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The Effect of the Savi Learning Model on the Mathematical Problem-Solving Ability of Elementary School Students is Reviewed from the Perspective of Creative Thinking Skills

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***Abstract*—** The logical, systematic, and analytical thinking skills developed through mathematics become the basis for decision-making and problem-solving in various fields. Despite its important role, mathematics learning in elementary schools still faces various challenges. This study aims to determine the difference in the influence of the SAVI learning model and the Direct Learning learning model on the mathematical problem-solving ability of grade V elementary school students. This study uses a quantitative approach with a 3x2 factorial type quasi-experiment design. The results of this study show that the SAVI learning model is more effective in improving students' mathematical problem-solving skills compared to the Direct Learning learning model. This can be seen from the results of the posttest, where the average score of students using the SAVI model reached 78.4 with a standard deviation of 7.8, while the Direct Learning group only achieved an average score of 72.1 with a standard deviation of 8.3. The results of the t-test showed a significant difference between the two groups (t = 3.214, p = 0.002), which proved that sensory, affective, visual, and intellectual activity-based approaches can improve comprehension and problem-solving skills more effectively compared to conventional learning. In addition, this study also shows that creative thinking skills have a significant influence on mathematical problem-solving skills. Students with high creativity had an average posttest score of 82.3, much higher than the medium (76.5) and low (68.9) creativity groups. The results of the ANOVA test showed significant differences between groups (F = 5.678, p = 0.001), which proved that the higher a person's creative thinking skills, the better their ability to solve mathematical problems.

***Keywords*—** SAVI Learning Model, Mathematics Problem Solving Ability, Elementary School, Creative Thinking Skills.

I. INTRODUCTION

Basic education has a very important role in shaping the Mathematics is one of the fundamental subjects in primary and secondary education. Apart from being an abstract science, mathematics is closely related to various aspects of daily life. The logical, systematic, and analytical thinking skills developed through mathematics become the basis for decision-making and problem-solving in various fields. Despite its important role, mathematics learning in elementary schools still faces various challenges. Many students experience difficulties in understanding mathematical concepts, which has an impact on their low problem-solving skills . PISA (Programme for International Student Assessment) data in 2020 shows that the average mathematics score of Indonesian students is still below the standards of OECD countries. In 2022, Indonesia's science literacy increased by six ranks compared to 2018, with a score of 383 out of the global average of 485. However, this increase has not reflected significant progress in mathematical literacy(Serevina, Heriyoso, & Liandari, 2023).

One of the main causes of low understanding of mathematics is teaching methods that still tend to be traditional. Many teachers still rely on one-way lectures and emphasize formula memorization without in-depth exploration of basic concepts. As a result, students lack understanding of the application of mathematics in daily life, which further reduces their motivation in studying this subject. Permendikbud Number 37 of 2018 has stipulated that the purpose of mathematics learning in Elementary

Schools/Madrasah Ibtidaiyah (SD/MI) is to develop students' abilities in communicating mathematically, reasoning, and compiling mathematical evidence through various representations. In relation to this goal, the National Council of Teachers of Mathematics mentions five standards that students must have in learning mathematics, namely mathematical communication, mathematical reasoning, problem solving, mathematical connections, and a positive attitude towards mathematics. The ultimate goal of learning mathematics is not only understanding the material, but also the emergence of positive effects such as critical thinking skills, creativity, and awareness of the importance of mathematics in various aspects of life. Other positive effects include increased analytical skills, awareness of the surrounding environment, and understanding of the relationship between mathematical concepts and other disciplines (Khusna & Heryaningsih, 2018).

Problem-solving skills are one of the main skills in mathematics learning. According to NCTM (2000), problem-solving involves applying concepts that have been learned in new situations. Anderson (in Ulfa et al., 2017) emphasizes that problem-solving involves a continuous process of analysis, interpretation, and evaluation. Therefore, a more effective learning approach is needed in developing these skills. One of the learning models that is considered to be able to improve problem-solving skills is the SAVI (Somatic, Auditory, Visual, and Intellectual) model. This model allows students to learn by utilizing all their senses and intelligence, so that learning becomes more meaningful and relevant to real life. This model emphasizes a multisensory learning experience through physical activity, hearing, visualization, and intellectual thinking. Conventional learning methods, such as Direct Learning, are still widely used by teachers. This model places teachers as the center of learning, with students as passive recipients of information. Although effective in delivering material systematically, this model has limitations in increasing student engagement. (Fajriah, Nurfitriani, & Permana, 2020)stated that Direct Learning can help learners understand procedural skills, but lacks in building deep conceptual understanding (Retnowati, Usodo, & Chumdari, 2025).

Research shows that the SAVI model is superior to Direct Learning in improving student motivation and learning outcomes. Mulyati and Sukardi (2021) found that students who learned with the SAVI model showed higher engagement and better understanding. This model also helps students with various learning styles because it combines physical, sound, and vision activities in learning. Another advantage of the SAVI model is its ability to improve students' memory and creativity. By involving various learning modalities, it is easier for students to understand and remember the subject matter. In addition, SAVI allows students to connect mathematical concepts with real experiences, so that learning becomes more meaningful and applicable (Darsih, 2022). Despite having many advantages, the implementation of the SAVI model also faces challenges. One of them is the need for more thorough preparation, both in planning learning activities and providing supporting facilities (Ardini & Nurlia, 2024). In addition, the competence of teachers in implementing this model is a key factor in its success (Ulin Nuha, Nisa, Anwar, & Musyafaah, 2023).

Another obstacle faced in SAVI learning is the dominance of superior students in group discussions, which can cause shy students to participate less (Patty et al., 2022). Difficulties in group cooperation and material understanding are also obstacles that need to be overcome so that learning is more inclusive and effective (Putri et al., 2021). Taking these challenges into account, the implementation of the SAVI model requires the right strategy so that all students can be actively involved in learning. Teachers need to design activities that encourage equal participation, as well as create a learning environment that supports the exploration and understanding of mathematical concepts in depth (Adolph, 2025).

Based on the above problems, this study aims to determine the difference in the influence of the SAVI learning model and the Direct Learning learning model on the mathematical problem-solving ability of grade V elementary school students. In addition, this study also aims to analyze the difference in the influence of creative thinking skills on the mathematical problem-solving ability of elementary

school students. Furthermore, this study will explore the interaction between the SAVI learning model and creative thinking skills in improving the mathematical problem-solving ability of elementary school students. Thus, the results of this study are expected to provide a deeper insight into the effectiveness of the learning model applied and its implications for the development of students' thinking skills in understanding and solving mathematical problems(Retnowati et al., 2025)..

II. MATH

This study uses a quasi-experiment method with a 3x2 This study uses a quantitative approach with a 3x2 factorial type quasi-experiment design. This factorial design allows researchers to test the influence of learning models (SAVI and DL) as well as creative thinking skills (high, medium, low) on problem-solving skills. To measure the effectiveness of the treatment, this study involved pretest and posttest measurements. Two-way 3x2 anova factorial experimental design, with factorial design model. The research was carried out in Wonogiri District, Wonogiri Regency on grade V elementary school students for the 2024/2025 school year. The instrument in this study is in the form of student worksheets (LKPD) to measure students' skills in creative thinking and mathematics learning outcomes. LKPD is in the form of a written test with 10 questions with a type of description to measure students' mathematics learning outcomes, while LKPD in the form of work shows is used to measure creative thinking skills with assessments using rubrics. Research instruments in the form of tests need to be tested for validity and data reabiltas in accordance with instrument standards. Data analysis is a crucial stage in this research. The data that has been collected will be processed using the SPSS 27 statistical program to produce findings that can support or reject the hypothesis proposed. The places used in this study are several State Elementary Schools in Wonogiri District, Wonogiri Regency, Central Java Province. The reason the researcher chose the place was that the school chosen had a balanced number of students. The thesis research period is carried out for 10 months, starting from July to April in the 2024/2025 academic year (Sugiyono, 2019)..

III. HELPFUL HINTS

Result

The data obtained were analyzed using the SPSS 27 statistical program with a normality test, t-test, and two-track ANOVA. The results of this study show that before being given treatment, students' initial ability in solving mathematical problems needs to be measured to ensure that both groups have balanced conditions. Therefore, a pretest was conducted for students who followed the SAVI and Direct Learning (DL) learning models. This pretest aims to find out if there is a significant initial difference between the two groups before receiving treatment. Thus, if there is an increase after treatment, it can be attributed to the effectiveness of the learning model applied. The following are the pretest results obtained from both experimental groups:

Table 1. *Results of the Mathematical Problem Solving Ability Pretest*

Learning Groups	N	Average	Standard Deviation	Mean Value	Max Value
Anonymous	60	58,7	8,5	45	72
Direct Learning (DL)	60	57,9	7,9	44	70

Source: Results of Research Data Analysis (2024)

The results of the pretest showed that there was no significant difference between the two groups before being given treatment (t = 0.542, p = 0.589). This means that the initial ability of students in problem-solving is relatively balanced among groups that will use the SAVI and Direct Learning learning models. These results are important because they ensure that the difference in posttest scores is actually caused by the learning intervention given, not other factors. After being given treatment in accordance with their respective learning models, a posttest is carried out to measure the improvement of students' abilities. Here are the posttest results:

Table 2. Results of the Mathematics Problem Solving Ability Posttest

Learning Groups	N	Average	Standard Deviation	Mean Value	Max Value
Anonymous	60	78,4	7,8	60	90
Direct Learning (DL)	60	72,1	8,3	55	85

Source: Results of Research Data Analysis (2024)

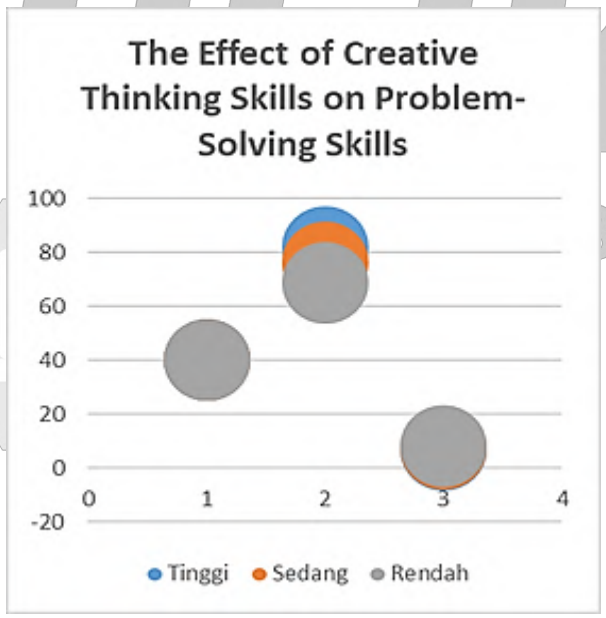
Based on the table above, it can be seen that the group of students who used the SAVI learning model experienced a higher average score increase compared to the Direct Learning group. The t-test results showed a significant difference between the two groups (t = 3.214, p = 0.002). These findings indicate that the SAVI learning model is more effective in improving mathematical problem-solving skills than the Direct Learning model. This is in line with previous research which shows that sensory, affective, visual, and intellectual activity-based learning models (SAVI) can increase student involvement in the learning process and strengthen a deeper understanding of concepts.

To analyze the influence of creative thinking skills on problem-solving skills, students were categorized into three groups: high, medium, and low. Here are the results of the analysis:

Table 3. The Effect of Creative Thinking Skills on Problem-Solving Skills

Creative Thinking Skills	N	Average Posttest	Standard Deviation
Tall	40	82,3	6,9
Keep	40	76,5	7,4
Low	40	68,9	8,1

Source: Results of Research Data Analysis (2024)



***Graph 1:** The Influence of Brfikir Skills*

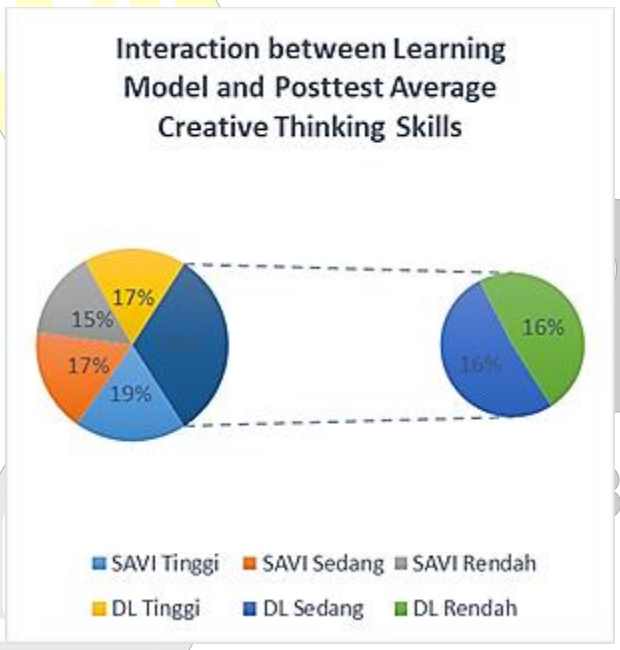
The results of the study show that the higher the creative thinking skills of students, the higher their ability to solve mathematical problems. The ANOVA test showed significant differences between groups with high, medium, and low creative thinking skills with a value of F = 5.678, p = 0.001. This shows that students who have high creative thinking skills can more easily understand mathematical problems, find various alternative solutions, and develop effective solving strategies. This discovery is in line with the

theory that states that creative thinking plays an important role in problem solving because it involves flexibility in thinking and the ability to connect different concepts. Interaction analysis was carried out to see if a particular learning model was more effective depending on the level of students' creative thinking skills. Here are the results:

Table 4. *Interaction between Learning Models and Creative Thinking Skills*

Learning Model	Creative Skills	Average Posttest
Anonymous	Tall	85,6
Anonymous	Keep	78,4
Anonymous	Low	67,5
DL	Tall	78,2
DL	Keep	74,6
DL	Low	70,3

Source: Results of Research Data Analysis (2024)



Graph 2. *Interaction Between Learning Models*

The results of the interaction test showed a value of F = 4.321, p = 0.015, which means that there was a significant interaction between the learning model and creative thinking skills on mathematical problem-solving skills. From the table above, it can be seen that the SAVI learning model is more effective compared to Direct Learning, especially for students with high and medium creative thinking skills. Students with high creativity in the SAVI group achieved an average score of 85.6, higher than the Direct Learning group which was only 78.2. On the other hand, for students with low creativity, Direct Learning provides more stable results compared to SAVI. This can be explained by the theory that learners with low creativity may have difficulty managing more complex learning activities and demanding active interaction such as in the SAVI model.

The results of this study provide several important implications for the world of education, especially in the development of more effective learning strategies. The SAVI learning model has proven to be superior to Direct Learning in improving mathematical problem-solving skills. Therefore, teachers and educators are

advised to apply more interactive and experiential methods in teaching mathematics. In addition, creative thinking skills also play a significant role in supporting the improvement of problem-solving skills. Therefore, schools need to develop a curriculum that encourages students to think creatively, for example by providing more varied and project-based problem-solving challenges. This study also highlights that not all learning models provide the same results for every learner. The SAVI model is more suitable for learners with high creativity, while Direct Learning can provide more stable results for those with low creativity. This shows that in the application of learning methods, adjustments need to be made based on the characteristics of students.

IV. DISCUSSION

Effectiveness of SAVI and Direct Learning Learning Models in Mathematical Problem Solving

The results show that the SAVI learning model is more effective than Direct Learning (DL) in improving mathematical problem-solving skills. This can be seen from the difference in the average posttest, where the group that used SAVI achieved a higher score compared to the group that used DL. The SAVI model, which emphasizes sensory, affective, visual, and intellectual activities, allows learners to be more active in understanding mathematical concepts through hands-on experience. In SAVI-based learning, learners not only receive information passively, but also engage in activities that connect their sensory and emotional experiences to the concepts learned (Ningsih, Kusumaningsih, & Buchori, 2020). This approach is in line with constructivist learning theory which states that deeper understanding occurs when learners have the opportunity to build their own meaning from their experiences. Therefore, the results of this study reinforce previous findings that show that activity-based learning methods are more effective in improving critical thinking and problem-solving skills. In contrast, the Direct Learning model tends to emphasize more on the delivery of information directly by teachers. Although this method can provide a clear conceptual understanding, this approach lacks space for learners to explore concepts independently. This may explain why the group that learned with this method experienced a lower improvement compared to the group that used the SAVI model (Dapa, Muchtar, & Syahrial, 2019).

The Relationship between Creative Thinking and Problem-Solving Skills

In addition to the effectiveness of the learning model, this study also highlights the importance of creative thinking skills in mathematical problem solving. The results of the analysis showed that students with high levels of creativity had better problem-solving skills compared to those with medium or low creativity. Creativity in mathematics is not only related to the ability to find new solutions, but also to the flexibility of thinking in the face of complex challenges. Students who have high creativity are more likely to use various strategies in solving problems, such as making diagrams, breaking down problems into smaller parts, or looking for patterns in the data provided. On the other hand, students with low creativity tend to rely on more mechanical methods in solving problems, so they have difficulty when faced with problems that require analytical and innovative thinking. Therefore, it is important for educators to not only teach mathematical concepts conventionally, but also provide exercises that encourage students to think creatively and exploratorily (Lia & Hilal, 2024).

Interaction between Learning Models and Creative Thinking Skills

The interaction analysis in this study shows that the effectiveness of the learning model varies depending on the level of students' creative thinking skills. The SAVI learning model has proven to be more effective for students with high and medium creativity, while for students with low creativity, the Direct Learning method produces a more stable score. This shows that in mathematics learning, there is no one method that is suitable for all students. Learners who have high creativity can benefit more from the SAVI method because this model gives them the freedom to explore and construct their own understanding. Conversely, learners with low creativity may feel more comfortable with more structured learning methods such as Direct Learning (Nisa, 2024).

The Importance of Differentiation in Mathematics Learning

These findings underscore the need for differentiation in mathematics learning. Differentiation is an approach in which educators tailor their teaching strategies based on the characteristics and needs of learners. In the context of this study, differentiation can be done by grouping students based on their level of creativity and applying the most appropriate learning strategies for each group.nFor example, for students with high creativity, teachers can provide more complex and project-based problem-solving challenges. Meanwhile, for students with low creativity, teachers can provide more structured guidance and more practice to build their confidence in solving math problems (Kurniawati & Kartono, 2021).

Implications for Educators and Policymakers

This research has important implications for educators and policymakers in the field of education. For educators, the results of this study emphasize the importance of using learning strategies that are varied and tailored to the needs of students. Teachers should not rely on just one learning method, but need to combine various approaches to ensure that all students can get the maximum benefit from the learning process. For policymakers, the results of this study show that the mathematics curriculum should be designed to not only emphasize the understanding of concepts, but also encourage the development of creative thinking skills. This can be done by integrating exploration-based activities, projects, and problem-solving in the school curriculum (Handini*, Ariyanti, & Kurniawan, 2023).

Comparison with Previous Research

The results of this study are in line with previous research which shows that the activity-based learning approach is more effective in improving problem solving compared to traditional learning methods. Studies conducted by several previous researchers have also shown that students' involvement in more active learning activities can improve their understanding of concepts and critical thinking skills. In addition, the study also supports the theory that creative thinking skills play an important role in mathematical problem solving. These findings reinforce the view that mathematics is not only about memorizing formulas, but also about how learners can think flexibly and find various innovative solutions in solving problems (Rahayuningtyas, 2022).

Challenges in the Implementation of the SAVI Learning Model

Although the SAVI learning model has proven to be more effective, its implementation in the classroom still faces some challenges. One of the main challenges is the readiness of teachers to apply this method. The SAVI model requires more interactive and creative teaching skills, so teachers need to get adequate training to implement these methods well. In addition, limited facilities and resources in some schools can also be an obstacle in implementing activity-based learning. Therefore, there needs to be support from schools and the government in providing adequate facilities and infrastructure to support the implementation of more innovative learning models (Wahyuni, WIransah, Syafruddin, & Bustami, 2022).

Based on the results of the study, it can be concluded that the SAVI learning model is more effective than Direct Learning in improving mathematical problem-solving skills. In addition, creative thinking skills also play an important role in supporting students' success in solving mathematical problems. As a recommendation, teachers are advised to use more activity-based learning approaches that encourage students to think creatively and exploratorily. In addition, learning differentiation needs to be implemented so that each student gets a learning method that suits their characteristics. For policymakers, the results of this study show that school curricula need to be more flexible and make room for more innovative learning approaches. Teacher training also needs to be improved so that they can apply more effective learning methods in improving students' creative thinking and problem-solving skills. By applying these findings in educational practice, it is hoped that mathematics learning can become more interesting, meaningful, and beneficial for students' cognitive development and thinking skills (Farokhah, Arisetyawan, & Jupri, 2017).

In the context of mathematics learning in elementary school, the selection of the right learning model is very important to improve students' problem-solving skills. The SAVI learning model, which emphasizes sensory, affective, visual, and intellectual activities, has been proven to provide a richer learning experience compared to the more conventional Direct Learning. Through experiential learning and active engagement, learners more easily understand abstract concepts in mathematics and apply them in real problem solving. This can be seen from the results of the study which showed a higher increase in posttest scores in the SAVI group compared to Direct Learning. In addition, the findings of this study also underscore the importance of creative thinking skills in improving mathematical problem-solving skills. Students with a high level of creativity tend to have flexibility in finding various alternative solutions and are able to connect different concepts more effectively. In contrast, learners with low creativity often face difficulties in understanding problems and tend to use less varied solving strategies. Thus, the results of this study reinforce the argument that the development of creative thinking skills should be one of the main focuses in mathematics learning in elementary schools (Ahmad & Mohamed, 2021).

The interaction between the learning model and creative thinking skills also provides additional insight into the effectiveness of different approaches for learners with varying levels of creativity. Students with high creativity benefit more from the SAVI learning model because this approach allows them to explore mathematical ideas and concepts more deeply. In contrast, learners with low creativity get more stable benefits from Direct Learning, as this model provides a more directed and systematic learning structure. Therefore, in the application of the learning model, teachers need to consider the level of creativity of students so that learning strategies can be better adapted to their needs. The implications of the results of this study are also relevant for the development of curriculum and teaching methods in elementary schools. More innovative and activity-based learning approaches, such as SAVI, can be integrated into the curriculum to improve the effectiveness of mathematics learning. In addition, training for teachers in implementing adaptive learning models is also needed so that they can accommodate the learning needs of students with different characteristics. With a better understanding of the interaction between learning models and creative thinking skills, educators can design more effective strategies to improve mathematical problem-solving abilities at the elementary school level (Nopitasari, Egok, & Yuneti, 2022).

Overall, this study makes a meaningful contribution to the field of mathematics education by showing that both learning models and creative thinking skills have a significant role in improving students' problem-solving skills. By understanding the factors that affect the success of mathematics learning, it is hoped that the results of this study can be a reference for educators and policymakers in designing more optimal learning strategies. The combination of appropriate learning models and the development of creative thinking skills will help create a more effective learning environment and support the cognitive development of students to the maximum

V. PUBLICATION PRINCIPLES

The contents of the journal are peer-reviewed and archival. International Journal of Innovative Research in Technology publishes scholarly articles of archival value as well as tutorial expositions and critical reviews of classical subjects and topics of current interest.

Authors should consider the following points:

1. Technical papers submitted for publication must advance the state of knowledge and must cite relevant prior work.
2. The length of a submitted paper should be commensurate with the importance, or appropriate to the complexity, of the work. For example, an obvious extension of previously published work might not be appropriate for publication or might be adequately treated in just a few pages.
3. Authors must convince both peer reviewers and the editors of the scientific and technical merit of a paper; the standards of proof are higher when extraordinary or unexpected results are reported.

4. Because replication is required for scientific progress, papers submitted for publication must provide sufficient information to allow readers to perform similar experiments or calculations and use the reported results. Although not everything need be disclosed, a paper must contain new, useable, and fully described information. For example, a specimen's chemical composition need not be reported if the main purpose of a paper is to introduce a new measurement technique. Authors should expect to be challenged by reviewers if the results are not supported by adequate data and critical details.

VI. CONCLUSION

Based on the results of this study, it is shown that the SAVI learning model is more effective in improving students' mathematical problem-solving skills compared to the Direct Learning learning model. This can be seen from the results of the posttest, where the average score of students using the SAVI model reached 78.4 with a standard deviation of 7.8, while the Direct Learning group only achieved an average score of 72.1 with a standard deviation of 8.3. The results of the t-test showed a significant difference between the two groups ($t = 3.214$, $p = 0.002$), which proved that sensory, affective, visual, and intellectual activity-based approaches can improve comprehension and problem-solving skills more effectively compared to conventional learning. In addition, this study also shows that creative thinking skills have a significant influence on mathematical problem-solving skills. Students with high creativity had an average posttest score of 82.3, much higher than the medium (76.5) and low (68.9) creativity groups. The results of the ANOVA test showed significant differences between groups ($F = 5.678$, $p = 0.001$), which proved that the higher a person's creative thinking skills, the better their ability to solve mathematical problems. Furthermore, the interaction between the learning model and creative thinking skills also showed that students with high creativity were more optimal in the SAVI learning model (85.6), while students with low creativity were more stable in the Direct Learning model (70.3). Thus, this study emphasizes that the effectiveness of the learning model in improving problem-solving skills is influenced by the level of creativity of students, so a more flexible and adaptive learning approach is needed.

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