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Logic Test Educational Game for Children Based on Multimedia

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ABSTRACT

Along with the development of information technology, the rapid use of technology as a learning media is very good to apply. Many ways can be done to improve the quality of education. This research was conducted by creating an interactive learning media product in the form of a logic test educational game where students are required to learn to solve existing logic problems. The multimedia-based logic test educational game for children is designed to develop children's logic, measure intelligence levels, and become an alternative means of fostering students' interest in learning. The research method used is the method of literature study, interviews, and observations, the stages of analysis and definition of needs, the stages of system and software design, the stages of implementation, and unit testing. The appearance of educational games is designed to be attractive, which is accompanied by images and quizzes that improve student memory and provide new experiences for students. The implementation of this educational game has been carried out on students of SD Negeri 060934 and the results show the enthusiasm level of the students towards the educational game used.

1. Introduction

There are three important factors in learning that affect the quality of learning. Learning media functions as an intermediary between learning resources and recipients and is very important in getting accurate information from sources to recipients[1]. The effectiveness of a learning process will be influenced using learning materials[2][3]. Learning resources must support or help teachers apply teaching strategies in class[4][5]. Good learning resources are those that complement the current learning environment[4][6]. As technology advances, learning media has undergone various changes[7]. One example of technological advances in education is the use of computers in various learning modalities[8][9].

Computer-based learning media is a type of learning media that utilizes computers as the main method of delivering material to students[10]. Available methods can be in the form of tutorials, simulations, and games[11][12]. With the help of computers, the learning process becomes more varied and less boring, so student learning outcomes increase[3][13]. One of the computer technologies that is currently being developed is games[14]. Educational games have several features compared to traditional teaching methods[15][14]. One of the most important advantages of educational games is the visualization of real problems[16]. Based on this game model, players must learn to solve existing game problems[17][18][19]. The hints and tools provided by the game are designed to guide players to actively search for information so that they can expand their knowledge and strategies during the game[20][21]. Games created as learning tools are expected to inspire students to actively participate in education[22]. The Massachusetts Institute of Technology (MIT) managed to prove with a game project called Scratch that games are very useful for increasing the logic and understanding of the players about a problem[23].

Interactive multimedia is one of the digital media that can be used for educational media[24][25]. Multimedia incorporates more than one media such as audio, images, text, animation, video, and games which enable students to be involved in the device[26]. Interactive multimedia in the learning process is proven to improve learning outcomes, critical thinking skills, conceptual understanding, and motivation[27][28].

Based on the observations made, the researcher obtained information that students at the SD Negeri 060934 Medan had not used learning media properly. Supposedly the provision of teaching materials assisted by

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learning media can help teachers and students. The use of monotonous media, such as books, videos or power points which causes students to get bored and less active in learning to give the impression that is less than optimal in learning which causes children's logical growth and development to be hampered. Therefore, it is very important to have media that can overcome existing problems in accordance with the problems above. Therefore, there is no doubt that multimedia-based educational games can support the educational process. One significant advantage is the presence of memory-boosting animation, which allows children to retain subjects or retain study material for long periods of time.

Multimedia-based educational games are designed to increase student interest in learning, because students can learn while playing[20][26][29]. The appearance of the game is made attractive, which is accompanied by pictures and quizzes so that students' memory increases and can provide new experiences for students. This educational game can be used as a learning-by-doing learning tool. Players must learn based on the patterns that the game has to solve the current problem. Players will be actively guided by game statuses, instructions, and tools to conduct research to expand game knowledge and tactics.

2. Research Methods

The research method used by the author in compiling the research is to use the following methods[30][31][32]:

1) Literature Study Method
   By learning to study theories from books and the internet related to the object of research as the basis for writing this paper.
2) Interview and Observation
   The author conducted direct observations and interviews at the school and the party being interviewed was one of the teachers at SD Negeri 060934 Medan, namely the homeroom teacher for class V and students at the SD Negeri 060934 Medan to make it easier to work on this research.
3) Stages of System and Software Design
   At this stage the requirements that have been defined are processed in the software needed by the system. Software design makes the function of the device system into a form that is transformed into several executable programs.
4) Stages of implementation and unit testing
   At the design stage the software is implemented or translated into a program. This implementation phase is assisted by the necessary software and hardware specifications, so that the machines will translate the available program units.

A flowchart is a flowchart that aims to describe the flow of work or processes, which displays the steps in using the multimedia-based logic test educational game for children application:

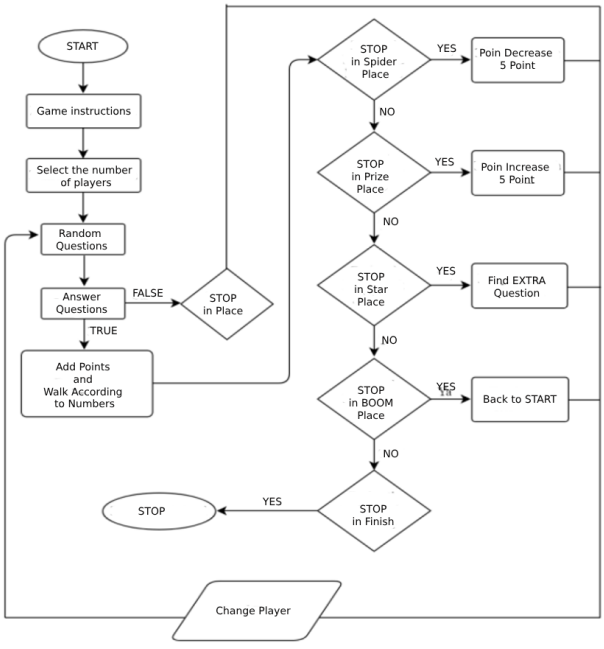

Figure 1. Logic test educational game flowchart for children based on multimedia.

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3. Result

This multimedia learning application is implemented using Indonesian language to facilitate users who are SD Negeri 060934 Medan students.

1) *Initial View*

When the game application is accessed for the first time, the page that will appear first is the start page. The user will start the game when the start button is pressed. The following is a picture of the initial display when the game is first opened.

Figure 2. Initial Game Display

2) *Home View*

After the start button on the home page is pressed, the home page will appear. The home display is made as a place for users to select the number of players, set audio (on/off) and view game guide information.

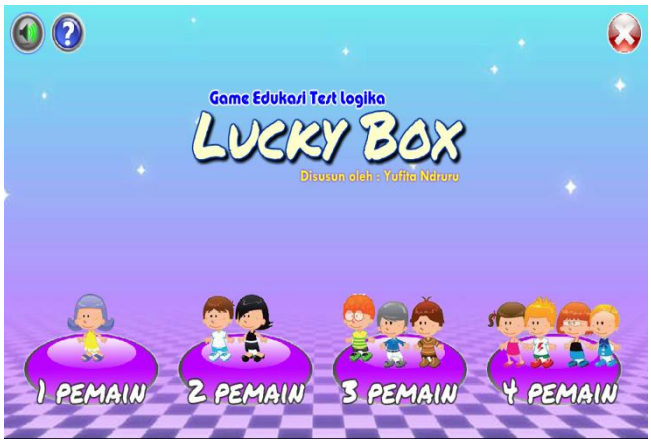

Figure 3. Home Page Display

3) *Game Information Display*

Is a display to find out the rules or instructions for the game. In this view there will be an information board and there is a close button to close the game information display.

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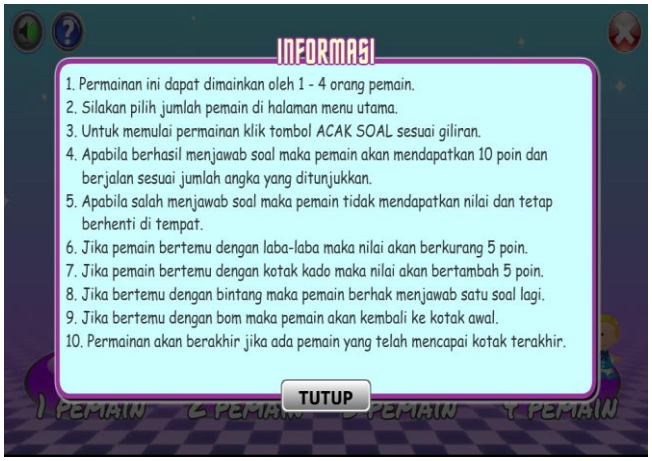

Figure 4. Game Information Display

4) Player View

Before entering the player game page, a page will appear where the user enters the name of the user or player. On the 1 player page, there is 1 column where the player's name is entered. On the 2-player page, there are 2 columns where the names of the two players are entered and so on.

Figure 5. View 4 Player

5) Question View

The question display is the display when the player presses the random question button. After the display appears, the player selects the answer and if the answer is correct then the player will walk according to the numbers listed on the question, but if the player makes a mistake, it stops and the other player continues.

Figure 6. Question View

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6) Finish View

The following display is the display when the player has reached the last box on the game board.

Figure 7. Finish View

Discussion

After testing all the menus of this educational game, the system shows the output results and processes that are in accordance with the design. The application of multimedia learning applications through this game model is socialized to elementary school students where students who use this application feel very happy with the use of games while learning.

4. Conclusions

Based on the results of the research and discussion of the results of the research, it can be concluded that designing interactive multimedia learning products in the form of games aimed at children containing logic material on general logic tests, statement, and conclusion analysis tests (syllogisms), image reasoning and arithmetic logic tests. Logic test educational games for children based on multimedia can attract students' interest in learning logic which can hone and increase student intelligence. With learning media in the form of interesting games, accompanied by pictures and quizzes, it can improve students' memory and can provide new experiences for students.

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