scene Display, players will be introduced to various types of waste and asked to put trash in the appropriate bin by dragging and dropping trash into the trash. There are six types of waste and trash bins, namely electronic waste, glass waste, paper waste, organic waste, metal waste, and plastic waste. Each type of waste has a special color to distinguish it from other types of waste, electronic waste is red, glass waste is light blue, paper waste is dark blue, organic waste is green, metal waste is yellow, and plastic waste is orange. In this game, there are two indicators, namely score and time. If the time runs out, the game will end. The aim of this game is to increase environmental awareness and help players understand the importance of waste management.
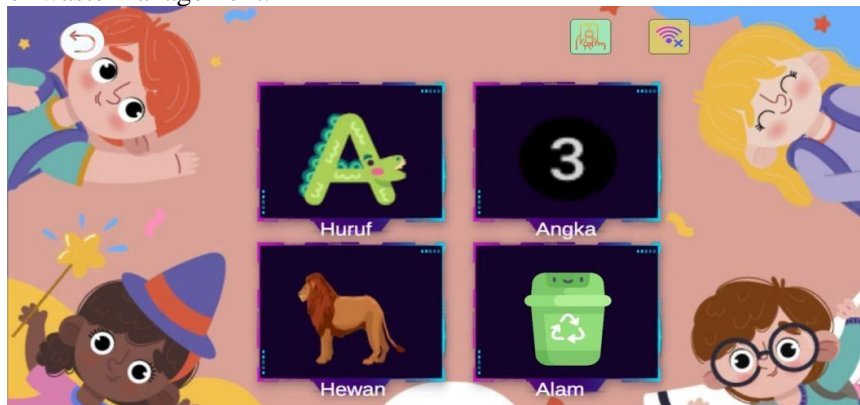

Figure 15. Video game scene display

In the Video Game Scene Display Implementation, there is a video main menu that displays four video options, namely videos about letters, videos about dangerous animals, videos about numbers, and videos about nature. This game is also equipped with an offline or online video viewing feature, so players can choose to watch videos according to their preferences and availability. The aim of this game is to provide players with information and knowledge through interesting and fun videos.
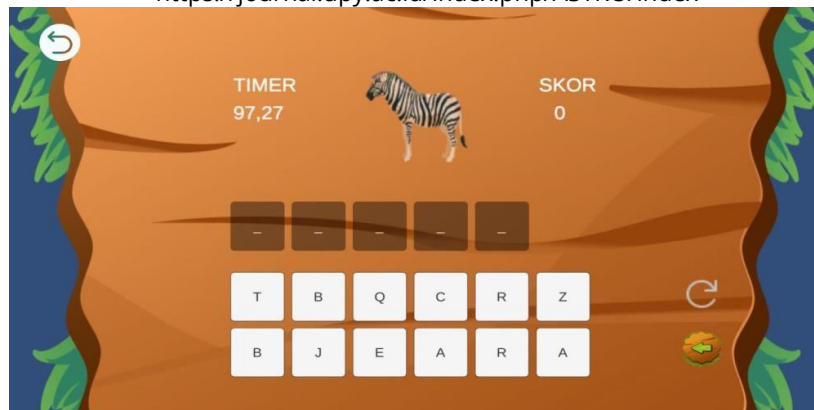
Figure 16. Display Game Text Scene

In the Implementation of the Text Game Scene Display (Word Content), there are pictures of animals or fruit which are the object of the game. Players are asked to enter the words on the board into the word column. In this game, there is a timer or time and player scores to monitor the progress of the game. The aim of this game is to improve players' ability to fill in words and help them increase their knowledge of everyday things.

Application Testing Using Black Box

This test is carried out by the second supervisor as well as the program supervisor. The black box test is carried out by playing the Siteka game as well as running the Siteka. Site web for the admin dashboard. Generated data as follows
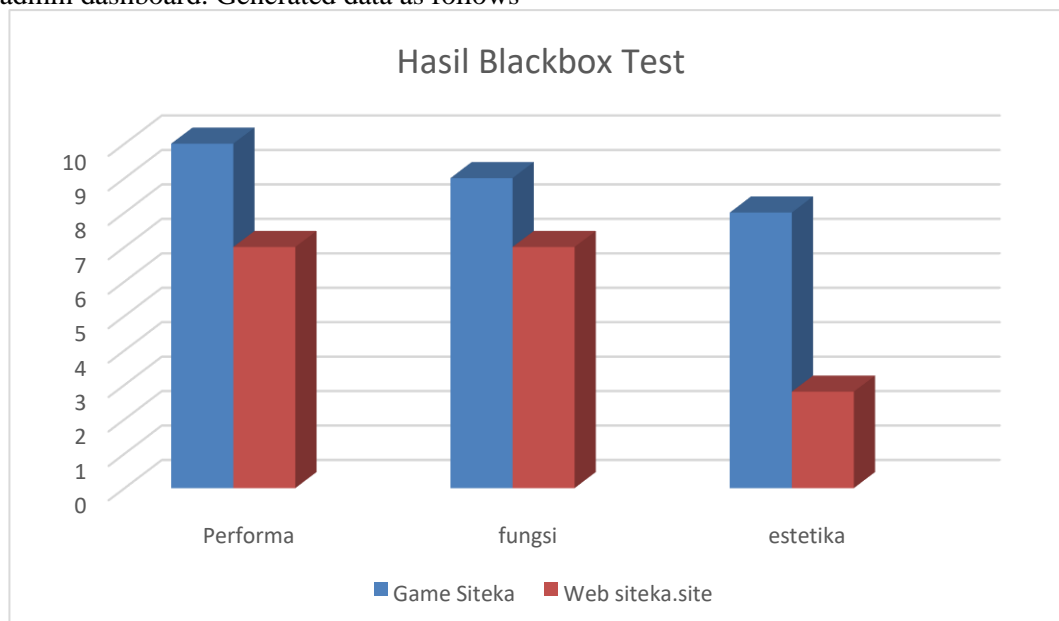

Figure 17. Graph of Blackbox Test Results

Questions on the black box test concern the performance and aesthetic functions of games and website sites. From the results of black box testing for game engineering, out of 15 black box test questions, only 1 did not run (no) and 14 ran smoothly (yes). In web testing, out of 13 black box test questions, 3 were answered negatively.

Application Testing Using Alpha Testing

The implementation of alpha testing was carried out by the author via the Google form, then 21 (twenty-one) respondents consisting of parents and children. Respondents worked on a questionnaire/questionnaire that had been distributed via the link. Next, fill out a list of statements (questionnaire/questionnaire) as a response to the performance of the application being built.

2. Apakah anda menemukan fitur yang anda butuhkan dalam aplikasi game Siteka ini ?
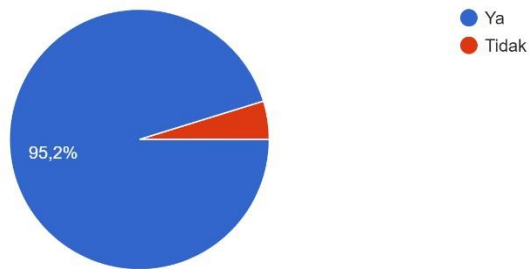21 jawaban

Figure 18. Percentage of Alpha Test Results

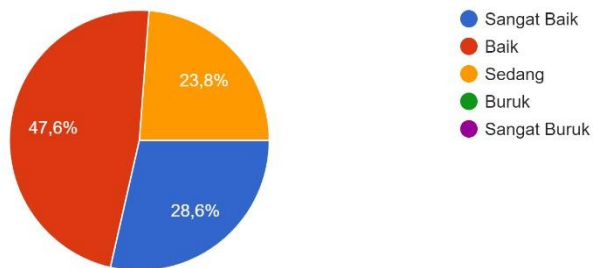4. Bagaimana penampilan aplikasi game Siteka ini ketika digunakan ?
21 jawaban

Figure 19. Percentage of Alpha Test Results

6. Apakah anda merasa nyaman menggunakan sistem aplikasi game Siteka ini ?
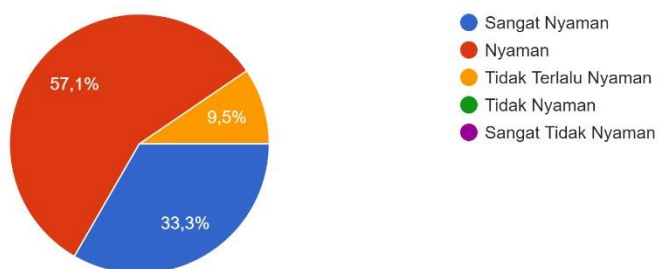21 jawaban

Figure 20. Percentage of Alpha Test Results.

4. CONCLUSION

Upgrade game app cognitive and literacy For child park children Android based already succeed increase ability cognitive and literacy child up to 56%. Application this too can help power educators in teaching material thematic with using an Android smartphone. Test results show that system application walk with good and get mark final 77.5% incoming in category very

28

worth . In conclusion , application This very help in development cognitive and literacy child park child

5. SUGGESTION

After going through implementation and evaluation, there is some suggestions that can give For improvement in game development cognition, and literacy For a child park child next android based. First, this game application should be applied in a manner area in the garden children so they can help increase the cognitive and literacy child. It can too _ help power educators To introduce technology to children early. Besides it, the application of this too can be made a tool to help in the learning process teach in the garden child.

Second, application This can continue For development more carry on with additional features new or material learn more interesting for the child. this _ can make a child more interested and excited to learn. Besides that, can study more carry on For test effectiveness application This in period longer time. With so, will see clear applications This truly can help increase the cognitive and literacy child or not. Besides it, the application this too can be developed For use on a variety of type mobile devices so more easily accessible to the public.

REFERENCES

[1] Fairuzabadi , M., & Saintek , F. (2021). Development of Project Based E-Learning with PIECES Analysis and UML Design. *Journal Dynamics Informatics* , *10* (2).

[2] Indra Borman, R., & Idayanti , E. (2018). Educational Game Development For Kindergarten Children (Kindergarten) With Implementation of the Visualization Auditory Kinesthetic (VAK) Learning Model . in *Journal Scientific Research and Learning Informatics)* (Vol. 03).

[3] Putra, DW, Nugroho, AP, Puspitarini , W., & Kunci , K. (2016). Educational Games Android Based As Learning Media For Early Childhood . *JIMP- Journal Informatics Merdeka Pasuruan* , *1* (1).

[4] Rozi , F., Khomsatun , K., & Technology Information on STKIP PGRI Tulungagung Jl Mayor Sujadi Timur No, P. (nd). *Design Build Educational Games Introduction Color For Early Childhood Education Using Adobe Flash Based Android* .

[5] Saed Novendri , M., Saputra , A., Firman , CE, Management Informatics , J., Dumai , A., Informatics , JT, Dumai , S., Informatics , JM, Karya , JU, Batrem , B., & Kode, D.-. (n.d.). *Application Inventory Goods at MTS Nurul Islam Dumai Using PHP and MYSQL* .

[6] Wahana , A., & Marfuah , HH (nd). Design Build Learning Media Culture 5S Work (Seiri , Seiton , Seiso , Seiketsu And Shitsuke) Based on Android. in *Journal Technology* (Vol. 12, Issue 1).

[7] Widyatmojo , G., & Muhtadi , A. (2017). Learning Multimedia Development Interactive Game Shaped For Stimulating Aspect Cognitive And Language Kindergarten Children. *Journal Innovation Educational Technology* , *4* (1), 38–49.