Jurnal Kajian dan Penelitian Umum
Vol.1, No.1 Februari 2023
e-ISSN: 2985-8666; p-ISSN: 2985-9573, Hal 27-34

The Savi Learning Model with PMR Settings in Straight Line Equations Learning

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Abstract*. This research was done to know student learning outcomes in junior high schools using the SAVI (Somatic, Auditory, Visual, Intellectual) learning model in the PMR (Realistic Mathematical Education Approach) setting. This study used a quasi-experimental method (Quasi-Experimental Design). In contrast, the sampling technique used was random cluster sampling using two classes, one as the experimental group class and one as the control group class. Data analysis techniques are normality tests, homogeneity tests, and hypothesis testing. Based on the study's results, it was found that there was an increase in student learning outcomes. The scores of student test results indicate this. Of 24 students who did not pass, only 2 people (5%) and 22 people (95%) passed. So that the results of the study concluded that the average student learning outcomes taught exceeded the minimum completeness criteria set by the school*

Keywords*: Savi Learning, Realistic Mathematics Education, Straight Line Equations*

Abstrak. Penelitian ini dibuat dengan tujuan mengetahui hasil belajar siswa di Sekolah Menengah Pertama menggunakan penerapan model pembelajaran SAVI (Somatic, Auditory, Visual, Intellectualy) setting PMR (Pendekatan Matematika Realistik). Penelitian ini menggunakan metode eksperimen semu (Quasi Eksperimen Design) sedangkan teknik pengambilan sampel yang digunakan adalah claster random sampling dengan memakai dua kelas, satu kelas sebagai kelas kelompok eksperimen dan satu kelas sebagai kelas kelompok kontrol. Teknik analisis data yaitu uji normalitas, uji homogenitas dan uji hipotesis. Berdasarkan hasil penelitian diperoleh bahwa adanya peningkatan hasil belajar siswa. Ini ditunjukkan dengan skor hasil tes siswa, dari 24 siswa yang tidak lulus hanya 2 orang (5%) sedangkan 22 orang (95%) dinyatakan lulus. Sehingga hasil akhir penelitian disimpulkan bahwa rata-rata hasil belajar siswa yang diajarkan melebihi kriteria ketuntasan minimal yang ditetapkan sekolah.

Kata kunci: Model Savi, Pembelajaran Matematika Realistik, Persamaan Garis Lurus

Received Desember 30, 2022; Revised Januari 30, 2023; Februari 27, 2023
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INTRODUCTION

Education is a journey that never stops throughout human life because education is one of the tools to create a quality society (Domu & Mangelep, 2019; Tiwow et al., 2022). Therefore, the government is trying to improve the quality and quality of education in Indonesia continuously. A significant role in the education world is to create quality human resources so that they can master and develop science and technology (Sulistyaningsih & Mangelep, 2019). One of the crucial roles in the world of education is mathematics (Manambing et al., 2017; Mangelep, 2020).

Especially where education is experiencing a period of various obstacles in an increasingly sophisticated era, especially during the Covid-19 pandemic, so the government is always trying to improve the quality of education by improving the curriculum, providing quality books online and face-to-face in class, and increasing teacher knowledge through training or further study. This initiative aims to improve the quality of education, which still requires improvement, and student learning outcomes are influenced by numerous factors.

Mathematics subjects serve as a tool, mindset, and source of knowledge or information (Suherman, 2003; Domu & Mangelep, 2019; Tiwow et al., 2022; Sulistyaningsih et al., 2022). These three functions should serve as a guide for mathematics instruction in schools. Students who are learning mathematics also have an aptitude for comprehending and deducing the relationship between these meanings. Students' mathematical reasoning skills will improve if they take an active role in their education. However, the development of mathematics learning is hampered because the learning process where students used to meet face-to-face with teachers at school now uses online and offline distance learning (PJJ), which results in students' understanding of mathematics not being realized properly and leads to poor student learning outcomes, also due to the very low motivation of student learning.

According to the findings of interviews with eighth-grade students at SMP SATAP Negeri 1 Nanusa in Laluhe, most of the eighth-graders dislike mathematics because it is difficult to comprehend or comprehend, and some even find it extremely boring. Coupled with distance and offline learning which adds students consider the difficulty level of mathematics much more complicated than before, and one of the most challenging materials is Straight Line Equations. This resulted in 14 out of 24 students failing to

complete the course with a score of 60, which did not meet the KBM of 70. This was also because the learning process was a monotonous interaction between the teacher and students. To enable students to master mathematics, they must apply learning that further stimulates student learning motivation and communication between students and teachers, as well as between students themselves. Therefore, it will be simpler to comprehend and conducive to learning.

These issues necessitate the SAVI Setting PMR learning model. SAVI is a learning model that involves movement, such as physical movement of certain limbs, speaking, listening, seeing, observing, and employing cognitive abilities to think, describe, and draw conclusions. Sidjaga (2009) proposes a number of key principles in learning using SAVI, namely: (1) Learning involves the whole mind and body, (2) Learning means creating, not consuming, (3) Collaboration helps the learning process, (4) Learning takes place in many levels simultaneously, (5) Learning comes from doing the work itself with feedback, (6) Positive emotions really help to learn, (7) Brain-images absorb information directly and automatically.

PMR is the use of reality and the student's environment to accelerate the process of learning mathematics and achieve the goals of mathematics education more effectively than in the past (Soedjadi, 2001; Mangelep, 2013). Guided reinvention/progressive mathematizing, didactical phenomenology, and self-developed models are three crucial principles of realistic mathematics education learning (Gravemeijer, 1994; Mangelep, 2015). According to Arrifadah (2004), it is stated that the three principles above are operationalized into five essential characteristics of realistic mathematics education learning, namely (1) Using contextual problems, (2) Using models, (3) Using student contributions, (4) There is interaction, (5) There is a link between parts of the subject matter.

The following is the formulation of the problem based on this study: Is the average learning achievement of students at SMP SATAP Negeri 1 Nanusa using the SAVI learning model with PMR settings greater than the average learning outcomes of students at SMP SATAP Negeri 1 Nanusa using the SAVI learning model without PMR settings?

METHOD

This research employed a quasi-experimental design. (quasi-experimental design). During the odd semester of 2021/2022, this research was conducted at SATAP Negeri 1 Nanusa Middle School in Laluhe. The participants in this study were eighth graders at SMP SATAP Negeri 1 Nanusa in Laluhe during the academic year 2021/2022. Random cluster sampling was employed, with one class serving as the experimental group and the other as the control group. The research design employed is a Nonequivalent Control Group Design of Quasi-Experimental Type.

Table 1. Nonequivalent Control Group Research Design

Class	Pretest	Treatment	Posttest
Experiment	o_1	x	o_2
Control	o_3		o_4

Information:

$o_{1,}o_3$: *Tests given before the learning process for the experimental class or control class.*

$o_{2,}o_4$: *Tests given after the learning process for the experimental class or control class.*

x : *Provision of treatment to the experimental group.*

The instruments used in this study were teaching material development instruments and data collection instruments. Learning Implementation Plans (RPP) and Student Worksheets (LKS) were the instruments for developing teaching materials. The data collection instruments were in the form of essay questions to obtain learning outcomes. Data testing techniques are normality tests, homogeneity tests, and hypothesis testing. The homogeneity test uses a homogeneity test of two variants or two fishers.

RESULT AND DISCUSSION

Based on research data from student learning outcomes after receiving the SAVI learning model treatment setting PMR on straight-line equation material, 95% (22 individuals) of the total 24 students passed, while 5% (2 individuals) did not pass. The minimum criteria for completeness at the school, which is 70, can only be met by those who are whole.

Before testing the hypothesis, the data used are the results of the final test (post-test) to determine the normality and homogeneity of the data. In this study, the data normality test is the lilies test with the following hypotheses:

H_0: Data is normally distributed

H_1: Data is not normally distributed

$\alpha = 0{,}05\ (5\%)$

By criteria:

Reject H_0 if $L_{hitung} > L_{tabel}$.

Based on normality test obtained

Table 2. Summary of the Normality Test for Experimental Class Learning Outcomes

Normality *Liliefors* Test	
Real value α	0,05
***Liliefors* count**	0,132
***Liliefors* Table**	0,179
Number of Student Respondents	24 Students

The normality test results for the value of $L_{count} = 0{,}132 < L_{table} = 0{,}179$ which means that the results of students' mathematics learning on straight-line equations using the Savi learning model setting PMR are normally distributed or in other words accept H_0.

The homogeneity test in this study was the two sample F-test for variances with the following hypotheses:

H_0: Homogeneous Data

H_1: Data is not homogeneous

By criteria:

Reject H_0 if $F_{count} > F_{table}$

Based on the F-test obtained:

Table 3. *F-Test Two-Sample for Variances Class Experiment and class Control*

	Variable 1	**Variable 2**
Mean	68,25	81.08333333
Variance	125.5869565	71.29710145
Observations	24	24
Df	23	23
F	**1.761459498**	
P ($F <= f$) one-tail	0.091072505	
F Critical one-tail	**2.014424842**	

$F_{count} = 1{,}761$

$F_{table} = 2{,}014$

This demonstrates that $F_{hitung} < F_{tabel}$, therefore H_0 is is accepted with a significant level of 5%. The variances of the control and experimental groups are identical. In this study, the hypothesis was tested using a paired t-test after it was determined that the classes were normally distributed and homogeneous. As a criterion for testing the hypothesis, H_0 is rejected, if $t_{hitung} > t_{tabel}$ with $\alpha = 5\%$.

Table 4. Summary of Experimental Class Learning Outcomes Hypothesis Testing

Hypothesis testing	
Number of Respondents (n)	24
dk	23
Average	80,71
Real value α	5%.
$\boldsymbol{t_{table}}$	2,064
$\boldsymbol{t_{count}}$	6,408

According to the information in table 4 $t_{count} = 6{,}408 > t_{table} = 2{,}064$ rejects H_0 accept H_1. Therefore, it was determined that the average learning outcomes of students taught using the Savi learning model setting PMR exceeded the minimum completeness criterion of 70.

SAVI is a learning model that involves movement, such as physical movement of certain limbs, speaking, listening, seeing, observing, and employing cognitive abilities to think, describe, and draw conclusions. PMR is the use of reality and the student's environment to accelerate the process of learning mathematics and achieve the goals of mathematics education more effectively than in the past (Soedjadi, 2001; Mangelep, 2017).

Following the findings of Asmaul Husna (2019) in his journal "Application of the SAVI Approach and the Realistic Approach in Improving the Mathematical Communication Skills of Middle School Students," said that although the two approaches, there were no differences in improving the mathematical communication skills of students who applied the SAVI approach and students who applied the realistic approach, reviewed of all students. Nonetheless, both increase students' mathematical communication skills. The fact that the pre-test and post-test results differ demonstrates this point. Husna suggested using these two learning models with subjects that emphasize the development of reasoning, problem-solving, creativity, and other skills. This is

consistent with the author's research on straight-line equations, which promotes reasoning, problem-solving, creativity, and critical thinking (Mangelep, 2017).

According to the findings of Kaunang's (2018) study, there are significant differences between the learning outcomes of the two classes. At Tomohon Christian Middle School, the learning outcomes of students employing a realistic mathematical approach are superior to those of students employing direct learning on straight-line equations material. This strengthens the author's research utilizing the SAVI learning model by establishing a realistic mathematical strategy for enhancing students' comprehension of material concerning linear equations.

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