Needs Analysis of Android Game Media in Mathematics Learning to Increase Learning Interest of Elementary School Students.

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Abstract. The development of science make students given guidance to be able to master science quickly with the learning efforts and ways of each student. Calculation material is a material that is difficult for students to learn. The background of this research is the lack in mathematics learning outcomes in low-level elementary school students. The decline in learning outcomes occurred during the online learning period. There are still many elementary schools not have interesting and innovative integer arithmetic operations media. (1) This study aims to identify mathematical difficulties. (2) This research is related to describe the media used in learning mathematics. (3) Describe the learning outcomes of mathematical integer arithmetic operations through android game media. This type of research is descriptive qualitative research. Qualitative descriptive research aims to describe, explain and answer in more detail the problems to be studied as much as possible an individual, a group an event. The object of research to be studied is the use of instructional media in mathematics learning operations to count integers. Data processing is carried out using the data triangulation method, this data comes from open interviews with educators, open interviews with students document studies on student learning outcomes before receiving treatment with learning media. From the research, it can be concluded that learning mathematics in elementary schools is still difficult. The role of providing instructional media is so important to support mathematics learning in integer arithmetic operations for elementary school students who generally still have a concrete level of thinking.

Keywords: Keyword number 1 android, Keyword number 2 integers, Keyword number 3 mathematics, Keyword number 4 learning media.

1 Introduction

Mathematics is one of the basic science that supports the development of other science and technology. The experience of students learning mathematics is very important to

M. Salimi et al. (eds.), *Proceedings of the 6th International Conference on Learning Innovation and Quality Education (ICLIQE 2022)*, Advances in Social Science, Education and Humanities Research 767,
https://doi.org/10.2991/978-2-38476-114-2_66

solve problems in everyday life. (Abdurrahman, 2003), there are two kinds of learning outcomes that must be mastered by students, namely, mathematical calculations and mathematical reasoning. Both learning outcomes are important for students in addition to solving problems in everyday life as well as studying other fields of study, because almost all fields of study require mathematics. As stated (Booker, 2009) that mathematics can be thought of many ways. It can be thought of in terms of its content such as number, space and measurement; the process for computing, constructing measuring; or its uses in applications across a diverse range of situations. Planting the right concept in learning mathematics in Elementary School (SD) is highly emphasized because it is a basic concept that must be mastered by students to understand mathematical concepts to the next level. This is related to the existence of a prerequisite topic or concept as a basis for understanding the next topic or concept (Heruman, 2008). Basic education is a very important and fundamental level of education in an effort to produce quality Indonesian people and has a big role both in preparing students to enter the community and to fulfill the requirements for attending secondary education. Therefore, learning mathematics in elementary schools will determine the results of education at the next level.

The quality of mathematics learning outcomes can be measured through the 2021 National AKM results which show that 2 out of 3 students have not reached the minimum standard in numerical ability (Puspendik, 2022). This fact shows the weak mastery of mathematics by students in Indonesia which leads to weak mastery of mathematics in elementary schools. Weak mastery of mathematics in elementary schools is caused by several factors, including the difficulty of students in understanding mathematical concepts, the unavailability of mathematics teaching aids, and the absence of media that supports learning.

Lack of students' mathematical skills and the absence of interesting learning media. The lack of android-based mathematics learning media is also a factor that affects the low results of mid-semester exams and end-semester exams. The fact shows that not many students are skilled in mathematical calculations. Therefore, it is necessary to develop learning media that can be made on the creativity of the teacher himself with some additions that need to be purchased. This media can certainly stimulate students to get used to thinking quickly, precisely and accurately without compromising the interest of students to continue learning mathematics.

Children's difficulties are basically very reasonable, starting from the words not interested and not talented. Some of them even punish themselves on the grounds that mathematics is a very difficult subject. Even when studying more deeply than every day we as humans who live in a social environment we can not deny even every day we always do we always activities that are very closely related to mathematics. In fact, most of us think that mathematics is difficult, that is, the level of difficulty experienced is not what we expect. So that until now there are still many students who always complain that mathematics is a difficult subject to conquer. However, with the motivation, interests and talents that everyone has, mathematics can be conquered. So that the interests and talents of children are also very influential in overcoming difficulties in learning mathematics. Factors that can cause students' difficulties in learning mathe-

matics are certainly influenced by several things, including student motivation, students' understanding of the material, difficulties in understanding mathematical language, and others. Thus the difficulties that arise must be overcome immediately otherwise if the difficulties of students in learning mathematics are not immediately addressed, of course it can affect the motivation of children in learning and this will have a major effect on academic achievement and emotional psychology in the child himself and eventually the child will inferior.

The difficulty of students in solving integer arithmetic operations is certainly influenced by several factors, both internal and external factors. Jamal (2014: 20) says that internal factors come from within students such as health, talents, interests and motivations as well as the intelligence of the students themselves. While external factors are strongly influenced by various things such as the school environment, family environment, and community environment. This shows that it is so important to conduct an evaluation to overcome the difficulties experienced by students in solving problems, especially in the matter of counting integer operations, because the evaluation can make it easier for teachers to know the difficulties faced by students in the learning process. Evaluations that involve the activeness and creativity of students are able to improve the abilities possessed by students. The need for the assignment of integer arithmetic operations material can optimize students' understanding of the learning. If the difficulty in solving the problem is not immediately addressed, it will also affect the students' mathematics learning outcomes and subsequent material, then the role of the teacher is needed to provide reinforcement regarding the material and evaluation at the end of the lesson. Therefore, the researcher intends to describe the types of difficulties experienced by students in solving integer arithmetic operations and the causal factors that influence them.

There are several indicators used to measure the use of learning media in the classroom, namely relevance, teacher ability, ease of use, availability, and usefulness. Meanwhile, according to (Riyana, 2009), the learning media in its use must be relevant to the learning objectives to be achieved, according to the competencies and teaching materials, so that with the use of media in learning students can capture the objectives and teaching materials easier and faster. The same thing was expressed by (Riyana, 2012), that the use of learning media effectively also influences the positive attitude of students towards learning materials and the learning process can be improved properly. Based on the explanation above, it can be concluded that the indicators of learning media include the relevance of the learning media used with teaching materials, the ability of teachers to use learning media, the ease of use of learning media for teachers and students, the availability of learning media used in classroom learning, and the usefulness of using learning media that is felt by students so that it can improve the learning process.

The importance of the problems faced by teachers is to be investigated because the calculation material is the most difficult material for students, there are no available learning media in the form of games for math subjects in overcoming weak mathematical arithmetic skills, and teachers have difficulty developing their creativity to make fun learning media in the form of games, participants Students have not been accustomed to thinking quickly, precisely and accurately when faced with a large number of

questions so they cannot complete them in the available time. This research is limited to the problem of learning media needs in mathematics subjects. This study is focused on analyzing the needs of existing learning media in elementary schools in learning arithmetic operations in mathematics subjects.

The research conducted by researchers, in this case, is to provide learning media needed by students according to the material needs of students. Learning media makes a different attraction for students. This learning media is the latest media which is different from the previous learning media. In previous studies, the needs analysis was carried out in relation to conventional learning media. However, researchers conducted analytical research on technology-based learning media with the use of devices that can be used by all students.

One type of media in the grouping of media types above is three-dimensional media based on Android. According to (Sudjana, 2011) three-dimensional media is a teaching aid that has length, width, and height and can be observed from any point of view. In line with this understanding, (Rondhi & Sumartono, 2011: 13) three-dimensional media are works of art that have width, length, and height or works of art that have volume and occupy space. Based on the expert opinion above, it can be concluded that three-dimensional media is media that can be touched, its appearance can be observed from any point of view, and it can be observed in its overall shape (length, width, and height or those that have volume and occupy space). Based on the description of the classification of media types and media functions.

The characteristics of the media can be seen from the ability to evoke stimulation of the senses of sight, hearing, and touch or conformity with the level of the learning hierarchy. (Asrotun, 2014: 17) suggests the characteristics of three-dimensional media are as follows: a. Its use is practical and does not require many processes b. Presenting material in an integrated manner, in other words, is easy for students to understand. c. Involve students in its use. Submission of material can be done simultaneously e. Overcoming space, time, and senses Based on the description above, the characteristics of Pandiwara media are included in the characteristics of 3-dimensional media. Pandiwara media is media that can cover the five characteristics of the three-dimensional media.

There are types of 3-dimensional media that are generally used in the learning process according (Nana & Rivai, 2017: 156). The types of 3-dimensional media are solid models, usually showing the outer surface of the object, the main idea is in terms of color, shape, and arrangement. The Cross-sectional model (cut away), this model shows how an object looks when the surface is lifted, the inner arrangement of this model will also be seen. The structure model consists of several parts of a complete object, or at least an important part of the object. A working model is an imitation of an object that shows the outside of the original object and has components of real objects. Mock-ups are simplifications of the arrangement of parts that are considered too complex or impossible to present in classroom learning. An example of a mock-up is a traffic sign simulation tool. A diorama is a mini 3-dimensional scene that aims to describe the actual conditions.

Three-dimensional media is a group of media without projections whose visual assessment is three-dimensional. This group of media can be tangible as real objects, both living and dead, and can also be tangible as imitations that represent the original. When

the original object is to be used as a learning medium, it can be brought directly to the classroom, or class students are deployed directly to the real world where the original object is located, then the imitation object can also function as an effective learning medium. (Moedjiono, 2008) says that three-dimensional simple media has advantages, including 1) providing direct experience; 2) concrete presentation; 3) can show the object in its entirety, both in its construction and how it works; 4) can show the organizational structure clearly; 5) can show the root of a process clearly. Three-dimensional media also has weaknesses, namely, they cannot reach targets in large numbers, their storage requires a large space, and their maintenance is complicated.

An expert gives statement (Susanto, 2013) argues, "Interest is an impulse in a person or a factor that raises interest or attention effectively which causes the choice of an object or activity that is profitable, enjoyable and will bring satisfaction in him over time". (Slameto, 2015) in his book mentions the notion of interest in learning is, "one of the forms of activity of a person who encourages to carry out a series of mental and physical activities to obtain a change in behavior as a result of individual experiences in interactions in their environment involving cognitive, affective and psychomotor " (Hansen, 2013) states that, "students' interest in learning is closely related to personality, motivation, self-expression and concept or identification, heredity and external or environmental influences". Based on the understanding of the experts above, it can be concluded that interest in learning is an impulse in oneself to do something that can make him interested and happy.

Based on the results of research conducted by (Mita, 2020) it can be concluded that the difficulties experienced by students in solving integer division arithmetic operations are difficulties in dividing numbers because they do not understand the concept of division, students do not understand how to solve problems, especially in determining the use of signs or based on the results obtained from research conducted by (Azmi, 2021) can be tabulated in order of the average value for the category of student difficulty caused by the lowest external factor, namely school infrastructure with a percentage of 5%, this requires good infrastructure improvements and meets student needs In following lessons based on the results of interviews, students need a comfortable and not hot room, such as the availability of a study room cooler or fan and other infrastructure improvements, followed by teacher learning media which is only 15%, it is better for the teacher to give a new color in presenting learning by presenting innovative and interesting learning media for students, parents' attention which is only 80% also needs to be improved considering the influence of children's friends and the use of the internet and television which must continue to be monitored. By knowing the external factors that cause student learning difficulties, all parties can be involved in overcoming the learning difficulties faced by students. positive negative symbols sometimes students only guess in giving answers.

2 Method

2.1 Reaearch Method

The method used in this research is descriptive with a qualitative approach. The research was conducted at an elementary school in Pajang Village, Surakarta, carried out in the even semester of the 2020/2021 academic year. The research informants were fourth-grade students as companion informants and teachers as main informants.

2.2 Sampling

The technique of taking research subjects used was random sampling, namely data collection techniques with certain considerations according to the research objectives (Arikunto, 2013; Herdiansyah, 2012; Sugiyono, 2015). This technique is considered more capable of obtaining completeness and depth of data in dealing with reality. This technique also tendency for researchers to choose informants (sources) who are considered to know the information and problems in depth and can be trusted to become solid and realistic data sources so that there are no data errors. The subjects taken in this study were 5 grade IV teachers and 20 grade IV elementary school students in Pajang Village.

2.3 Data Collection

To find out the application of learning media by teachers, interviews with Class IV teachers and documentation were carried out to make it easier to analyze data from interviews using recording devices and storing events such as videos and photos. The validity of the data is done by testing its credibility and dependability. The research results will be presented using a qualitative descriptive method with a model designed by Miles and Hubermann (Sugiyono, 2019) and Cresswell, namely "activities in qualitative data analysis are carried out interactively, and take place continuously", namely with the flow of (1) data reduction (data reduction); (2) data presentation (data display); and (3) drawing conclusions. The research conducted is intended to provide an understanding of what is experienced by the research subject and will be explained by means of descriptive words. This research was conducted for 1 month in semester 2.

All data obtained from data sources are not yet valid, so they must be tested first. Validity is a description of the reality of the data that the researcher wants to reveal after the data is collected. Sukmadinata (2013) suggests that validity shows the results of a measurement that describes the aspect or aspect being measured. Instruments can be said to be valid or have validity if the instrument actually measures the aspect or aspect to be measured, which is indicated by a degree or level of the truthfulness of the data results in the study. The validity of this research uses the triangulation technique. Triangulation means a technique of checking or comparing the validity or credibility of data based on many data sources, methods, time, and investigators about something (Iskandar, 2013; Sugiyono, 2015; Ulfatin, 2017). Based on the observations that have

been made and the consideration of the data, there are two triangulations used in this study.Inserting Content Elements

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2.4 Data Analysis

Triangulation techniques are comparing and checking the validity of research findings from different data collection methods (Ulfatin, 2017). Researchers validate the activity data of students' activities. The validation carried out by the researcher is in the form of test, interview, observation, and documentation techniques to analyze the students' conceptual understanding ability. Triangulation techniques are carried out by combining the results of tests, interviews with teachers, interviews with students, observations of teachers' teaching, and documentation during learning activities. During the research, the researcher conducted interviews and observations. Researchers took several photos and videos during the learning process as documents.

This type of triangulation method is carried out through the collection of similar data but by using different data collection techniques or methods. The emphasis on triangulation of this method is the use of different data collection methods and it is even clearer to try to lead to the same data source to test the stability of the information.

Source triangulation means a technique for exploring the validity of information by comparing and checking back data from various sources with the same technique (Sugiyono, 2015; Ulfatin, 2017). The views and ideas of students, teachers, and researchers are the sources of this triangulation of research sources. The results of the interviews were compared with existing documents. This method directs the researcher when collecting data using a variety of available sources. This means that the same or similar data will be more stable and valid when extracted from several different data sources.

3 Result and Discusion

The research data were collected through a questionnaire with two indicators, namely the need for media indicators and the tendency indicators for learning interest. In developing the questionnaire, the researcher also asked about the need for smartphone facilities to be used as media to support student learning. It aims to see whether students already have supporting media in implementing Android-based learning media in mathematics subjects. In addition, observations related to support from schools in terms of facilities aim to find out how much it is necessary to use Android media in the learning process for students and to find out the use of Android-based learning media by teachers. In the second indicator, the researcher asked about the students' needs to pay attention to the tendency of students' interest in learning.

In this study, the respondents were taken as many as 70 students consisting of 5 elementary school grade IV. Students are given a questionnaire as a research instrument in determining the analysis of the need for Android-based learning media. The purpose

of the analysis of this study is to make researchers know what students really need, especially the need for the use of Android-based learning media in mathematics subjects so that researchers can connect between students and their needs for Android-based learning media in arithmetic operations subjects. math round.

Therefore, in this study, the researchers developed several questions related to students' needs for Android-based learning media with two indicators. Based on the results of filling out the questionnaire, it will be known the students need for the need Android-based learning media, especially in mathematics subjects following the development of existing information technology. The results of questionnaires and data processing in this study can be seen in Table 1. Based on Table 1 shows that 100% of fourth-grade elementary school students as many as 70 students have utilized and used smartphones with the Android operating system in their daily lives. The use of these devices is 94.1% used by students from the age of 2-5 years with a percentage of 41.2% and the majority of use is at the age of 6-10 with a percentage of 47.1%. The duration of smartphone use for students is 1-12 hours per day with 70% and is used for learning with a percentage of 65%.

Schools support smartphone facilities by not prohibiting their use as long as they can support the process of teaching and learning activities and can achieve the learning objectives that have been set. In a total of 4 elementary schools in the city of Surakarta in this study as many as 47.1% have provided wifi facilities for their students. Contrary to the implementation of the use of learning media in schools by teachers who use Android learning media with a percentage of 100%.

Some teachers have also used the use of Android-based learning media as media to support their learning activities, but not in the form of special applications. Teachers only use search applications on Google as their supporting media during the teaching and learning process to find and deepen their reference sources. For this reason, 94.1% of students think they agree with using Android-based learning media in the process of learning mathematics or crafts. Based on the data in Table 1, it can be concluded that students agree if Android-based learning media is developed to support the process of learning activities as a necessity in helping students master the material, especially in mathematics.

The use of Android-based learning media is a special interest for students, especially in elementary schools in the city of Surakarta. This is also supported by data that most students in the city of Surakarta have used and utilized smartphones in their daily lives, both in the school environment and outside the school environment. The use of smartphones in learning activities can also make students more motivated and interested in participating in the learning process because of the ease of accessing them anywhere and anytime. The results of the second indicator regarding the need for students' tendencies toward learning interests can be seen in Table 2. Based on Table 2, as many as 41.2% of elementary school students in the city of Surakarta liked the learning process using words such as feel, touch, and hold. This shows that students will get more experience if they are directly involved and feel for themselves the learning objects or media used during the teaching and learning process.

Other data obtained by 47.1% shows that more students or easier to remember things they saw, read, and did. This shows that the use of Android-based learning media is

very significantly needed, because the media provides features that can later be seen or read, listened to, and can provide feedback for students to evaluate and measure how much students understand the material that has been presented on the learning media. . Another point states that 52.9% of students strongly agree and 47.1% of students agree that the process of learning activities, especially in mathematics, contains audio/sound, visual/image, text, and animation. Based on the data from the research, it can be concluded that students agree on the use of Android-based learning media to support their learning activities.

From the results of interviews conducted by researchers with students, data obtained that students are very interested in the use and use of learning media based on Android because the learning media can provide convenience to them without knowing the limitations of space and time so that students can learn and use learning media anytime and anywhere. they are. In addition, the use of Android-based learning media will make it easier for students, especially as a reference source for them by the availability of a package of learning media devices that are in accordance with content/basic competencies in accordance with the applicable curriculum, as well as evaluations that can be used to measure learning achievement. student. Based on the results of the questionnaire on indicators of needs and learning style tendencies, it can be concluded that the need for using Android-based learning media will provide convenience to students, especially in solving problems or problem-solving that students face better, practically, and effectively.

According Maheasy, Munzil, and Yulianti (2017) mentioned that most learning media are packaged in the form of print media or printouts in the form of textbooks that are less attractive and less practical to use in the process of learning activities. This shows that innovation in learning media that is in accordance with technological developments is needed, especially Android-based learning media. In the development of learning media, it is very much needed at various levels, both elementary, middle, and even higher education levels. To support the achievement of quality educational goals, quality development must be carried out in all aspects, elements, components, and objects that support the learning process. The more quality aspects, elements, components, and objects that support learning including learning media, the more effective the learning process will take so that the quality of learning will be better and in accordance with the needs of students for supporting infrastructure from schools or the need for learning styles that adopt technological development.

4 Conclusion

Based on the results of the research that has been carried out, it can be concluded that the analysis of students' needs for the use of Android-based learning media, especially in mathematics subjects at Elementary Schools in the city of Surakarta assumes to develop of Android-based learning media with a percentage of 94.1% in the analysis on the indicators of infrastructure needs. on android-based media, then 100% includes strongly agree 52.9% and agree 47.1% seen from the needs analysis paying attention to learning style tendencies, students who think positively on this media are in the range

of strongly agree and agree, plus all students already have an Android device/mobile, as well as the school, has provided supporting facilities and infrastructure for this Android-based learning media but it has not been effectively used. The development of learning media is expected to make it easier for students to master the teaching material so that learning objectives can be achieved easily. Students do not have to access learning at school, but students can also access the media wherever and whenever they are via Android media devices that students already have.

Acknowledgments

I would like to thank all teachers and principals of the Laweyan cluster for allowing researchers to conduct research studies in their respective schools. I do not forget to thank my thesis supervisor who has guided me so that this research can be carried out well and smoothly.

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