

Article

Tangga Pintar Sebagai Media Pembelajaran Matematika Dengan Pendekatan STEAM

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Abstract: This study aims to describe the implementation of meaningful mathematics learning with contextual approach and to know the student's response to meaningful mathematics learning. The subjects of this study are students of class VIII B SMP Negeri 7 Banjarmasin as many as 27 people and students of class VIII F SMP Negeri 24 Banjarmasin 2020/2021 lesson year as many as 30 people. Technique of collecting data with observation of learning implementation with contextual approach and questionnaire of student response to learning math meaningful with contextual approach, and documentation. Data analysis technique using percentage. The results show that the implementation of meaningful mathematics learning will take place as planned, containing seven components in a contextual approach if the teacher is able to translate the essence of each step in a syntactic contextual approach with the media and learning resources. Student's response to the learning of mathematics is significant with the contextual approach of qualification both good and very good, although percentage, student response in class VIII B SMP Negeri Banjarmasin better than student response in class VIII F SMP Negeri Banjarmasin.

Keywords: meaningfull learning, contextual approach, response

1. Introduction

In general, the world of education is the basic capital of the nation's progress. Science and technology can be developed through education. This is in line with the law of the Republic of Indonesia. Number 20 of 2003 article 1 concerning national education explains that education is held in a democratic and fair manner and is not discriminatory by upholding human rights, religious values, cultural values, and national pluralism. Education is held as a systemic unit with an open and multi-meaning system. So, in this case education is one of the important things in the formation of a developed country. As stated by Hasbullah (2017: 3) Education is a conscious guidance or leadership by educators on the physical and spiritual development of students towards the formation of the main personality.

According to Hamzah, et al (2014:48) mathematics is a science that discusses numbers and their calculations, discusses numerical problems, regarding quantity and magnitude, studies the relationship of patterns,

shapes and structures, means of thinking, collection of systems, structures and tools. . For this reason, it is necessary to have a fun, innovative mathematics learning process that can be implemented in life so that students' motivation and interest in learning mathematics can increase.

In line with this, STEAM-based learning is a learning approach that emphasizes the relationship of knowledge and skills in science, technology, engineering, art, and mathematics to solve problems. With the element of art, it is hoped that through STEAM students will get used to solving a problem in a creative way. Meanwhile, according to Wijaya, et al (2015) STEAM learning is needed by Indonesian students as an effort to train their abilities and talents to face 21st century problems.

Learning Media is anything that can be used to convey messages or information in the teaching and learning process so that it can stimulate students' attention and interest in learning. Furthermore, Arsyad (2013:4) explicitly says that learning media includes tools that are physically used to convey the content of teaching materials. From these two understandings, the media is a tool used to deliver learning materials. The use of learning media in the learning process and the need for cross-disciplinary learning is necessary so that mathematics learning can be more innovative, dynamic, and able to answer the challenges of the times. To achieve good learning outcomes, teachers should be able to combine activities directed by adults or teachers in the form of lesson planning, with activities directed by children or students in the form of games they like. For this reason, the author developed a smart ladder learning media, which in its use was developed with the STEAM learning model to create a cross-disciplinary learning that is not only innovative and fun but also meaningful.

According to Heruman (2010:12) elementary school students are still in the concrete operational period, namely the ability in the thought process to operate logical rules, although they are still tied to concrete objects, due to abstract mathematics learning, students need tools aids in the form of media, and teaching aids that can clarify what will be conveyed by the teacher so that it is more quickly understood and understood by students, especially lower class students. The use of learning media is very important. Hamalik (2015:3) states that the use of learning media in the teaching and learning process can generate new desires and interests, generate motivation, and stimulate learning activities, and even bring psychological influences on students. Well-designed media will greatly help students achieve the learning objectives of Nurseto (2011).

As a counting medium, smart ladder media is equipped with a picture stick as a counting medium. This is to make students take an active role in learning using learning media. Research on the development of media in the form of 3-dimensional ladders has been carried out by Hayati and Rahmawati (2017) elementary school age children are still in the period of concrete operational thinking, so they need concrete media in the teaching and learning process, three-dimensional learning media with the use of game models have met Two characteristics of PMRI are students play an active role and there are learning media.

Based on the results of observations at Mutiara Hati Integrated Islamic Elementary School on May 14-21, 2022, improving the quality of learning is something that is endlessly discussed and pursued. Various efforts have

been made to change and improve the quality of education so that it runs optimally. One of the efforts to improve the quality of education is to change the paradigm of education, especially in elementary schools, from teacher centered teaching to student centered learning. This educational paradigm change also requires teachers to be more creative and innovative in developing learning in the classroom.

As educators, of course every teacher hopes that his students can achieve optimal learning outcomes. However, many students think that the subject matter delivered by the teacher is difficult to understand, does not fully understand learning and the development of media has not been maximized. The media used by the teacher is limited to pictures in the textbook.

Thus, the use of smart ladder media to help students in the learning process, especially learning Mathematics. Smart ladder media is a media that is made to resemble a 3-dimensional ladder. Jonkenedi (2017) three-dimensional media is a suitable medium to increase student activity because the presentation is concrete and avoids verbalism, so that students will be active in the learning process.

2. Materials and Methods

This type of research is descriptive qualitative research. According to Prastowo (2011: 24), qualitative research is a systematic research method or path used to examine or examine an object in a natural setting without any manipulation in it and without hypothesis testing, with natural methods when the results of the research are What is expected is not generalizations based on quantity measures, but the meaning (in terms of quality) of the observed phenomena. A qualitative approach is research that displays an assessment procedure that produces descriptive data in the form of written or spoken words from people and observed behavior. In this case, the researcher interprets and explains the data obtained by the researcher from interviews, observations, documentation, to get answers to problems in detail and clearly. The selection of a qualitative research approach was carried out based on the specifications of the research subject and to obtain in-depth information and cover social realities. According to Arikunto (2012:3) the type of descriptive research is if the researcher wants to know the status of something and so on, then the research is descriptive, namely explaining events and things.

This research was conducted in the fourth grade of Mutiara Hati Islamic Elementary School, which consisted of 10 students. Researchers collect the data needed to answer the problem in this study. Researchers may still take data back to the field if the data obtained during observation have not been able to solve the problem in this study. The method used in collecting data is descriptive analytic method which is designed to obtain information about smart ladders as a medium for learning mathematics with the STEAM approach at SD Islam Terpadu Mutiara Hati. The purpose of this analytical descriptive research is to make a systematic, factual, and accurate description, picture or painting of the facts, characteristics and relationships between the phenomena being investigated.

The data sources in this study consisted of primary data sources or primary data sources, namely verbal information obtained from informants (humans), in this case the teachers of SD Islam Terpadu Mutiara Hati Elementary School. The secondary data sources or supporting data sources include principals, representatives of the curriculum, student affairs and official documents in the form of relevant books. From these sources data were obtained relating to the smart ladder as a medium for learning mathematics with the STEAM approach at Mutiara Hati Integrated Islamic Elementary School.

The data acquisition technique in this study uses the technique proposed by Sugiyono (2016: 225) which consists of interviews, observations, documentation and triangulation or a combination. According to Sugiyono, (2016: 231) an interview is a meeting of two people to exchange information and ideas through questions and answers, so that meaning can be constructed in a particular topic. The interview technique here is done by asking questions to the teacher. The purpose of this interview was to obtain in-depth data or information about the smart ladder as a medium for learning mathematics with the STEAM approach. According to Sugiyono, (2016:145) observation is a data processing technique that has specific characteristics when compared to other techniques. In this case, the observations were made by observing directly about the smart ladder as a medium for learning mathematics with the STEAM approach. According to Sugiyono (2016: 241) Triangulation is defined as a data collection technique that combines various data collection techniques and existing data sources. The purpose of triangulation is not to find the truth about some phenomena but rather to increase the researcher's understanding of what has been found. In this study, researchers used one kind of triangulation, namely source triangulation. According to Sugiyono (2016: 241) source triangulation means getting data from different sources with the same technique. Data is said to be valid if there is consistency or suitability between the information provided by one informant and another. Thus, the focus of this research is that researchers focus more on smart ladders as a medium for learning mathematics with the STEAM approach. In this study, researchers went directly to the field for observation.

3. Results and Discussion

Mathematics is one of the exact disciplines. Certainty of value and meaning in mathematics can be understood as certainty at the end of a problem-solving process, not in the learning process that is passed. The process of solving mathematical problems can be done in various ways, so that the way in solving problems is not a certainty that must be the same. Solving mathematical problems that can be done in different ways will provide opportunities for students to develop understanding, reasoning, critical and creative thinking skills in producing appropriate solutions according to their knowledge. These abilities can be developed through learning that leads to the improvement of various aspects of knowledge, not only one aspect of the discipline but also various disciplines. The

integration of various disciplines contained in a learning approach, one of which is the STEAM learning approach.

STEAM is a meta-discipline in which science, technology, engineering and mathematics teachers teach an integrated approach and each discipline material is not divided but handled and treated as a dynamic whole. The implementation of STEAM in school learning has been carried out in various subjects. One of the subjects that can also use STEAM as a learning approach is mathematics.

To apply STEAM learning, students are encouraged to find systematic and iterative ways to design objects, processes, and systems to meet human needs and desires (engineering). Engineering elements in STEAM can start from a problem, need, or desire with measurable criteria which are then tested to identify constraints or limitations.

Mathematics as one of the subjects in elementary school which has special characteristics between abstract, deductive, consistent, hierarchical, and logical. Some students think mathematics is a difficult subject. Moreover, usually teachers do not use teaching aids only rely on books. At the time of learning is dominated by the teacher using the lecture method and students are not actively involved. They will find it difficult to understand the material presented by the teacher.

A teacher is said to be successful in learning if his students are actively involved in learning and get optimal grades. If the teacher is creative, of course, he will use interesting teaching aids so that learning is fun. Mathematics teaching aids are a set of objects that are designed, created, collected, or arranged intentionally that are used to help instill mathematical principles and concepts effectively. Students will be more impressed with mathematics because using the media will have a longer memory than rote.

The use of media is needed, so that students can easily learn it. Teachers can use media or teaching aids so that students are more motivated to participate in the learning process. One way to increase learning motivation and student learning outcomes is to use smart ladder media. Teachers can make media or teaching aids for smart ladder units of length using simple materials.

The benefits of using media can make it easier for teachers to explain material that is difficult for students to understand. With props or media students can demonstrate directly so that learning will be more meaningful for students and the expected learning outcomes can be achieved.

The steps for making a long unit smart ladder are by preparing tools and materials that are easily available and do not require expensive costs. It is enough to use Styrofoam as the main material, as well as tools and materials such as origami paper, glue, scissors, markers, rulers and cutters. How to make this smart ladder media is quite easy, namely by making a pattern like a ladder on Styrofoam for the size of the ladder can be adjusted to your needs.

The use of smart ladders is very effectively used as a learning medium and to instill more meaningful and fun learning. From the discussion above, it shows that the indicators of success are achieved, there is an increase in student learning outcomes in classroom learning activities through Smart

Ladder as a medium for learning mathematics with the STEAM approach to fourth grade students of SD Islam Terpadu Mutiara Hati.

Through the smart ladder as a medium for learning mathematics with the STEAM approach, it makes students more actively participate in solving the difficulties experienced by students during the process of learning mathematics in class. In learning mathematics, the teacher applies the smart ladder learning media appropriately and correctly so that learning outcomes will increase. From the discussion above, it shows that the indicators of success are achieved, there is an increase in student learning outcomes in classroom learning activities using smart ladder learning media in grade IV SD Islam Terpadu Mutiara Hati.

Some of the obstacles faced when applying the smart ladder learning media include students who are still not accustomed to expressing their ideas and lack confidence in expressing their opinions. Another obstacle faced was that during the discussion activities, students were still not maximally active in the group.

4. Conclusions

From the results of observations made at the Mutiara Hati Islamic Elementary School, learning mathematics using the smart ladder learning media with the STEAM approach runs smoothly and in accordance with the objectives. Although there are several obstacles, the level of student participation in the class tends to increase so that it affects their learning outcomes. It can be concluded that teachers should always use media in the delivery of learning. Therefore, teachers also always need to develop learning in the classroom by using creative and innovative ideas so that the classroom atmosphere remains active. So that it will have an impact on the seriousness of children's learning in class. Suggestions in this study are as follows. (1) Students are advised to diligently read various sources in learning, so that students gain broad insight and are able to solve the problems they face in the learning process. (2) Teachers are advised to always provide a forum for students to develop reading skills and use various kinds of learning innovations so that students feel happy and motivated in learning. (3) Schools are advised to always provide policies that lead to increasing learning resources and increasing human resources for school residents. (4) Other researchers are advised to conduct research using more complex variables so that problems in the world of education can be minimized by learning resources and increasing the human resources of school residents. (4) Other researchers are advised to conduct research using more complex variables so that problems in education can be minimized.

Conflicts of Interest: The authors declare no conflict of interest

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