

Light Math: Mathematics Interactive Multimedia Game for Elementary School Student

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Abstract – This paper aims to: (1) Describe new ideas to increase the interest in learning Mathematics for elementary school students. (2) Describe the steps of new product ideas to increase interest in learning Mathematics for elementary students, (3) Describe the role of the parties involved in helping new products to increase interest in learning Mathematics for elementary students. The approach used in this paper is descriptive qualitative based on literature review and observation. Primary data includes observational data. Secondary data includes: (1) books relevant to the topic of writing, (2) scientific papers, (3) articles from the internet, and (4) research results. The data collection is secondary data in the form of relevant theories were obtained by the literature review method. The data obtained were analyzed descriptively qualitatively. The preparation of this paper has gone through systematic steps, so that the results of a complete and structured study are obtained. The steps taken in writing this paper are: (1) finding and formulating problems, (2) finding and selecting relevant literature sources, (3) analyzing data to answer problems, (4) formulating alternatives solving problems, (5) drawing conclusions and recommending suggestions, and (6) compiling written papers. The interactive multimedia-based game media, namely the "Light Math" game, provides benefits, namely (1) Providing alternative media for learning mathematics in elementary schools, (2) Growing interest in learning Mathematics for elementary students, (3) Increasing elementary students' mathematics learning achievement.

Keywords – *Light Math, Mathematics, Interactive Multimedia Game.*

I. INTRODUCTION

The development of increasingly advanced technology requires every individual to adapt to the times. The benefits of information technology in life are many, especially for education. Current technological developments raise hopes that can increase children's interest in learning. The demands of the times require children to be familiar with technology from an early age and of course it is appropriate. In improving the quality of learning, one must have creativity and innovation in the presentation of learning in the form of the use of information and communication technology.

Conventional learning activities will have an impact on student saturation so that understanding of basic concepts is not optimal. At this time, it can be said that schools and teachers are less creative in designing learning that attracts students. Therefore, in learning Mathematics, it is necessary to create an interesting learning media so that the teaching and learning process of Mathematics becomes easier. In addition, students are also able to have the skills to think and act critically. In this case, the notion that Mathematics is a difficult subject can be lost even if little by little. In the end, students can master learning materials, especially Mathematics.

There are many ways that can be done to make children happy in learning Mathematics. One of them is through games. Especially the use of technology in the form of games or games. However, there are still many schools that still use the traditional way of delivering Mathematics learning. The material presented makes students not have interest in learning Mathematics. It can be proven that of the 2.7 million teachers in Indonesia, only 10% to 15% use technology in classroom learning. This figure shows a very minimal value considering the rapid development of technology (Fadli, 2017).

By looking at some background, the solution offered by the author is to make learning media in the form of games. Mathematics learning will be more interesting if delivered through games so that later it will experience an increase in student learning outcomes. Students will also have creativity. It is possible for students to even get scores above the average.

II. METHOD

The approach used in this paper is descriptive qualitative based on literature review and observation. Primary data includes observational data. Secondary data includes: (1) books relevant to the topic of writing, (2) scientific papers, (3) articles from the internet, and (4) research results. The data collection is secondary data in the form of relevant theories were obtained by the literature review method. The data obtained were analyzed descriptively qualitatively. The preparation of this paper has gone through systematic steps, so that the results of a complete and structured study are obtained. The steps taken in writing this paper are: (1) finding and formulating problems, (2) finding and selecting relevant literature sources, (3) analyzing data to answer problems, (4) formulating alternatives solving problems,

III. DISCUSSION

A. Old Ideas

To overcome the low interest in Mathematics in elementary students, many ideas have been implemented. First, the idea of Mathematics education (Amanda & Putri, 2019). Second, the idea of Macromedia Flash (Wardani & Setyadi, 2020). Third, the idea of Android-based Mathematics learning media (Karim, Dini, & Hasbullah, 2020). Fourth, the idea of interactive multimedia in Mathematics lessons (Paseleng, 2015). Fifth, the idea of using animation media as a medium for learning Mathematics in flat material (Adi, Relmasita & Hardini, 2020). Sixth, the idea of using dominoes as a medium for learning Mathematics (Setiawan, Indhira, & Aan, 2020). Seventh, mathematics learning media uses number congklak (Sari, et al., 2019). Eighth, the idea of innovation of audiovisual learning media powtoon (Anjarsari, Farisdianto, & Asadullah 2020). Ninth, the idea of developing comic media (Indaryati & Jailani, 2015). Tenth, the idea of Math games (Krisbiantoro & Deny, 2017). Eleventh, the idea of a number ladder snake (Rekysika & Haryanto, 2019). Twelfth, the idea of animated video (Prasetya, Suwatra, & Mahadewi, 2021).

However, there are some weaknesses of the old idea in overcoming the problem of lack of mathematics learning media. Weaknesses of Mathematics education program (Amanda & Putri, 2019), are students will be addicted to gadgets and students are not interested in conventional learning models. Weaknesses of Macromedia Flash (Wardani & Setyadi, 2020), namely students tend to be interested in learning games compared to conventional learning. Furthermore, the weakness of Android-based Mathematics learning media (Karim, Dini, & Hasbullah, 2020), is that not all students have Android. Weaknesses of interactive multimedia Mathematics (Paseleng, 2015), is a relatively high cost. In addition, it takes a long time to design. Weaknesses of animation media as a flat wake media (Adi, Relmasita, & Hardini, 2020), that is difficult if the teacher has not mastered the media to be used and difficult if students do not have the tools.

Furthermore, the weakness of domino cards as a medium for learning mathematics (Setiawan, Indhira, & Aan, 2020), is the difference in the characteristics of each student in the thinking process. Weaknesses of Congklak number learning media (Sari, et al., 2019), namely the manufacture is quite complicated and prone to loss. Weaknesses of Powtoon audiovisual learning media (Anjarsari, Farisdianto, & Asadullah, 2020), namely the lack of teacher skills in making media and limited equipment such as projector screens. Weaknesses of comic media (Indaryati & Jailani, 2015) namely the lack of teacher ability to make comic media. Weaknesses of Math games (Krisbiantoro & Deny, 2017) namely the application cannot be accessed online and the questions are still updated manually. Weaknesses of number ladder snake (Rekysika & Haryanto, 2019), ie the media used is still manually. Weaknesses of animated videos (Prasetya, Suwatra, & Mahadewi, 2021) namely the learning videos cannot be accessed online.

B. New Ideas Offered

To increase interest in learning Mathematics, elementary school students need more interesting and fun learning media according to the age of the students. Interesting media can support improving student learning outcomes, especially Mathematics. The writer gave this media the name "Light Math: Mathematics Learning Media Based on Interactive Multimedia Games for Elementary School Students". This game emerged from the synthesis of old ideas. This game is a game that is predicted to be comprehensive enough to solve the problem.

Game "Light Math" is an interactive multimedia game application that makes it easier for users to learn Mathematics. This is because Light Math is packaged attractively. This game can display various menus such as start menu, material menu, game menu, practice questions, and answer keys. Packed dominantly with interesting animations. By using a laptop or smartphone, this game can be accessed without connecting to the internet so that it can make it easier for users. Unless the user wants to install or upgrade the application on android.

C. Steps To Take

1. Media Creation

- a. Making Flowchart of learning media,

Flow chart used as a reference in designing this game design, so that the flow and path of the process of working on this learning media can be easily understood and passed and followed by the user. Here the author takes the example of Mathematics material about flat shapes.

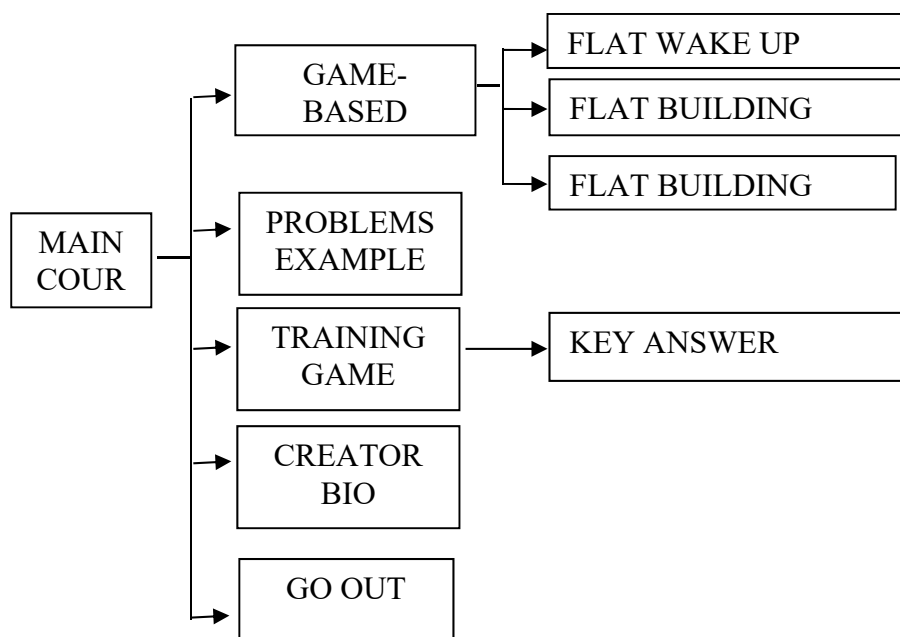


Figure 1: Flowchart Game Light Math

- b. Making learning media storyboards, more complete explanations from flowcharts

Storyboard contains a more complete written explanation of each flow contained in the flowchart.

Table 1: Flowchart Game Light Math

No.	Information	Visual	Audio
1.	Main course	Name of learning media Menu buttons Navigation buttons	When the navigation button is clicked, a sound effect will appear
2.	Game Based Material	Material selection buttons, Navigation buttons Explanation of the material arranged based on the game	
3.	Flat Build Image	Explanation of flat material with images modified into games	
4.	Flat Build Characteristics	Explanation of the characteristics of flat shapes modified into games, Navigation buttons	
5.	Flat Build Formula	Explanation of flat shape formulas modified into games, Navigation buttons	
6.	Problems example	Navigation buttons, presentation of examples of questions about flat wake	
7.	Exercises	Navigation buttons, discussion of practice questions	
8.	Answer key	Navigation buttons, discussion of answer keys from practice questions	

c. The game design

The game is designed using the Smart Apps Creator application, made using a laptop, then set so that the media can be downloaded and become an application on Android.

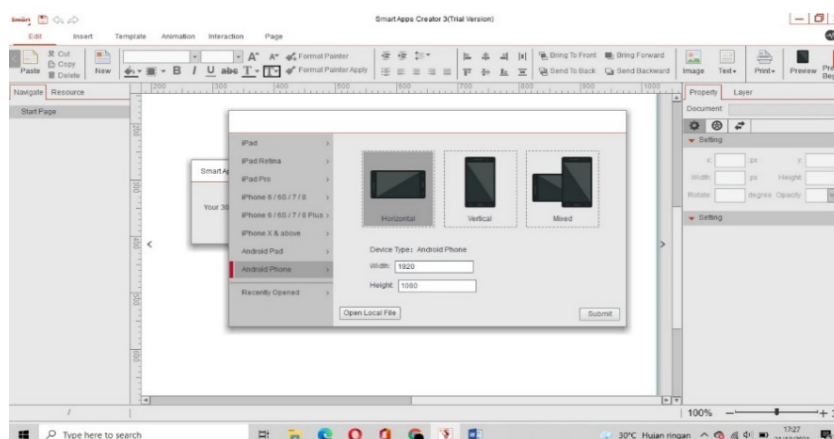


Figure 2. An overview of the Smart Apps Creator application initial screen

d. Application development begins with creating an attractive user interface (visual appearance).

e. The menu in the visual display of the application includes: initial menu, material menu, game menu, practice questions, answer keys, author's bio. In this media, the dominant form is an interesting game about the mathematics material to be taught.



Figure 3. An example of one of the menus in Light Math

2. Game ready to be used by students

2.1. Application in learning

- Giving problems to students to find relationships between materials. Here the teacher gives problems that often occur in everyday life concerning the material to students, with questions and answers about the material to be studied and students answer with the knowledge of the students themselves.
- Students and teachers can use computers or gadgets to access this game. Interactive multimedia game media such as applications that can be accessed by teachers and students with laptops, computers, or Android. When studying at school, students can study together with the teacher through the LCD, but when at home students can learn to repeat with this game application that has been installed using Android.
- Giving Math games to students. When the teacher teaches in class, the teacher uses a laptop or computer media via an LCD so that students can learn together with this game media. This interactive multimedia game media is like an application on a gadget in general, by pressing the icon on the screen. But when studying at school, students who play (choose) by looking at the LCD but the teacher monitoring (which is pressed through a laptop). Herethere is material but the delivery is dominant in the form of games.
- In the game menu, students play and learn about the material discussed.
- Introduction of the material by the teacher. The teacher displays this interactive multimedia game learning media through the LCD in the classroom, by introducing and explaining the material to be studied and explaining how to use the interactive multimedia game media so that students understand and can follow the lessons given by the teacher.
- Students can use it repeatedly, for independent study until they understand. When studying at home, students can use this game through their respective androids, with the application already installed.
- The teacher gives questions to students
- The teacher concludes the work that has been responded to by the students

D. How Far The Problem Can Be Fixed

Great interest in Mathematics will focus his attention more than other students. Intensive attention to the material is what allows the student to study harder and finally achieve the desired achievement. According to Shah (2006), interest means a high tendency

or excitement or a great desire for something. The learning process will run smoothly if it is accompanied by interest. Students who have an interest in a lesson mean that he has set useful goals so that he will tend to like it.

Mathematics learning achievement means the results that have been achieved by students after following the entire series of Mathematics learning processes. The activeness of learning Mathematics can be interpreted that students play an active role in every process of learning Mathematics. This activity can be seen from the students' courage in answering and asking questions. The attention of students in every activity in the student learning process in answering the questions faced by students in learning Mathematics.

E. Supporting Parties

There are several parties who can help create "Light Math" as follows: (1) The principal supports, coordinates the implementation and encourages teachers to apply the game "Light Math". (2) Teachers in teaching must be supported by applying Light Math so that children do not get bored in learning. (3) Media makers, with more concern for the development of children who have been discriminated against. (4) IT team, installing network, internet connection, and various other computer equipment.

IV. CONCLUSION

The "Light Math" game is an interactive multimedia game application program that makes it easy for users to learn Maths easily and fun because it is packed with interesting games. This application system can display various menus such as initial menu, material menu, game menu, practice questions, answer keys, which are packaged predominantly with attractive animated games. By using a laptop or android, this application can be accessed without connecting to the internet so that it can make it easier for users, unless the user wants to install or upgrade applications on android.

The use of this game can be done by means of students and teachers together using computers or smartphones. When studying at school, students can study together with the teacher through the LCD.

This game is used like an application on a gadget in general, by pressing the icon on the screen. When studying at school, students play (choose) by looking at the LCD but the teacher monitors (who presses through a laptop). In the game menu, students play and learn about the material discussed accompanied by an introduction to the material by the teacher. The teacher displays this interactive multimedia game learning media through the LCD in the classroom, by introducing and explaining the material to be studied and explaining how to use the interactive multimedia game media so that students understand and can follow the lessons given by the teacher.

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