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Analysis of the Needs of Games-Based Interactive Learning Media on Scale and Dena Materials in Elementary Schools

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Keywords	Abstract
Multimedia, Games, Scale and Dena	Mathematics learning has the main characteristic, namely deductive reasoning, which means the truth of a concept or statement obtained because of the logical consequences of previous truths. The paradigm of mathematics learning that raises the ability to solve problems through appropriate strategies must be maintained, but in Indonesia this paradigm still does not attract much attention from teachers in managing the mathematics learning process. An alternative solution to this problem is the development of interactive media and games for mathematics subjects in elementary schools. Before developing multimedia, it is necessary to hold a preliminary of the main research on the development of learning media. The purpose of this study is to conduct a needs analysis for designing media games. The benefit in this study is to find out the analysis of the needs of digital multi-media games for mathematics subjects. The research method used is descriptive qualitative with the object of research of grade V students of SD Saint Caroline totaling 25 students. Data collection techniques with interviews, questionnaires. Needs analysis is carried out to identify the scope of teachers, facilities and infrastructure and identify the characteristics of students. The results of this study found that 80% of students agreed on the development of multimedia games material and 90% of students agreed on the development of multimedia games such as multimedia games. This provides a real picture of the need for the development of games-based learning media for scale material and mathematics subjects in grade V SDS Saint Caroline Jakarta.

INTRODUCTION

Mathematics learning has the main characteristic, namely deductive reasoning, which means the truth of a concept or statement obtained because of the logical consequences of previous truths. According to Ghasya (Auliya et al., 2021) revealed that a process of providing learning experiences to students must go through a series of planned activities in the process of teaching and learning activities in mathematics learning at the elementary school level so that students can gain competence about the material studied. In the perspective of education, especially in mathematics education, the paradigm that raises the ability to solve problems through appropriate strategies must be maintained, but in Indonesia this paradigm still does not attract much attention from teachers in managing the mathematics learning process (Arifin, 2010: 112). The improvements and changes seen in the education sector are now evident with the renewal of the education curriculum. To improve the quality of education, these changes were made (Achmad et al., 2022).

However, today's problems, in mathematics learning there are obstacles due to cognitive abilities and everything that is different in each student that the characteristics of students with learning difficulties appear in: 1) attention disorders 2) failure to develop and mobilize strategies for learning, organizing learning, active learning frameworks, and metacognitive functions 3) weak in movement ability between good and gross movement coordination 4) Perceptual problems include, differences in auditory stimuli, vision, *closure* and *frequency* hearing, and vision 5) oral language difficulties 6) reading difficulties 7) difficulty writing language 8) mathematical difficulties, including quantitative thinking, counting, time, space and counting facts (Heryanto et al., 2022).

Solutions to overcome these problems by using interactive media. Interactive is a relationship of communication through two directions. The characteristics of interactive are actions of action and reaction, active and related to one another. Meanwhile, according to Tri & Yanto (2019), interactive learning media is a form of learning media which in its use can cause linkages between users and the learning media by giving each other actions and reactions to each other in helping deliver learning material. By looking at this understanding, it can be seen that interactive learning media is a medium that can be used by teachers in learning but is different from media in general where there is no direct interaction between teachers and students. Therefore, using interactive learning media will make it easier for students to understand abstract learning to be more real.

The use of scales on floor plans in everyday life is a material in mathematics learning that must be mastered by students. One of the important points in the material is about the understanding of scale and problems related to scale. Mathematics as a subject related to everyday life will certainly be easier and more fun if in the learning process using interesting learning media and related to events that occur in the student's life environment. For example, by associating mathematics with natural phenomena that occur or associating the process of mathematical knowledge with the Qur'an. In addition, mathematics is knowledge, so to learn mathematics and form knowledge about mathematics, direct contact with things you want to know is needed, because mathematics is a science that requires more understanding than memorization (Wiyono, 2021). The purpose of learning mathematics is to master concepts and principles and have the skills to develop knowledge and self-confidence as a provision to continue education at a higher level and develop science and technology (Fajar, 2022). One application for multimedia learning is the application *Wordwall.* is one of the new programming languages that makes it easier for everyone to create interactive stories, interactive games, and animations, and share one's work with others over the internet (Fabiana Meijon Fadul, 2019). *Wordwall* is an application to create a product without having to think hard about programming languages. Although it is easy and simple in terms of making, but *Wordwall* can and is suitable to be used as a learning medium (Akhlis et al., 2019). Students in *Wordwall* Not be intimidated by compilers when they forget semicolons or have inappropriate parentheses, because such mistakes are impossible (Pratama, 2018). This is due to the application *Wordwall* There are already programs that take the form of command beams, making it easy to use.

With such conditions at SDS Saint Caroline North Jakarta, the absence of learning media and the limitations of learning media have an impact on the ability to understand material for students. As a game-based learning media, it has also been studied in a study entitled "The Effectiveness of Game Media in Elementary School Science Learning" which aims to measure the effectiveness of game-based interactive learning media using applications *Wordwall*. Researchers used samples from 2 classes where one class used game-based media *Wordwall* and one other class learning by lecture method. The results showed that learning using game-based media *Wordwall* quite effective on student learning outcomes by referring to the results of the N-gain test with a score of 75.67%. These results indicate that the game is based *Wordwall* can be used as one of the effective learning media and can be recommended in improving student learning outcomes (Released, 2022).

The interactive learning media that will be developed will be equipped with the addition of *worksheets* as a pretest before learning the material, then entering the material will display animated characters who act as teachers in explaining the material and there are *game* features as equipped with video, audio and images that will be designed as attractive as possible. Based on needs analysis and previous research, researchers want to develop interactive learning media using wordwall applications. By establishing the *wordwall* application as *appropriate software* in developing interactive learning media for the material to be taught in class, namely scales and floor plans. Based on the results of a needs analysis questionnaire given to 25 students at SDS Saint Caroline, 60% of them experienced difficulties in learning mathematics in class. Then data was obtained that the media used in the mathematics learning process was in the form of image media. Based on the background, the problem can be formulated, namely how to analyze the needs of Games-Based Interactive Learning Media on Scale and Dena Material at Saint Caroline Elementary School Jakarta?

METHOD

This research method uses descriptive qualitative research (Arikunto, 2014). This research was conducted at SDS Saint Caroline Jakarta. The subjects of the study at the stage of anesthesia needs with 1 Gutu Mathematics Subject grade V, as well as analysis of the characteristics of students in 25 grade V students at SDS Saint Caroline Jakarta who were involved in learning mathematics subjects scale and dena material. Data collection techniques used in digital multimedia needs analysis are interviews and questionnaires in the form of *google forms*.

RESULTS AND DISCUSSION

Based on the needs analysis data in this step, the activities carried out by the researcher were conducting interviews and distributing questionnaires through *google form* to teachers and grade V students at SDS Saint Caroline Jakarta. The purpose of interviews with mathematics teachers is to find out how the process of learning mathematics in the classroom and what learning resources have been used by the teacher. Below is data from an interview with a grade V mathematics teacher at SDS Saint Caroline Jakarta.

The results of the needs analysis in this study identify the scope of research Most students find it difficult to understand mathematics lessons, especially on scale and game-based dena materials. Through multimedia games on scale and dena material because it requires practical access. This phenomenon can be seen from the value of the students' scores, which is 80% still below the minimum completeness criteria.

In addition, researchers obtained some information that supports the selection of products and materials to be developed in game-based multimedia.Some of the findings from the results of the scope identification analysis are as follows: 1) Teachers of Class V mathematics subjects stated that the achievement of student competency results in mathematics learning is still relatively low. This is due to the learning of mathematics scale and dena material. is still considered difficult 2) Mathematics subject teachers rarely use interactive media in delivering material so that students have difficulty in understanding

a lot of material 3) Mathematics subject teachers rarely use games-based digital media. Multimedia that is often used in the form of images 4) Teachers have never used game-based multimedia using wordwall, because only multimedia is available in class.

Based on the analysis above, it allows learners to lack understanding of scale and dena material due to the lack of multimedia innovation in mathematics learning. Teachers need the right solution in the form of practical digital multimedia and video. The multimedia needed must be in accordance with the needs and characteristics of students so that it can help students in improving learning outcomes. After identifying teachers of mathematics subjects, then researchers identified the scope of facilities and infrastructure at SDS Saint Caroline Jakarta. The results of the analysis of facilities and infrastructure can be seen in table 1.

Table 1. Analysis of Facilities and Infrastructure of SDS Saint Caroline Jakarta

Facilities and Infrastructure	Existing/None	Information
Computer Laboratory	Exist	25 Computer
Internet connection (*wifi*)	Exist	Connected
Smartphone	Exist	Every learner
LCD	Exist	Can be used in the learning process

Furthermore, from the analysis of the scope of facilities and infrastructure that has been carried out, researchers do the next rare thing that is to identify the characteristics of students. Based on the identification of student characteristics, it is carried out using *googleform* for Class V students of SDS Saint Coroline Jakarta. The results of the identification analysis of students are as follows:

1. Students with 69.2% stated that they liked the learning style by displaying audio, such as voice recordings and teacher explanations, 76.9% liked learning with presentation slideshows, images and concept maps (visual) and 84% of students liked learning by listening to radio, lectures, and podcasts (audio).
2. Students with 84.4% stated that they liked games-based learning with the latest digital media.
3. Wifi at school is smooth 80.8%
4. As many as 84.6% of students are accustomed to using laptops and *mobile phones.*
5. Learners stated 92.3% difficulty learning scale and floor plan material.
6. 92% of students need digital learning resources that will be accessed from various groups

Based on data on student characteristics to support the learning process. These results support the development of multimedia using *the Canva* application on mathematics subjects, scale and floor plan materials. The use of multimedia learning must be adjusted to the characteristics of students.

Based on the results of the needs analysis, most learners like the audio-visual learning style. So to overcome this, learning media that have games are needed, because the multimedia can help visualize mathematics subjects to be more interesting.

It also aims to help and facilitate teachers in conveying information can also help in making it easier for students to understand the material being studied.

Identify the analysis of needs and characteristics described above there are 10 points shown that 92% of students are accustomed to using laptops, this is because the facilities at school support the learning process. The learning process at SDS Saint Caroline Jakarta is quite good, only the lack of learning with interactive media makes students less interested and find it difficult to learn, this aspect is also continuous with the aiming points which prove 92.3% of students have difficulty in learning scale and floor plan materials. So it can be concluded from the analysis of the needs carried out that there is a need for new innovations in the form of interactive media based on games that are more interesting and innovative to support the learning process at SDS Saint Caroline Jakarta.

CONCLUSION

It can be concluded that there is a need for new innovations in the form of digital multimedia that is more interesting and up-to-date so that students can access multimedia anywhere and anytime that is more practical and efficient. From the analysis data on the needs of game-based multimedia development, it is known that 92.3% of respondents think there is a need for game-based multimedia that can be accessed by *smartphones* or computers that support technological developments so that they can adjust the learning styles of students independently which aims to help learn scale and floor material and guide students in learning independently. Based on these data, as many as 92% of students stated that they needed a solution in the form of multimedia.

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