

EFFECTIVENESS OF LEARNING MATHEMATICS WITH CONTEXTUAL APPROACHES

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ABSTRACT

This experimental study aims to determine the effectiveness of learning mathematics with a contextual approach in terms of understanding students' concepts. The sample of this study was the whole of the population, namely all classes IX MTSN 2 Asahant 2018/2019 school year with the number of students as many as 48 students distributed in 2 classes, namely classes IX-A and IX-B. Based on testing the hypothesis with a significance level of 5%, it was found that the percentage of students completing had exceeded 70%. The conclusion of this study is mathematics learning with an effective contextual approach in terms of understanding students' mathematical concepts.

Keywords: effectiveness, understanding of mathematical concepts, contextual approaches

INTRODUCTION

Mathematics as one of the basic sciences that has developed rapidly is generally more abstract. In order for students to learn and understand mathematics well, a teacher must be able to organize learning activities that are meaningful and enjoyable for students so that students get learning experiences that can give the impression that mathematics is easy. Djahiri states that in learning the main principle is the process of involvement of all or most of the potential of students (physical and non-physical) and meaningfulness for themselves and their lives now and in the future (life skills) [1]. Based on this statement, students are expected to be actively involved in learning activities and be able to link the material obtained with their experiences in life, both at school and outside of school. Thus, students are trained in solving problems they face in the real world by applying the knowledge they have received. Therefore, learning activities are needed to link mathematical material with the real world.

Mathematics learning that is associated with real life students will be easier to understand and remember by students. The association of mathematical material with real life can help students construct their own mathematical knowledge. The association of this material makes students know the use of mathematics in real life, so students feel the need to learn mathematics. From these problems it is necessary to find alternative solutions to learning approaches that are effective in carrying out the learning process in the classroom. One alternative is the learning approach with a contextual approach. With the contextual approach, students are invited to understand mathematical concepts by linking the material being studied to problems in daily life in groups and at the end of learning students work on student worksheets.

Sutikno states that effective learning is a learning that allows students to learn easily, fun, and can achieve learning goals as expected [2]. Hamalik states that learning is said to be

effective if the learning provides opportunities for self-learning and broad activities for students to learn, in other words effective learning if students are actively involved during learning activities [3]. Based on the statement above, it can be concluded that the effectiveness of learning is the use of learning from a process of interaction between students and students and between teachers and students in educational situations to achieve learning objectives.

Kunandar states that Contextual teaching and learning (CTL) is a learning concept that helps teachers connect the subject matter they teach with real-world situations of students and encourages students to make connections between the knowledge they have and their application in their daily lives [4]. Sihono states that the contextual approach has 7 main components, namely (1) constructivism, (2) inquiry, (3) questioning, (4) learning community, (5) modeling, (6) reflection, and (7) authentic assessment [5].

Constructivism is the basis of thinking for a contextual approach which states that knowledge is built by humans little by little, the results of which are expanded through limited and indirect contexts. Sihono states that knowledge is not a set of facts, concepts, or rules that are ready to be taken and remembered. Humans must construct knowledge and give meaning through real experience [6]. Based on these statements, students need to be accustomed to solving a problem, struggling with ideas, and finding something useful for themselves.

Sihono states that finding is a core part of contextual-based learning activities which argues that the knowledge and skills acquired by students are expected not from the results of remembering a set of facts, but the results from discovering themselves [7]. The teacher must always design activities that refer to discovering activities, whatever the material being taught. Knowledge possessed by someone can also start from the questioning activity. Questioning is a strategy that is used actively by students to analyze and explore ideas. Sihono states that asking questions in learning are seen as teacher activities to encourage, guide, and assess students' thinking abilities [8]. For students the activity asks to dig up information, confirm what is already known and show attention to aspects that are not yet known.

Sihono states that the concept of learning community suggests that learning outcomes are obtained from collaboration with others [9]. Therefore, in class the teacher is advised to always carry out learning in study groups. Learning outcomes are obtained from discussions between friends, and between groups, from those who know to those who do not know. Both the people in the class, around the class, and outside the class, all are members of the learning community.

Modeling in a contextual approach can be in the form of demonstrations, giving examples of concepts or learning activities. In other words, an example of that model could be how to operate something, how to draw parallel lines, how to draw a cube, and so on. Faridah states that in contextual learning, teachers are not the only model. Models can be designed by involving students [10]. Sihono states that reflection is a way of thinking about what we have just learned or thinking back about what we have done in the past. Students settle what they have just learned as new knowledge structures, which are enrichments or revisions of previous knowledge. Reflection is a response to events, activities, or knowledge that has just been received. The key to the reflection activity is how the knowledge settles in the minds of students.

Johnson states that authentic assessments (authentic assessment), aimed at students' motivation to excel in the era of technology, this actual assessment is centered on the goal,

involving hands-on skills, application, and cooperation as well as high-level thinking that repeatedly [11]. Correct learning should be emphasized on efforts to help students to be able to learn something, not emphasize on getting as much information as possible at the end of the learning period. Learning progress is assessed from the process, not just the results, and in various ways. Tests are only one way to judge. That is the true essence of judgment.

According to Gagne, concepts are abstract ideas that allow us to group objects into examples and not examples[12]. In mathematics, a concept is an abstract idea that allows a person to classify an object or event. So understanding the concept is the correct understanding of an abstract design or idea. The ability to understand mathematical concepts is one of the important goals in learning, providing an understanding that the material taught to students is not only rote, but with understanding students can better understand the concept of the subject matter itself. This is in accordance with Hudoyo which states the purpose of teaching is that the knowledge delivered can be understood by students [13].

Understanding of student concepts can be seen by achieving indicators of concept understanding. In the technical explanation of the Ministry of Education's Director General of Elementary Education Regulation Number 506 / C / Kep / PP / 2004 indicators of concept understanding, namely: (1) restating a concept; (2) classifying objects according to certain properties; (3) giving examples and non-examples of concepts; (4) presents concepts in various forms of mathematical representation; (5) developing the necessary and sufficient conditions of a concept; (6) using, using and choosing certain procedures or operations; (7) applying the problem solving concept or algorithm [14]. So understanding the concept of influencing the achievement of learning achievement. From the description above it can be concluded that the understanding of concepts is the ability of students to master learning material.

METHOD

This study is a study of the total sample of all students of class IX in the second semester of MTSN 2 Asahan in the 2018/2019 academic year with 48 students divided into 2 classes, namely class IX-A and class IX-B. Class IX-A and class IX-B each have 24 students. This research is an experimental research with descriptive data analysis. This research data is quantitative data that is data in the form of students' understanding of mathematical concepts obtained through concept understanding tests conducted after the subject. The test instrument used is a test item that has been declared valid by a mathematician. After being tested the test results are measured by the level of test reliability. After calculation, $r_{11} = 0.8299$ is obtained so that the reliability of the test instrument is said to be high.

Data understanding of students' concepts is obtained from the results of formative test assessments conducted by students. Students are said to have finished learning if the value obtained (X) ≥ 65 of the maximum score. After the data is obtained, then a calculation is performed to find the percentage of students who have finished learning. Learning mathematics with a contextual approach is said to be effective if the learning can achieve indicators of success with at least 70% of students complete.

RESULTS AND DISCUSSION

Based on the results of tests conducted after the end of the learning implementation phase, it is known that in class IX-A the highest value is 100 and the lowest value is 30, while

in class IX-B the highest value is 100 and the lowest value is 36. Based on the calculation results, it is obtained that students who finish in class IX-A are 87.5% of the number of students in one class or 21 out of 24 students who take mathematics learning with a contextual approach, as well as class IX-B. However, to test whether mathematics learning with an contextual approach is effective in terms of understanding the mathematical concepts a proportion test is conducted. From the standard normal distribution list with $\alpha = 0.05$, $z = 1.64$ is obtained. Criteria accept H_0 if z count is less than 1.64. Because z count is 1.87, H_0 is rejected. That means that learning mathematics with contextual approaches is effectively applied to class IX students in terms of understanding students' mathematical concepts.

Based on the test results, it was found that the highest concept understanding indicator in class IX-A is presenting concepts in various forms of mathematical representation (88.89%) and using, utilizing, and choosing certain procedures or operations (88.89%). The lowest indicator understanding of the concept achieved is giving examples and non examples of a concept (22.92%). In class IX-B, the highest concept understanding indicator is using, utilizing, and choosing certain procedures or operations (93.06%). The lowest indicator understanding of concepts achieved is giving examples and non examples of concepts (37.5%).

The results of this study are consistent with the results of Hermawan's research which revealed that mathematics learning with contextual approaches was effectively applied to class IX students [15]. One of the principles in contextual learning is learning society. During the learning process students are required to understand the material being learned through group discussions. Through this group discussion, each student can help other students in the group to understand the material being studied. This is in accordance with the statement of Sihono which states that learning outcomes should be obtained from collaboration with others [16].

The worksheets given are presented in problems related to students' daily lives so that they help students find and construct their own knowledge about the material they are learning little by little. This is in accordance with the principles of discovery and constructivism in the contextual approach. By finding and constructing their own knowledge of the material being studied students will better understand the material. Modeling is one of the important components in contextual learning. Modeling can use objects that are in the classroom or can be a demonstration from the teacher. The choice of presentation model in linking material to real life must pay attention to the surrounding environment and the level of student experience so that the real problem makes it easier for students to understand the material being studied.

In the presentation of the results of the discussion students must have the courage to deliver the results of the discussion and other students pay attention to the presentation and ask questions or provide feedback. With the discussion and question and answer between teachers and students and between students and students, learning becomes more active and student activities that are not relevant to learning can be reduced.

Reflection becomes an important part in contextual learning. After the group discussion goes on and the group representative presents the results of the group discussion, as a reflection the presentation of the results of this discussion closes with a class discussion with the guidance of the teacher. This class discussion is intended to equalize students' understanding between different groups.

CONCLUSION

Based on the results of the study and discussion it was concluded that mathematics learning with a contextual approach is effective when applied to class IX students of MTSN 2 Asahan. Presentation of material that links it to the real life of students and is supported by a pleasant atmosphere of group learning helps students to understand abstract mathematics. Through the presentation of material that deals with problems that are close to real life, students will know the application of the material learned in real life so students are motivated to understand the material. So by linking the material to real-life students, mathematics learning with a contextual approach enables students to learn more easily, is fun, and can achieve the expected learning goals, so that learning is effective to apply.

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