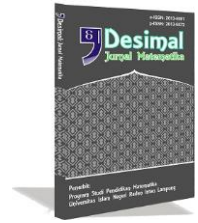




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## Comparison of Somatic, Auditory, Visual, and Intellectual Learning Models and Snowballing Against Numerical Ability of Students

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### ABSTRACT

Numerical ability in learning mathematics is an important thing for students to facilitate teaching and learning process. SAVI and Snowballing are learning models that can facilitate the development of numerical abilities of students. The purpose of this study is to determine the effect of SAVI and Snowballing learning models on the numerical ability of students. This research is a type of research Quasy Experimental Design. The sampling technique used was class random technique with row and series material. The instrument used to collect data was a numerical ability test in the form of a description item. The data analysis technique of this study used the T-Test analysis technique. The results of this study are that the two models do not have the same numerical ability of students, meaning that there are differences in the impact given by the SAVI learning model and the Snowballing learning model on numerical ability. The numerical ability of students using the SAVI learning model is better than using the Snowballing learning model.

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### INTRODUCTION

Given the importance of mathematics in science and technology, mathematics must be understood and mastered by students (Indrawati 2015). Factors that influence the success of students in mastering mathematics include numerical ability (Zikriah 2018). Some research results suggest that children who have high numerical ability

will be able to develop new thinking by integrating a variety of basic knowledge as supporters to think more broadly, because in these students there is perseverance, tenacity, hardness of heart, interest, curiosity and creativity (Kurniyanthi, Suarni, and Gunamantha 2019). Therefore numerical ability is very needed in mathematics (A. Hamid, S. Afriza 2016).

Learning models that can be used to improve students' numerical abilities such as the SAVI learning model and the SNOWBALLING Learning Model (Tanjung and Nababan 2018). The SAVI learning model trains participants to learn by listening, speaking, and thinking (Sulakasana, Margunaasa, and Authority 2018). Thus, between physical activity and intelligence go hand in hand. Based on research on students' numerical abilities using the SCRAMBEL, TSTS, COOPERATIVE TIPESTAD, OSBORN, PAIR CHECK models (Melani, Candiasa, and Hartawan 2019; Sunilawati, Dantes, and Candiasa 2013; Lanya and Aini 2019; Irawaan 2014). The SNOWBALLING learning model is a learning model where students are trained to be responsible for discussions in stages to get the right answer, so students can exchange opinions so as to produce a maximum result and be approved (Ramadhani, R., Umam, R., Abdurrahman, A., & Syazali, M. 2019), so that this learning model can improve the numerical ability of students (Kuncoro, Purnami, and Key 2018). Based on previous research that has been done about numerical abilities using learning models SAVI, TSTS, SCRAMBL, OSBORN (Setyani, Nizardin, and Utami 2019; Melani, Candiasa, and Hartawan 2019; Sunilawati, Dantes, and Candiasa 2013; Lanya and Aini 2019). Previous studies also included SNOWBALLING learning models for learning motivation, learning outcomes, critical thinking skills (Srisusilaningtyas 2018; Putranto, Susatyo, and Siadi 2013; Maasawet 2010). Also research using the SAVI learning model to measure learning outcomes, mathematical connections, student achievement, critical thinking skills, mathematical representation skills (Yulianti, Haris, and Chandra 2018; Nur Agustina, Yurniwati, and MS 2019; Setyani, Nizardin, and and Utami 2019; Dewi, Murda, and Pudjawan 2019;

Sulakasana, Margunaasa, and Authority 2018).

None of the previous studies discussed the two methods of learning, so this study, researchers were interested in the two learning models by focusing on the SAVI learning model and the SNOWBALLING learning model on students' numerical abilities. So this study aims to see which learning model is more effective to be used in improving numerical abilities of students.

## METHOD

This research is included in quantitative research with the type of research used is quasy experimental design (Putri and Silalahi 2018). The population to be used in this study is 60 students consisting of 2 classes with 30 students each in each class selected by cluster random sampling technique (Anwar, Munzil, and Arif Hidayat 2017). The two classes were given different treatments, namely the class that was applied to the SAVI learning model and the class that was applied to the SNOWBALLING learning model.

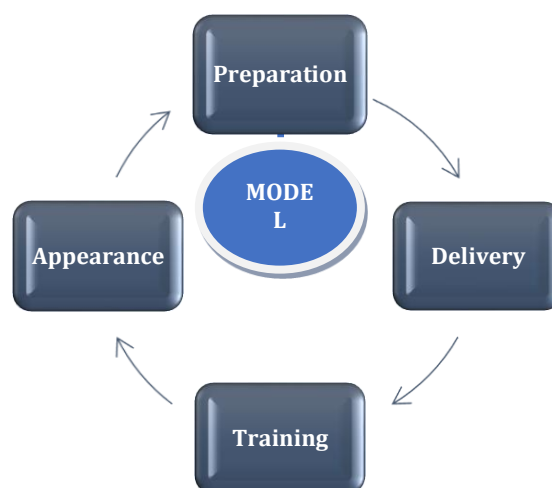


Figure 1. SAVI model research design

In Figure 1 we can see the steps of the SAVI learning model. There are 4 stages in the application of the SAVI learning model, which starts from the preparation stage by the teacher and

students, then the delivery of new learning material that involves the five senses and is suitable for all learning styles, then the training conducted by the teacher to help

students understand and absorb new knowledge and skills in various ways and lastly is the appearance of the students (Novitasari 2017).

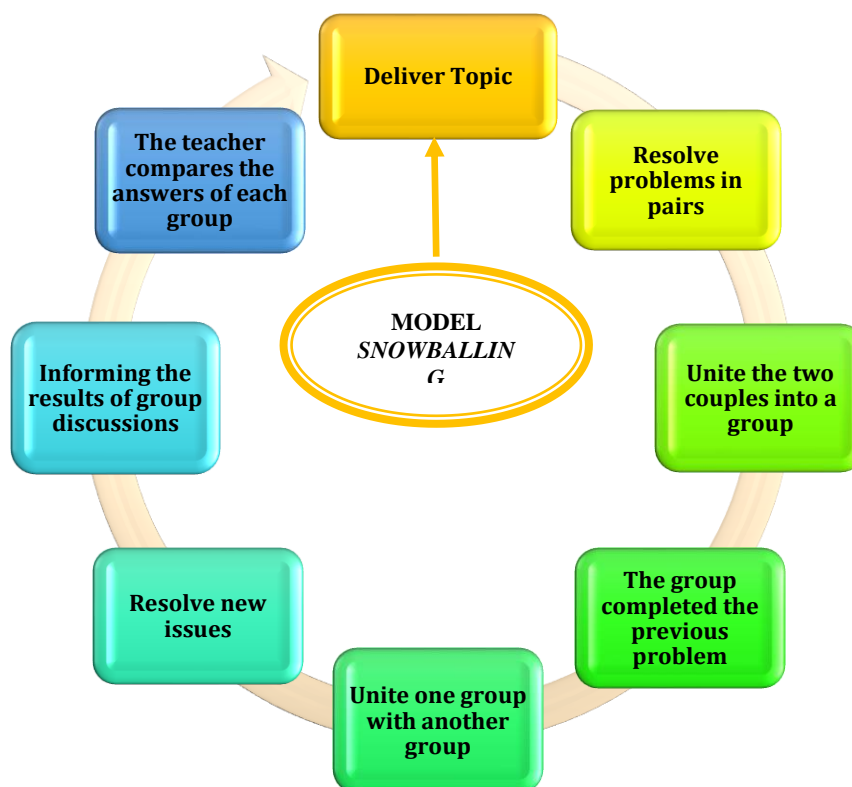


Figure 2. SNOWBALLING model research design

In Figure 2, we can see the steps of the SNOWBALLING learning model, which starts from conveying the topic of the lesson, asking students to solve problems in pairs, uniting one pair with another pair into a group and solving problems in the group, then uniting again group one with other groups to solve problems in groups that have been united, the group informs the results of the group to other students, finally the teacher will compare the answers from each group (Siregar, Ardiana, and Rosyidi 2019).

Data collection techniques used to evaluate and validate the data obtained is a matter of description tests, namely by giving questions that are of type description to students who will then be collected back to researchers to retrieve the test data results. The type of data used

to process research data is quantitative data.

The data analysis technique used in this study was the T-Test analysis technique, with the research design used was post-only control design (Dongoran, Basri said, and Defitriani 2019). There are several stages before the test instrument is used in conducting research including, 1) arranging the material that will be used in the questions, 2) making the questions grid, 3) compiling questions and their keys and 4) conducting a cobasoaletes test (Maasawet 2010). The instrument was tested on students to find out the validity, reliability, level of difficulty, and distinguishing problems.

## RESULTS AND DISCUSSION

Based on research results obtained from research on the effect of the SAVI and SNOWBALLING models on the numerical

abilities of students, the following is presented a descriptive description of the results of the SAVI and SNOWBALLING learning models on numerical abilities.

Table 1. Descriptive Statistics

Method	Mean	Median	Variance	Std. Deviation	Max	Min	Range
SAVI	86.5333	88	49.085	49.085	72	96	24
SNOWBALLING	80.3667	80	32.861	5.73244	70	90	20

Based on Table 1 it can be seen that the mean value for the SAVI learning model is 86.5333 while SNOWBALLING has an average of 80.3667, for the median the SAVI learning model has a median of 88.0000, the variance value 49.085 the standard deviation value is 7.00607 meaning that if there is an average deviation, the deviation does not more than 7.00607 or - 7.00607, the lowest value for the SAVI model is 72.00, the highest value is 96.00. The SNOWBALLING learning model has a median of 80,0000, the variance value is 32,861, the standard deviation value is 5.73244 means that if there is an average deviation, the deviation does not exceed 5.73244 or - 5.73244, the lowest value for the SNOWBALLING model is 70.00, with the highest value being 90.00.

Based on the results of the previous data analysis, the researcher will conduct a T test. Before the T test the researcher will conduct a normality and homogeneity test first as a prerequisite test. Normality test is used to find out whether the data is normally distributed or not, while the

homogeneity test is used to find out whether the data is homogeneous or not. This prerequisite test uses a significance level  $\alpha = 0.05$ .

$H_0$  = Data is normally distributed

$H_1$  = Data not normally distributed

Conclusion if  $p \text{ value} > \alpha$  so  $H_0$  accepted and rejected  $H_1$ , while if  $p \text{ value} < \alpha$  so  $H_0$  rejected and accepted  $H_1$ .

Numerical ability normality test results are in Table 2. Based on Table 2, normality test results with a significant level  $\alpha = 0.05$  shows that the application of the SAVI learning model and the SNOWBALLING learning model to numeric abilities shows the p value of the SAVI learning model is 0.128 and the SNOWBALLING learning model is 0.115 for the Shapiro-Wilk output probability. Because the values of  $p \text{ value} > \alpha$ , both data are normally distributed.

Homogeneity test with hypothesis  $H_0$  = Homogeneous data,  $H_1$  = Not homogeneous data.  $H_0$  accepted if  $p \text{ value} > \alpha$ . Homogeneity test results are in Table 3.

Table 2. Test results for numerical ability normality

Method	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	P-value	Statistic	Df	P-Value
SAVI	.182	30	.112	.921	30	.128
SNOWBALLING	.142	30	.139	.944	30	.115

Table 3. Homogeneity Test Results

Numeric ability	Levene Statistic	Df 1	Df 2	P-value
	80.3667	80	32.861	5.73244

Based on Table 3, the homogeneity test results with a significant level of 0.05 looks p value is 0.125 and greater than the significance level of 0.05, it can be concluded that the two data are homogeneous (Ramadhani, R., Huda, S., & Umam, R. 2019). After the prerequisite tests are normality tests and homogeneity tests are generated that the data is normally distributed and homogeneous, then the researcher will conduct an independent samples test. Independent Samples Test results are found in Table 4. Based on Table 4, the calculated T value (3,731) > T table is 1.72472 then H0 is

rejected. So the two models do not have the same average.

In Table 1 the average for the SAVI learning model is 86.5334, while for the SNOWBALLING learning model is 80.3667. It means that there is an average difference between the SAVI learning model and the SNOWBALLING learning model. So there will also be differences in their effect on the numerical ability of students, where the SAVI learning model is superior to the SNOWBALLING learning model. This can be seen from the steps in the two learning models.

Table 4. Test results for numerical ability normality

Numeric ability	Levene's test for equality of variances		t-test for equality of means					
	F	Sig.	T	df	Sig (2-tailed)	Mean difference	Std. error difference	95% confidence interval of difference
Equal variances assumed	2.425	.125	3.731	58	0	6.16667	1.65273	2.85836 - 9.47497
Equal variances not assumed			3.731	56	0	6.16667	1.65273	2.85560 - 9.47774

In line with studies that have been conducted, the SNOWBALLING learning model can have an impact on students' abilities in problem solving, conceptual understanding (Munifah, M., Romadhona, A. N., Ridhona, I., Ramadhani, R., Umam, R., & Tortop, H. S. 2019), and student learning outcomes (Fallis 2013; Srisusilaningtyas 2018; Putranto, Susatyo, and Siadi 2013; Maasawet 2010). The SAVI learning model has an impact on increasing students' learning interest and learning achievement (Rahmawati, R., Lestari, F., & Umam, R. 2019), problem solving, and student learning outcomes (Yulianti, Haris, and Chandra 2018; Nur Agustina, Yurniwati, and MS 2019; Setyani, Nizardin, and Utami 2019; Sulakasana, Margunaasa, and Authority 2018; Dewi, Murda, and Pudjawan 2019). Different from previous studies, our research has proven that the SAVI and SNOWBALLING learning models

actually have an impact on the numerical ability of students (Munifah, Tsani, I., Yasin, M., Tortop, H. S., Palupi, E. K., & Umam, R. 2019), and the most effective is the SAVI learning model.

## CONCLUSIONS AND SUGGESTIONS

Based on the results of the study concluded that there is an influence of the SAVI learning model and the SNOWBALLING learning model on the numerical abilities of students. However, according to the data that has been obtained, the SAVI learning model is more effective than the SNOWBALLING learning model, because the SAVI learning model encourages the integration of physical movements with intellectual activities that use all the senses so that the numerical abilities of students develop faster.

We suggest to future researchers who will continue this research to put more emphasis on the activeness and improvement of the character of students. The use of methods and learning media that are as attractive as possible so that students are more enthusiastic and enthusiastic during the learning process.

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