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Application of the Somatic Auditory Visualization Intellectually Learning Model Assisted by Geogebra

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Abstract

The current mathematics learning system still uses conventional methods such as lectures, namely the teacher explains in front of the class while the students take notes, listen and work on practice questions given by the teacher, this method focuses on delivering material or teaching materials directly, developing it requires a learning model that is suitable. One way is by implementing the SAVi learning model. This research operationally aims to determine the influence of the Somatic Audiotory Visualization Intellectually (SAVI) learning model assisted by geogebra media on students' understanding of mathematical concepts in class VII geometric transformation material at MTs Al-Muhtadin. This research uses a quantitative approach with a quasi-experimental method. The population in this study was all class VII students at MTs Al-Muhtadin, totaling 179 students with a sample of 60 students obtained using the Cluster Random Sampling technique. The instrument used to collect data was an essay test, in accordance with indicators of understanding of mathematical concepts on the subject of geometric transformations, totaling 6 questions. The conclusion of this research is that students' understanding of mathematical concepts given the Somatic Audiotory Visualization Intellectually (SAVI) learning model assisted by geogebra media is better than the conventional learning model using the lecture method on class VII geometric transformation material at MTs Al-Muhtadin.

Keywords: Conceptual understanding, mathematics, SAVI learning model.

1 INTRODUCTION

Education is something very important that cannot be separated from life, because education is a reflection of a nation. A developed nation certainly has good quality education. The aim of education is to improve the quality of human resources, to produce quality resources it is necessary to improve human resources. This improvement can be done through the learning process, one of which is learning mathematics. Learning is an activity that is deliberately carried out for students to learn in an important process in the world of education. The learning process involves teachers and students. Teachers have the task of carrying out the teaching and learning process and students are recipients of learning from a learning process. In the process, learning will usually experience several obstacles, including the delivery and strategies used in learning being less attractive to students. Mathematics is a universal science that is the basis for the development of modern technology and has a very important role in various disciplines and developing human thinking power.

Mathematics has a very important role as has been mentioned, but it is still considered unpleasant and scary learning, especially if the learning is only teacher-centered, the teacher only conveys information without involving much in the way of learning mathematics, which

is less popular with most students. Competencies or learning outcomes that students need to master in learning mathematics in the independent curriculum can be seen in Permendikbudristek No. 033 of 2022. Mathematics is considered one of the learning materials that must be understood by students and is considered a conceptual tool for constructing and reconstructing the material, hone and train the thinking skills needed to solve a problem. (Susanto, 2018) said that mathematics is one of the disciplines that can improve thinking and argumentation skills, contribute to solving everyday problems and in the world of work, and provide support in the development of science and technology. Mathematics is one of the branches of exact and organized knowledge, deductive science about area or measurement and location, about numbers and their relationships, ideas, structures and their relationships that are arranged in a logical order, about logical structures regarding organized forms of the arrangement of quantities and concepts starting from undefined elements to defined elements, contributing to solving everyday problems and in the world of work, and is divided into three fields, namely algebra, analysis, and geometry.

The ability of students in Indonesia to solve mathematical problems is still relatively low. Based on PISA *(Programme for International Student Assesment)* In 2018, the overall ability of Indonesian students was ranked 74th out of 79 countries. The latest PISA results from year to year which are carried out every 3 years, namely in 2018, Indonesia received a score in mathematics ability of 379 points. The 2018 PISA results experienced a decline compared to the previous 3 years in 2015, which was 386 points.

Based on the results of the author's observations of one of class VII at MTS Al-Muhtadin, totaling 30 students, who gave test questions on Lines and Angles material which refers to indicators of concept understanding, indicating that the students' understanding of mathematical concepts is low. Several factors that influence students' low understanding of mathematical concepts at MTS Al-Muhtadin are the lack of use of interactive learning models and learning media, making it difficult for students to understand the material presented by the teacher. Apart from that, the author sees that the available facilities and infrastructure are not optimal so that the learning process is not running well. because the learning model used is less interactive. The teacher plays more of a role than the students, the students only listen to the explanation given by the teacher from the beginning to the end of the lesson and only a few students are active in asking questions while the others are passive. As a result, students feel afraid to ask questions that are unclear or things that are not understood during learning or when expressing opinions. So that students do not have enthusiasm or high enthusiasm for learning to understand the learning, resulting in students' low understanding of mathematical concepts.

The problems above need a change in order to improve students' understanding of mathematical concepts. Therefore, teachers are able to offer more effective teaching methods that can arouse students' attention so that they become active and motivated in learning, and this must be balanced with the teacher's ability to master these methods. One way is through the SAVI learning model. The characteristics of the SAVI learning model are: Somatic (S): Learning by moving and doing, Auditory (A) Learning by speaking and listening, Visual (V): Learning by observing and drawing, Intellectual (I): Learning by solving problems and reflecting (Isrok'atun, 2020). One way to increase the effectiveness of student learning in mathematics is to use learning media that can be used, namely computers as media based on information and communication technology. Computers can be used as a tool in preparing teaching materials and in the learning process to make it more effective and efficient (Kusuma, 2017). The SAVI learning model (Somatic, Auditory, Visual, Intellectual) is one of the types of cooperative learning models, learning that involves all senses in learning activities (Shoimin, 2016).

In general, according to Meier (Sutrisno et al., 2013), SAVI is a learning model that combines motoric movements (physical), intellectual activities, and utilizes all senses

possessed by students in order to solve mathematical problems through creative thinking. More specifically, this learning model can be interpreted based on the compiler of the SAVI abbreviation itself. Based on the opinion put forward by Meier (Rahmi et al., 2019), Somatic means that in learning that applies this model, learning materials are presented to students in an effort to facilitate students to be actively involved in utilizing all their abilities to ask questions and build knowledge. Auditory means that in this learning, students are provided with maximum opportunities to listen, express opinions, and ask questions if there is something that is not yet understood. Visual means that in learning that implements the model, students are facilitated to make observations and pay attention visually to the knowledge they are building. Intellectual means that students are facilitated to utilize their intelligence or thinking skills to think about and solve problems. Because all students' senses are utilized during the learning process that implements the SAVI model, according to (Handoko, 2017), students' creative attitudes can be developed. In its application, this SAVI model is implemented according to stages starting from the preparation stage, delivery stage, training stage, and ending with the results display stage (Khaidir, 2012; Rosalina & Pertiwi, 2018). The SAVI learning model has elements including learning by moving and doing (Somatic), learning by speaking and listening (Auditory), learning by observing (Visual), learning by solving problems and thinking (Intellectual) (Pratama, Nuryatin, Mardikantoro, & Artikel, 2017). From the results of the writing by (Khery & Raodyatun, 2014) that the SAVI learning model provides active, communicative responses and good activities in the learning process of acids and bases.

Based on the description of the problem of understanding students' mathematical concepts, the author intends to conduct research with the research title "Application *Model Pembelajaran Somatic Audiotory Visualization Intellectually* (SAVI) Assisted by Geogebra Media in Understanding Students' Mathematical Concepts in Geometry Transformation Material." With the aim of finding out "Is students' understanding of mathematical concepts given the SAVI learning model assisted by Geogebra media better than the conventional learning model?" The aim of this research is "To analyze students' understanding of mathematical concepts given the SAVI learning model assisted by Geogebra which is better than the conventional learning model".

2 RESEARCH METHODS

This research is quantitative research with a quasi-experimental method, while the design used is a posttest only group design. In this design, the research carried out only uses a posttest or final test and then the results will be analyzed to determine the success of the research. The population of this study were all class VII students at MTs Al-Muhtadin. This research was carried out in the even semester of the 2023/2024 academic year. The sampling technique uses Cluster Random Sampling.

The samples chosen were class VII D as the experimental class which was treated with learning using the SAVI learning model assisted by geogebra, and class VII E as the control class with the conventional learning model. The data collection techniques used were observation, interviews and tests of students' understanding of mathematical concepts. This test consists of 6 written test questions in the form of description questions based on indicators of conceptual understanding, namely: 1) students' ability to restate a concept; 2) students' ability to classify objects based on certain properties; 3) students' ability to provide examples and non-examples of concepts; 4) students' ability to write concepts in various mathematical representations; 5) students' ability to develop necessary and sufficient conditions for a concept; 6) students' ability to use and select certain procedures; and 7) students' ability to apply concepts.

3 RESULTS AND DISCUSSION

Based on the instrument test calculations, there are 6 questions used to measure students' understanding of mathematical concepts. After carrying out the test, data was obtained regarding students' understanding of mathematical concepts in the experimental class and control class as presented in Table 1.

Table 1. Sample group test results

No.	Variable	Sample Group	
		Experiment	Control
1	Many students	30	30
2	Rate-rate	55,17	48,5
3	Standard Deviation	16,39	12,69
4	Variance	184,9	161,07
5	Minimum	25	25
6	Maximum	79	75

Based on Table 2, it can be seen that the average score for understanding mathematics in the experimental class that uses the Geogebra-assisted SAVI learning model is higher than the average score for the control class that uses the conventional learning model. To draw conclusions from this research, carry out a hypothesis test. Before carrying out a hypothesis test, a normality test and homogeneity test are first carried out on the two samples.

The results of testing on research samples are used to assess the distribution of data in a group of data or variables that are normally distributed or not. The data normality test uses the Liliefors method with a significance level a=0.05. This data normality test was carried out twice, namely in the experimental class group and the control class group. A summary of the normality test results of the data obtained is presented in Table 2.

Table 2. Normality Analysis

Category	N	L_{count}	L_{table}	Conclusion	Test Decisions
Control Class	30	0,153	0,161	Normal	H_0 accepted
Experimental Class	30	0,132	0,161	Normal	H_0 accepted

Based on Table 3, it can be seen that at the significance level a=0.05 all L-counts are not critical members so that H_0 test decisions are accepted for each group. Based on the test results, it can be concluded that the two groups, namely the experimental class using the Geogebra-assisted SAVI learning model and the control class using the conventional model came from a normally distributed population. The population variance homogeneity test is carried out to determine whether the populations being compared have the same variance (homogeneous) or not. Therefore, the homogeneity of population variance test was carried out once, namely by comparing the variance of the experimental class group and the control class group against the students' mathematical concept understanding test data. This test uses the Fisher test with the conclusion that both populations have the same variance or in other words the experimental class and control class come from a homogeneous population, the results can be seen in table 3.

Table 3. Homogeneity Analysis

	Experimental Class	Control Class
Variance (s^2)	184,90	161,07
F_{hitung}	1,148	
F_{tabel}	1,858	

The homogeneity test carried out shows that the sample data has a homogeneous variance. This is the basis for using the t-test in further hypothesis testing. This t-test aims to compare understanding of mathematical concepts between students in the experimental group and the control group. A summary of the t-test analysis, including the mean value, standard deviation, and p value, from the test of understanding mathematical concepts for the two groups can be seen in Table 4. This table provides a clear picture of whether the differences in the results obtained are significant or not, as well as providing insight. about the effectiveness of the intervention applied to the experimental group.

Table 4. Results of t-test analysis

Class	Mean	t_{hitung}	t_{tabel}	Information
Experiment	55,17	1,9641	1,6716	Ho was rejected
Control	48,50			

Based on the results of hypothesis testing obtained $t_{count} = 1{,}964$ as for t_{table} with $\alpha = 0.05$ and $dk = 60$ that is $t_{table} = 1{,}671$. These results show that $t_{count} > t_{table}$ which means indicating that the null hypothesis (H_{the}) rejected so it can be concluded that students' understanding of mathematical concepts given the SAVI learning model assisted by Geogebra media is better than the conventional learning model.

The results of previous research are in line with the results of this research, that the SAVI learning model assisted by Geogebra media can influence students' understanding of mathematics. However, there are still differences with this research, research by I Gusti Agung Mas Widnya Dewi and friends looked at the influence of the SAVI learning model with the help of Geogebra media on students' mathematical problem solving abilities. Based on the data obtained from the mathematics PST-test, there is an influence of the SAVI learning model assisted by Geogebra media on students' understanding of mathematical concepts. Thus, this research succeeded in proving the proposed research hypothesis that there is an influence of the SAVI learning model assisted by Geogebra media on students' understanding of mathematical concepts in class VII Mts data presentation material. Al-Muhtadin.

4 CONCLUSION

Based on the results of post-test data analysis on understanding mathematical concepts, it was found that there was a difference in the average score in students' understanding of mathematical concepts, students' understanding of mathematical concepts in the experimental class geometric transformation material using the Geogebra-assisted SAVI learning model was higher compared to class students' understanding of mathematical concepts. control using the conventional learning model, lecture method. The results of hypothesis testing using the t-test obtained values $t_{count} = 1{,}9641 > t_{table} = 1{,}6716$,so that H_0 rejected H_1 accepted. Thus, the conclusion of the results of this research shows that students'

understanding of mathematical concepts given the SAVI learning model assisted by Geogebra media is better than the conventional learning model.

Based on the conclusions that have been put forward, the researcher would like to propose several suggestions regarding the application of the SAVI learning model assisted by Geogebra, namely: Teachers use the SAVI learning model to improve students' understanding of mathematical concepts so that students become more creative, active and work together in finding answers to problems. with his group. It is also hoped that teachers can use learning media to attract students' attention, one of which is Geogebra media. For students, it is hoped that they will be able to develop the ability to understand mathematical concepts so that students obtain better learning outcomes so that they are able to solve all forms of mathematical problems. It is hoped that this research can become a reference source for further research in looking at the influence of the SAVI learning model on understanding mathematical concepts with the help of Geogebra media. And the author can develop this research in more depth so that this research can be useful for improving the quality of education, especially in Indonesia.

5 SUGGESTION

Based on the research results that have been described, several suggestions are given regarding the SAVI learning model to improve students' understanding of mathematical concepts so that students become more creative, active, and work together in finding answers to problems with their group of friends, namely:

1. Teachers can use learning media to attract students' attention, one of which is Geogebra media.If present, it should be placed before the reference section without numbering. Place Acknowledgments, institutional rather than individual in nature, including information about the source of any financial support received for the published work.
2. Students are able to develop the ability to understand mathematical concepts so that students obtain better learning outcomes so that they are able to solve all forms of mathematical problems.
3. The research can be a reference source for further research in looking at the influence of the SAVI learning model on understanding mathematical concepts with the help of Geogebra media. The author is further advised to develop this research in more depth so that this research can be useful for improving the quality of education, especially in Indonesia.

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