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**THE MULTIMEDIA DEVELOPMENT FOR LEARNING OUTCOMES OF FRACTION
CONCEPT IN THIRD GRADE OF SDN 41 SUNGAI AMBAWANG**

Mahdalena, Indri Astuti, Dede Suratman

Universitas Tanjungpura, Pontianak, Indonesia

E-mail: ragilmandala13@gmail.com

Abstract

The main problem in this research is the difficulty of learning media procurement in math, especially on fractional concept material. Many learners have difficulty understanding fractions because learning tends to use a mechanistic way of giving rules directly to be memorized, remembered, and applied so that learners will quickly forget the fractional concepts, and it will be challenging to apply the concept. The results of this research are: (1) multimedia design is carried out through stages such as conducting preliminary research, designing, material collection, initial product development, material expert validation, media expert and design expert, (2) multimedia profile depicted in the storyboard contains the forms of drawings accompanied by explanations or narratives used in the process of producing multimedia programs, so that in the process of producing multimedia programs will be more structured and orderly, (3) students implement multimedia learning with enthusiasm, it looks more enthusiastic learners in the implementation of learning so that learners are more independent and active, and (4) Learning outcomes of learners who use multimedia, this can be seen from the differences in learning results fractional concepts between before learning and after learning to use multimedia.

Keywords: Multimedia, Fractional Concept, Borg and Gall

Introduction

Mathematics is one of the most useful human knowledge in life. Almost every part of our lives contain mathematics. Mathematics plays a role in the formation of students' logic thinking. However, many students are unable to absorb the subject matter delivered by educators as a result of strategies and learning methods that are carried out incorrectly so that mathematics becomes a subject that is considered difficult and even boring.

Because of the abstract nature of mathematics, many students still consider mathematics difficult. Mathematics is considered a complicated and challenging science. It may be caused by the learning system implemented in schools in general, which is more dominated by conventional learning, where learning is centered on the educator so that the students tend to be passive and sit and listen and record the material presented, then do the exercises from the educator. Learners are accustomed to shipping a concept without knowing how to form the concept. It causes students to forget often the material being studied. Even unable to conclude the subject matter conveyed by educators.

In mathematics, every abstract concept that has just been accepted by students needs to be strengthened so that it settles and lasts long in the memory of students so that it will cling to their thought patterns and action patterns. Factors educators and students can cause concept

errors in mathematics. Educator factors include because educators do not master the material, strategies, and appropriate learning methods used to deliver the material. Every educator must also own mastery of the material. If the educator does not master the concept, it is likely he will convey the wrong concept, which is then accepted by students.

Specifically, for elementary level education, the misconceptions conveyed by educators are due to the lack of educator creativity in the learning media used in the learning process for the limited time allocated. Elementary school educators are class educators meaning that elementary school educators must master all subjects. One of the government's efforts to improve the quality of elementary school educators is to enact SI equalization rules for elementary school educators.

Some students assume that mathematics is a boring subject and is very difficult to learn because it is considered as a lesson that contains formulas, numbers, and to master, it must have strong memorization. The assumption is not entirely wrong, that mathematics is identical to formulas, but what needs to be taught is that the formulas do not come by themselves, but some approaches are used to obtain these formulas. But educators, tend not to involve students in finding an answer to an existing problem and using reasoning to determine a formula, so that when forgetting a formula that has been memorized, then he cannot work on the problem.

The fraction is one of the core studies of mathematics material that is learned by students in elementary schools. The discussion of the material starts with understanding the concept of fractions. The center for curriculum development and educational facilities of the writing and development agency (Depdikbud) states that fractions are one of the topics that are difficult to teach. This difficulty is seen from the lack of meaningful learning activities undertaken by educators and the difficulty of procuring learning media. As a result, educators usually directly teach the introduction of numbers, as in fractions $\frac{1}{2}$, 1 is called the numerator, and 2 is called a denominator (Heruman, 2013: 43).

Due to the difficulty of procuring learning media in mathematics, especially at the elementary school level, the learning of mathematics in elementary schools shows that many students have difficulty understanding fractions. In addition, many elementary school educators have difficulty teaching fractions. Educators tend to use a mechanistic way, which provides rules directly to be memorized, remembered, and applied.

Mechanistic learning has an impact on the meaningless learning process in students because fractions are presented separately from the context that students can understand at the beginning of learning. Thus, the concept of fractions will be quickly forgotten by students, and students will find it challenging to apply the concept.

Difficulty in studying fraction material is also experienced by students of third grade in SDN (State Elementary School) 41 Sungai Ambawang. It is evidenced from the results of initial observation conducted by the author on January 23, 2017, by conducting interviews with third-grade educators and interviews with 3 third grade students in SDN 41 Sungai Ambawang who have high abilities, medium abilities, and low abilities. The results of the interview show that the most difficult mathematical material is broken material. Fractional material is material that is quite broad in scope and contains mathematical concepts that confuse students.

Difficulties in learning fraction material experienced by students can be seen from the number of students from 2 classes that are not complete in the daily fractional test material, with Minimum Completion Criteria (KKM) 65 only 24.24% to 25.81% of students who achieve completeness while incomplete reaches 75.76%. Inadequacy of students in understanding the concept of fractions will continue on the next fraction material. It is also evidenced from observations in third grade when the learning process took place, namely on January 25, 2017, to educators and students. In the learning process, educators only use LKS books without various media. Only a few students pay attention to educator explanations, while others are busy themselves, telling stories and playing with their peers so that the class becomes noisy.

Some of the explanations mentioned above indicate that the problem that causes students' lack of understanding of fraction material is the learning process that does not activate students, the lack of use of varied learning resources or learning media that can attract students' learning interest so that it can lead to students' learning motivation towards fraction concept learning.

The media used in the learning process is multimedia. With multimedia that is designed in such a way as to simplify the heavy tasks in the calculation so that students more easily understand the fraction material. Making media in the form of engaging learning multimedia, so students are more motivated and more interested in the process of learning mathematics.

Through multimedia in learning mathematics in elementary schools is expected to overcome the learning difficulties faced by students, and can improve the quality of learning mathematics in fraction material in elementary schools. Thus the acquisition of learning is more optimal in accordance with what is expected. With multimedia, students are invited to be directly involved in the learning process. Students are independently invited to solve problems and problems.

Through the use of multimedia learning is expected to enhance the quality of the learning process, which in turn can affect the quality of student learning outcomes and the achievement of objectives in the learning process. The achievement of learning objectives in the learning process is characterized by changes in behavior concerning changes that are cognitive, affective, and psychomotor. The selection and use of appropriate learning media also determines the absorption of students towards the message conveyed and the learning success of students. Multimedia is expected to be able to help students in learning the concept of fractions.

Research Method

This type of research used in this study is the type of research development. According to Sugiyono (2010: 333), research development methods are research methods used to produce specific products and test the effectiveness of these products. Meanwhile, according to Setyosari (2010: 277), development is a process that is used to develop and validate educational products and development that can be in the form of processes, products, and designs.

The research development used in this study aims to develop a learning product that can make it easier for students to master the concepts. The product is a learning resource in the form of multimedia that shows the design of fraction concepts. The developed multimedia is expected to be able to teach students easily, pleasantly, independently to achieve complete learning acquisition.

The development procedure in research uses the Borg & Gall development procedure. This development consists of ten stages, namely research and data collection (research and information collecting), planning (planning), developing a product draft (developing preliminary form of product), preliminary field testing, revising the trial results (main product revision), field trials (main field testing), product improvement results from field tests (operational product revision), field implementation tests (operational field testing), final product revision (final product revision), and dissemination and implementation (dissemination and implementation).

This research will be conducted in third grade in SDN 41 Sungai Ambawang, Kubu Raya Regency, in the 2016-2017 school year. Data on research subjects were drawn from selected samples. The selection of subjects in this study is based on the results of discussions with third-grade educators with several considerations, namely: (a) students have learning outcomes above the KKM, (b) students have the same learning outcomes with KKM, and (c) students again have learning outcomes under the KKM).

The main instrument in this study is the researcher himself. Therefore, researchers must be objective in collecting data. But researchers also use several tools in collecting data, namely observation sheets, interview guides, questionnaires (questionnaires), and pictures as documentation of trial activities.

Observation is needed to be able to understand the process of the interview, and the results of the interview can be understood in its context. Observations made in this study were divided into two, namely initial observation and process observation. At the initial observation, the researcher has observed the subject, such as third-grade educators, other teachers, and third-grade students in SDN 41 Sungai Ambawang. As for what was observed by researchers, among others: the behavior of the subject during the interview, the interaction of the subject with the researcher, and the things that are considered relevant so that it can provide additional data on the results of the interview. This observation was conducted to find out the problems that arise in mathematics learning in third grade in SDN 41 Sungai Ambawang. While the observation process, the researcher will do two subjects, namely, educators and third-grade students. Students here are divided into three groups, considering this research to facilitate independent learning.

The techniques and data collection tools used in this study are (1) Direct observation techniques. The data collection tool is an observation sheet. Observation to find out the learning behavior of students who use multimedia. (2) Direct communication techniques. Data collection tools are interview guidelines. Interviews were conducted to determine the quality of multimedia developed learning. Interviews were conducted on students who did fraction concept learning activities using multimedia. (3) Documentary techniques. The collected data with the study documentation. Documentation is used to collect documents relating to the focus of research, such as data on school profiles, number of students, number of teachers, and learning outcomes. Checking the validity of the data is done by increasing perseverance in observing and triangulating the methods. Method triangulation is comparing data generated from three methods of data collection. If the data obtained from the three methods are the same and support one another, then the data has high credibility.

Results and Discussion

Results

(1) Multimedia design in fraction concept learning is carried out through stages, including conducting preliminary research, design making, material collection, initial product development, validation of material experts, media experts, and design experts. (2) Multimedia profiles on learning the concept of fractions are illustrated in a storyboard that contains forms of images accompanied by explanations or narratives used in the process of producing multimedia programs so that in the process of producing multimedia programs will be more structured and orderly. (3) The implementation of learning the concept of fractions using multimedia is carried out by students enthusiastically. It seems that students are more enthusiastic in implementing learning so that students are more independent and active. (4) The learning outcomes of students who use multimedia for the acquisition of fraction concept learning have increased, this can be seen from the difference in learning outcomes of fraction concepts between before learning and after learning to use multimedia.

Discussion

The multimedia display in this study consists of seven parts, namely (1) opening, (2) main menu, (3) competence, (4) evaluation, (5) profile, (6) references, (7) assistance (exit). To make it look attractive, researchers add unique icons, background colors that do not hurt the view, and background noise that can encourage students to start learning.

It is in accordance with Smaldino's statement, a good learning media must have aspects that attract the attention and interest of the user, so students want to interact with the multimedia. In line with what is described by Gagne in a chart of basic models of learning and memory, external factors designed and packaged properly will affect optimal memory reception, and ultimately make it easier for students to recall.

In the validation process conducted by researchers, both validation to material experts, media experts and design experts, researchers get the assessment of material experts, media experts, and design experts who show that the learning media developed by this researcher is worthy of being tested and used in the process learning mathematics on fraction concept material in elementary schools.

With the results of the validation, the researchers concluded that the multimedia display of learning developed by researchers was very good and deserves to be tested and used in the learning process.

Multimedia profiles on learning the concept of fractions that researchers have created can be described in the storyboards that have been made by researchers. With the storyboard, it will be clear explanations or narratives accompany the forms of pictures prepared. The results of storyboarding will be used in the process of producing multimedia programs so that in the process of producing multimedia programs will be more structured and organized.

The storyboard role becomes the basic description of a product that we will build. Next, this is a blueprint or algorithm of what we will build. At first, the storyboard is a collection of drawing paper that contains a series of events in film production, including animated films. It will be the basic framework for the director or screenwriter on how a film should work. Similarly, the creation of interactive multimedia applications. Usually, making interactive multimedia involves several people in a team, involving at least two experts, an expert who understands the content of learning materials, and another expert in a coding program or who compiles learning material into an interactive learning multimedia application program.

The Implementation of the Learning Concept of Fractions Using Multimedia in 41 public elementary schools was carried out with one-on-one, small group, and large group trials. This multimedia trial was conducted on students who had different results (students had learning outcomes above KKM, students had similar learning outcomes to KKM, and students again had learning outcomes under KKM).

From the results of observations of students consisting of aspects of content/material and aspects of learning design both in one-on-one trials, small groups and large groups in the average results obtained by students' observations during the learning process of learning multimedia used in the process learning is 4,5 with very good categories. It shows that students are pleased, enthusiastic, and motivated to follow the process of learning mathematics with this multimedia. It is in line with the opinion raised by Rusman (2015: 4) that the learning process in every elementary and secondary education unit must be interactive, inspiring, fun, challenging and motivating students to participate actively, and provide sufficient space for initiatives, creativity, and independence in accordance with the talents, interests and physical and psychological development of students.

Based on the pretest and posttest values obtained, the researchers then conducted a two-paired sample T-test. The results obtained are based on the calculation performed, the value of $t_{\text{arithmetic}} > t_{\text{table}}$ ($26.92 > 1.69$), then H_0 is rejected, and H_a is accepted, meaning that there are differences in learning outcomes of fraction concepts between before learning and after learning to use multimedia.

From the learning outcomes obtained show that the desired learning objectives have been achieved, i.e., students have improved both in terms of knowledge and attitude in learning this is in line with the opinion according to Sardiman (2004: 26-28) that the learning objectives are to get knowledge that is characterized by the ability thinking, the inculcation of

concepts and skills that are physically and spiritually intertwined and the formation of mental attitudes and behavior of students, will not be separated from the matter of instilling values.

Conclusions and Suggestions

Conclusions

The conclusions of this study are: (1) Multimedia design in fraction concept is carried out through stages including conducting preliminary research, design making, material collection, initial product development, validation of material experts, media experts, and design experts. (2) Multimedia profiles on learning the concept of fractions are illustrated in a storyboard that contains forms of images accompanied by explanations or narratives used in the process of producing multimedia programs so that in the process of producing multimedia programs will be more structured and orderly. (3) The implementation of learning the concept of fractions using multimedia is carried out by students enthusiastically. It seems that students are more enthusiastic in implementing learning so that students are more independent and active. (4) Learning outcomes of students who use multimedia for the acquisition of fraction concept learning using the two-sample paired T-test. The results obtained are based on the calculation performed, the value of $t_{\text{arithmatic}} > \text{table}$ ($26.92 > 1.69$), then H_0 is rejected, and H_a is accepted, meaning that there are differences in learning outcomes of fraction concepts between before learning and after learning to use multimedia.

Suggestions

Based on these conclusions, researchers provide suggestions, namely: (1) Further researchers need more and more up-to-date literature to develop multimedia teaching materials, (2) Multimedia is developed only to the extent of research so that in the future multimedia can be further developed and can used by other schools, (3) Multimedia can be also developed in the learning process that involves teachers and students, and (4) Teachers are expected to be more creative in teaching, while students are more active in learning to gain more maximum learning experiences.

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