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Effectiveness of the Self Regulated Learning Model using the SAVI Method to Reduce Anxiety in Learning Science

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ABSTRACT. Science is a difficult subject and requires more understanding. The difficulty of science material causes anxiety for students so that it can have an impact on learning outcomes. This research aims to determine the implementation of learning and student activities when implementing the self-regulated learning model using the SAVI method. Apart from that, it is also to determine the effectiveness of the self-regulated learning model using the SAVI method to reduce anxiety learning science. The type of research carried out was quantitative, namely quasi-experimental with a pretest posttest design research design. The samples used were classes VII F and VII H. The sampling technique was through cluster random sampling. Data were analyzed using descriptive statistics and inferential statistics, namely the T test (one tailed and two tailed), N gain test, ANCOVA test, and Cohen's d effect size test. Based on the research results, the self-regulated learning model using the SAVI method was implemented very well and students were actively involved in learning activities. The implementation of learning received a score of 95, including the very good category. Student activities also received a very good category with a score of 90. The effectiveness of the self-regulated learning model using the SAVI method obtained an N gain test value of 76.1 and a Cohen's d effect size test value of 1.63. This means that the learning model applied is in the effective category. After implementing the self-regulated learning model using the SAVI method, the learning anxiety experienced by students decreased and learning objectives could be achieved.

Keywords: SAVI method, science learning anxiety, self regulated learning

INTRODUCTION

Current developments are in the 21st century which is marked by the age of knowledge. In the 21st century or the era of globalization, technology is becoming increasingly sophisticated. Therefore, to keep up with current developments, educational institutions are required to produce students who have various skills. The skills that students must master consist of the 4Cs, namely creative thinking, critical thinking, collaboration and communication (Septikasari, 2018). Therefore, the government always changes the curriculum according to the needs and developments of the times (Rawung et al., 2021). The curriculum used in the 21st century requires students to be more active in learning activities. However, the conditions that occur in the field are inversely proportional, many students are not yet active in learning activities. This can be seen from the lack of understanding of the material received by students, especially in science learning.

Science is a scientific discipline that discusses all natural phenomena. Science learning in SMP/MTs consists of two elements, namely understanding science and process skills. Elements of understanding science are related to students' ability to think at a high level (High Order Thinking Skill). Science is learning that has characteristics in the form of values, attitudes and processes (Sulthon, 2017). Science learning is carried out through experiments and direct observation to gain knowledge. When compared with other sciences, science is a learning that requires deeper understanding, remembering that the material contained in science is abstract material so students have difficulty understanding it. The difficulty of understanding this learning can also be caused by students' learning anxiety.

Anxiety is a psychological condition where a person (student) feels uneasy. Students who experience anxiety are caused by something they feel is dangerous. One of the factors causing students' anxiety experienced at school is because the discussion material is difficult to understand. However, anxiety experienced by students does not always have a negative impact, in fact learning anxiety is important for students to motivate themselves (Rudiansyah et al., 2016). This is because achieving success does not only rely on intelligence, but mental peace is also very influential (Lestari et al., 2013). However, if the level of anxiety is in the high category, it will be a problem for learning outcomes (Suratmi et al., 2017). Apart from that, it can also have an impact on students' physical and psychological well-being (Febriansyah, 2023).

Anxiety experienced by students can be observed through several indicators, namely cognitive, motor, somatic and affective (Hasniati, 2017). Students are said to experience anxiety if seen from a cognitive perspective, they are constantly worried and anxious so that it is very difficult for them to concentrate on receiving learning. From the motor aspect, students who experience anxiety will be nervous and tremble which ultimately results in difficulty in expressing. Meanwhile, from the somatic aspect, not much is visible because it arises from within the body, such as heart palpitations and increased blood pressure. However, there are several things that can be observed, one of which is the body sweating. The anxiety experienced by students can also be seen from affective indicators. Students who experience anxiety will usually appear restless and irritable (Hasniati, 2017).

Previous research that discussed anxiety was research conducted by Rizal which showed that students experiencing anxiety could have an impact on learning outcomes (Rizal, 2011). This statement is also supported by research conducted by Solihah which states that if the level of anxiety experienced by students is high it can affect learning outcomes (Solihah & Liana, 2017). Apart from that, research related to anxiety was also carried out by Kodirun, whose research found that anxiety had a significant negative relationship with learning outcomes (Kodirun et al., 2019). One solution that can be applied to reduce anxiety is through appropriate learning methods and models (Rudiansyah et al., 2016).

Learning methods are ways that teachers use to implement plans that have been prepared systematically, structured, and aimed at achieving learning goals. An appropriate learning method is a learning method that can reduce various kinds of problems experienced by students during teaching and learning activities. Using appropriate learning methods can attract students' attention. Then the learning model is a conceptual framework that describes systematic procedures in organizing learning experiences to achieve certain learning goals (Sutikno, 2016). The learning model is able to provide useful information for students in the learning process (Asyafah, 2019). One learning model is self-regulated learning.

Self-regulated learning is learning where learning activities are more controlled by students. The self-regulated learning model makes students have independence in learning. According to (Kristiyani, 2016) defines that self-regulated learning is proactive involvement in learning activities, where students direct their thoughts, feelings and actions to be carried out systematically in accordance with the goals. Through the self-regulated learning model, students monitor their own goals, motivation and learning process. Students who have self-regulated learning usually learn independently by tapping from the heart. The self-regulated learning model is designed and managed in such a way that it is able to encourage students to regulate and organize their own experiences into new knowledge (Surawan et al., 2018).

The SAVI method is a learning method that consists of somatic, auditory, visual and intellectual. Somatic means learning through body movements and auditory means learning through sound. Meanwhile, visual is learning through pictures or observations. Lastly, intellectual, namely learning through problem solving (Kristiani, 2014). According to (Kurnianingtyas, 2017) the SAVI method can train students to think independently and be able to express their opinions. So that learning through the self-regulated learning model combined with the SAVI method can

integrate student independence and the role of students in creating their own understanding through somatic, audio, visual and intellectual means. Learning through the use of all senses will be more meaningful for students. The advantage of the SAVI method is that the understanding learned is formed through learning experiences, so the material will remain recorded in the brain. Apart from that, with the SAVI method, students become more active and enthusiastic. So that indirectly the independence of students will be visible and formed. According to Kurnianingtyas, the SAVI method can train students to think independently and be able to express their opinions (Septikasari, 2018).

Based on the results of a preliminary study conducted at State Islamic Boarding School 2 Ponorogo, it was found that the average student found it difficult to understand science material optimally. This statement is supported by the average score obtained which is below the KKM, namely 74.4. Based on the overall average of the anxiety aspects, a score of 74.8% was obtained, meaning that students experienced moderate anxiety. According to the majority of students, science is a subject that is classified as difficult. The large amount of memorizing material coupled with complicated formulas adds to students' learning anxiety. In addition, if the teacher suddenly asks questions randomly, even though the material has not been mastered optimally, it will increase students' worry and anxiety. Based on the problems that have been explained, researchers are interested in conducting research entitled the effectiveness of self-regulated learning using the SAVI method to reduce anxiety about learning science.

METHOD

The research was carried out using a quantitative approach, namely experimental. The type of experimental research used is quasi-experimental with pretest posttest design. The research was carried out from January to March at MTsN 2 Ponorogo. The sampling technique is carried out through probability sampling by type cluster random sampling. The population came from class VII, totaling 331, with the research samples chosen being classes VII F and VII H. The sampling technique was through cluster random sampling. The flow of the research carried out is shown in Figure 1.

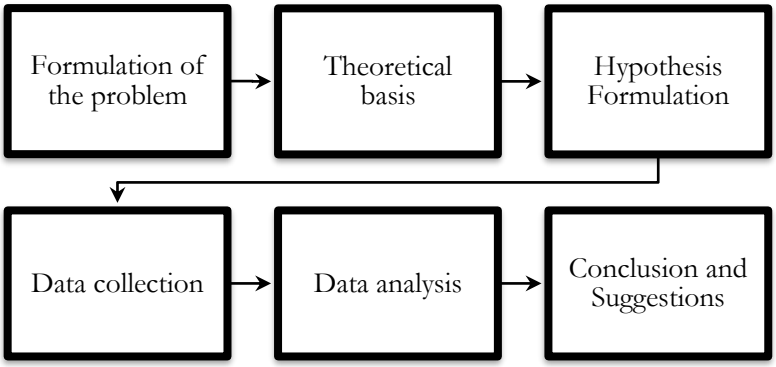

Figure 1. Quantitative Research Flow

The flow of research carried out is First, problem formulation based on problems that occur in the field. Second, based on the problem formulation that has been determined, researchers look for various relevant theories. Third, formulate a hypothesis based on an appropriate theory. Then proceed with data collection. Fourth, collecting data, researchers determined the population, namely class VII with samples from class VII F and VII H. Before conducting research, the instruments to be used were validated with validators first. The validated instrument was tested on 13 students and to determine the validity of an instrument it was

processed using SPSS 22 software. The assessment carried out included all aspects of the instrument used, namely: teaching module, observation sheet, anxiety questionnaire sheet, pre-test sheet, and post-test. Instrument assessment score guidelines refer to the guideline formula for calculating validator questionnaire scores according to Sari and Suswanto.

$$P = \frac{\sum \quad x}{\sum \quad y} \, x \, 100\%$$

Information:
P = Value.
Σx = Total score.
Σy = Maximum score (Sari & Suswanto, 2017).
So it can be calculated and produce a scoring scale as follows

Table 1. Instrument Validation Assessment Criteria

No	Average Score Interval	Criteria
1.	$81{,}25 < Score \leq 100$	Very Worth It
2.	$62{,}5 < Score \leq 81{,}25$	Worth It
3.	$43{,}75 < Score \leq 62{,}5$	Not Worth It
4.	$25 < Score \leq 43{,}5$	Not feasible

(Source: Auliya & Lazim, 2020)

Fifth, data analysis was carried out through descriptive statistics and inferential statistics. Based on descriptive statistical analysis, the data is presented in the form of tabulated tables, graphs, diagrams, or by presenting the characteristics of concentration measures and dispersion measures (Arifin, 2014). Prerequisite tests carried out include normality tests and homogeneity tests using SPSS 22 for Windows statistical software. The inferential statistical tests carried out were the T Two tailed and T One tailed tests using Minitab, the N gain test, the ANCOVA test, and the Cohen Effect Size test. The N gain score classification criteria used to measure the level of difference seen from the pretest and posttest scores consist of 3 categories.

Table 2. N gain Score Categorization

No	Average Score Interval	Criteria
1.	$N-Gain \geq 0{,}7$	High
2.	0,3 – 0,7	Currently
3.	0,00 – 0,29	Low

(Sumber: Supriadi, 2021)

So, in order to provide an interpretation of the effectiveness of N-Gain, the following criteria are used table 3.

Table 3. N gain Effectiveness Criteria

No	Score % N-Gain	Criteria
1.	< 40	Ineffective
2.	40 – 55	Less effective
3.	56 – 75	Quite effective
4.	76 – 100	Effective

(Sumber: Supriadi, 2021)

Apart from that, an effect size test is also carried out which plays a role in understanding the magnitude of the differences found in a research experiment. Effect size not only measures whether research is effective or not, but also explains how big the effect of this effectiveness is.

Table 4. Effect Size Classification

D Score	Criteria
0,00 – 0,20	Weak effect
0,21 – 0,50	The effect is rather weak
0,51 – 1,00	Medium effect
> 1,00	Strong effect

(Sumber: Cohen dalam Indrayati, 2018)

The data that has been processed is then analyzed to answer the hypothesis and ends with conclusions and suggestions. To categorize anxiety experienced by students according to table 5.

Table 5. Category of Learning Anxiety

No	Average Score Interval	Criteria
1.	$71{,}5 < Score \leq 88$	Panic
2.	$55 < Score \leq 71{,}5$	Severe Anxiety
3.	$38{,}5 < Score \leq 55$	Moderate Anxiety
No	**Average Score Interval**	**Criteria**
4.	$22 < Score \leq 38{,}5$	Mild Anxiety

(Source: Djemari dalam Hastogiri, 2016)

RESULT AND DISCUSSION

The application of the self-regulated learning model using the SAVI method at MTsN 2 Ponorogo is because students find it difficult to understand science, considering that science material is very complex and requires more understanding. When students have difficulty understanding the material, students will feel anxious and afraid, causing anxiety. Therefore, researchers are trying to overcome the anxiety felt by students when learning science by implementing a self-regulated learning model using the SAVI method.

The implementation of the learning process using the self-regulated learning model at MTsN 2 Ponorogo is actually an effort to realize the success of teaching and learning activities. The teaching and learning process is a step or sequence of implementation in which there are interaction activities between the teacher and students which take place in an educational situation to achieve learning objectives. Implementation of learning is the implementation of learning activities as planned. In this research, researchers used a self-regulated learning model with the SAVI method for the experimental class and a conventional learning model for the control class. The self-regulated learning model using the SAVI method has 7 stages including analysis, planning, implementation, observation of understanding, problem solving, evaluation and modification. The values per syntax of the three meetings are shown in table 6.

Table 6. Implementation of Learning

	Syntaks	Meeting			Total	Score	Criteria
		1	2	3			
1.	analysis	3	3,5	4	10,5	87	Very good
2.	Plan	4	4	3	11	91	Very good
3.	Im	4	4	4	12	100	Very good
4.	Obserion of understanding	4	4	3	11	91	Very good
5.	Problem solving	4	4	4	12	100	Very good
6.	Evaluation	4	3	4	11	91	Very good
7.	Modification	4	4	4	12	0	Very good
	Total	27	25,5	21,5	84	95	Very good

The application of the SAVI method in research is that through the somatic element, students are involved in working on LKPD in groups, through the audio element, students are invited to memorize the material with songs and presentations, through the visual element, students are shown PPT and observe pictures, finally, through the intellectual element, students are given problems in the LKPD. The overall observer assessment results during three meetings using the self-regulated learning model with the SAVI method obtained a final score of 95 and was included in the very good category.

Beside that, the following are student activities during three meetings in accordance with the syntax of self-regulated learning using the SAVI method. The results of the observer's assessment are in table 4, overall during the three meetings a final score of 90 was obtained, which is in the very good category. This means that students' activities are in accordance with the self-regulated learning model using the SAVI method very well. The values per syntax of the three meetings are shown in table 7.

Table 7. Student Activities

No	Syntaks	Meeting			Total	Score	Criteria
		1	2	3			
1.	Analysis	3	3	4	10	83	Very good
2.	Plan	4	4	3,5	11,5	95	Very good
3.	Implementation	3	3	4	10	83	Very good
4.	Observation of understanding	3	4	3	10	83	Very good
No	**Syntaks**	**Meeting**			**Total**	**score**	**Criteria**
5.	Problem solving	3,5	4	3,5	11	91	Very good
6.	Evaluation	3,5	3,5	4	11	91	Very good
7.	Modification	4	4	4	12	100	Very good
	Total	24	24,5	26	75,5	90	Very good

The effectiveness of the self-regulated learning model using the SAVI method to reduce anxiety learning science in this research contains several implementations. Firstly, this research was carried out using a self-regulated learning model with the syntax of analyzing, planning, implementing, observing understanding, problem solving, evaluating and modifying. The research was conducted based on the syntax of the self-regulated learning model, but it also contains SAVI elements in the form of Somatic, Audiotory, Visual and Intellectual.

Through the self-regulated learning model, students are given the freedom to effectively manage their own learning through various methods, so that the results obtained will be maximized (Surawan et al., 2018). Apart from that, the self-regulated learning model makes students motivated individually and in groups and ultimately makes students enthusiastic about learning. The use of the self-regulated learning model makes students have independence in completing tasks given by the teacher according to the initiative. Apart from that, it can make

students have persistence and high enthusiasm for learning and have strategies in their learning (Sihaloho, 2016). Additionally, the SAVI method is applied in learning activities. According to (Kurnianti, 2016) the SAVI method is learning that involves all the senses to achieve maximum goals. Apart from that, the SAVI method is also defined as learning by maximizing cognitive, affective and psychomotor aspects. The SAVI learning method involves a lot of physical movement which makes students happier in learning the material (Fadly, 2022).

Based on observations made by students in the experimental class using the self-regulated learning model with the SAVI method, they appeared enthusiastic and interested compared to the control class. The SAVI method which consists of somatic, auditory, visual and intellectual is applied to science learning. First, in the somatic element, learning activities are carried out by involving the sense of touch or hands, mainly using the physical or body in learning activities. Second, the auditory element of learning through speaking and listening. Third, the visual element of learning activities utilizes the sense of sight. Fourth, the intellectual element of learning activities is carried out by providing problems to students. Through the SAVI method with a self-regulated learning model, students find their own understanding through somatic, audio, visual and intellectual means, so that the material will be absorbed well.

Judging from learning anxiety, the average student experiences anxiety learning science. This is because science is a subject that requires deeper understanding than other subjects, considering that the material contained in science is abstract material. So students often find it difficult to understand the material. The difficulty of understanding this learning can also be caused by students' learning anxiety. According to (Hasniati, 2017) anxiety is an emotional state experienced by a person with a physiological and psychological response of feeling unsafe because they think that something bad might happen, so that a person or in this context a student becomes worried and anxious in learning science. Therefore, to find out the initial anxiety experienced by students, they were given a learning anxiety questionnaire first before being given treatment in both the experimental and control classes.

Based on the results obtained, the majority of students experienced anxiety in the moderate category as in figure 2. Students who experience mild anxiety look calm and confident. Then students who experience anxiety have decreased attention, are easily confused, and start to sweat when asked by the teacher to make a presentation. Students who experience severe anxiety look afraid and tremble. Finally, at the panic level, only a few respondents experienced it, they were unable to focus on an event.

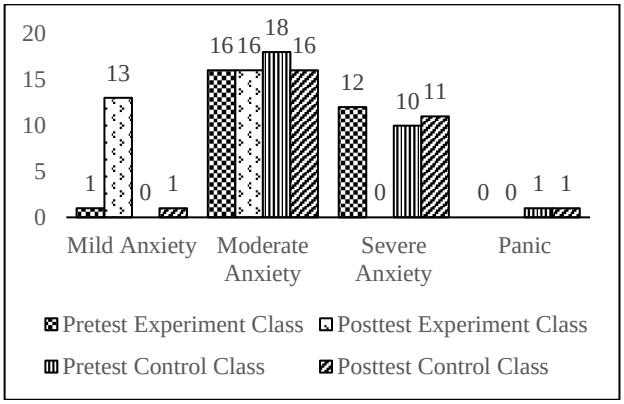

Figure 2. Distribution Graph of Categorization of Science Learning Anxiety for Experiment Class and Control Class

The learning anxiety experienced by students in the experimental class decreased according to table 5. Based on the results of the N gain test on the learning anxiety questionnaire, it turned out that after being treated with the self-regulated learning model using the SAVI method, students' learning anxiety decreased in each aspect.

Tabel 7. Differences in N-gain Values of Experimental Class Science Learning Anxiety and Control Class

Class	Mean	Skor N-gain	Kategori
Experiment	48,31	-0,27	Failed/No upgrade
Control	54,65	0,035	No upgrade

Based on table 5, it can be seen that the mean value in the experimental class was 48.31 with an N gain score of -0.27 or -27%, meaning that there was no increase because the N gain value was negative. The control class also did not experience an increase. However, despite this, if we observe each aspect, namely the cognitive, motor, somatic and affective aspects, there has been an increase.

The effectiveness of the self-regulated learning model using the SAVI method can be seen from the results of statistical tests, namely the N gain test, T test and Cohen's effect size test. Based on the N gain value obtained by the experimental class with the self-regulated learning model using the SAVI method, it is in the high category with the increase in learning outcomes being in the medium category, so it can be said that the self-regulated learning model using the SAVI method is effective to apply compared to the control class using conventional learning models. This is proven by the N gain value in the control class being in the low category where student learning outcomes have not increased, so it can be said that applying the conventional learning model is not effective in reducing anxiety about learning science.

Apart from that, the effectiveness of the self-regulated learning model using the SAVI method to reduce anxiety in learning science is also proven by the results of the t-test, both through the two-tailed t-test and the one-tailed t-test. Based on the tests that have been carried out, it is known that the experimental class that uses the self-regulated learning model using the SAVI method is proven to be better than the control class that uses the conventional learning model. Apart from that, the anxiety of studying science experienced by students in the experimental class also decreased to the mild anxiety category. According to the opinion of (Kristiyaningsih et al., 2022) excessive levels of anxiety can influence students' learning behavior for the worse, however if the level of anxiety experienced by students is in the low category it influences good learning behavior. The effectiveness of the self-regulated learning model using the SAVI method is also supported by the results of the Cohen's d effect size test.

Table 6. Cohen's Effect Size Test Results for Experimental Class and Control Class

	Experimental Class	Control Class
Mean	42,6206	55,6551
Standar Deviasi	6,37026	9,6821
Effect Size	1,59	

Based on table 6, it can be seen that the mean anxiety value in the experimental class was 42,62 with a standard deviation of 6,37. Meanwhile, in the control class, the mean value was 55,65 with a standard deviation of 9,68. The results of the Cohen size effect test obtained a value of 1,59 > 1,00. This means that there is a strong effect, so it can be concluded that the use of the

self-regulated learning model with the SAVI method has a strong effect on students' learning anxiety. To make it clearer, look at the figure 3.

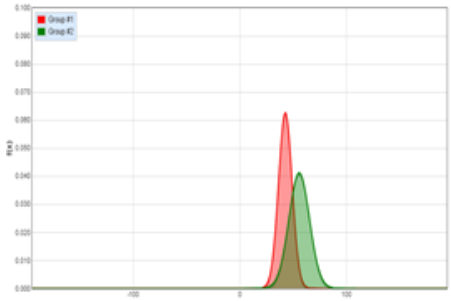

Figure 3. Graph of Effect Size Test Results for Anxiety for Experimental Class and Control Class

That group one is red, which indicates the experimental class. Meanwhile, group two is green, indicating the control class. The graph in Figure 3 shows that the use of the self-regulated learning model with the SAVI method has a higher effect compared to the control class. Apart from that, based on learning achievement indicators, the self-regulated learning model using the SAVI method can also be said to be effective. This is because through the self-regulated learning model using the SAVI method students are able to achieve learning goals well. This is in line with the opinion of (Setyosaro, 2014) which states that learning is said to be effective if it succeeds in achieving the learning objectives as expected by the teacher.

Science learning anxiety consists of several aspects, namely cognitive, motor, somatic and affective. Based on the results of the N gain test on the learning anxiety questionnaire, it turns out that after being treated with the self-regulated learning model using the SAVI method, students' learning anxiety decreased in each aspect. First, in the cognitive aspect, there was a decrease in the average anxiety score. In this aspect, it can be seen that students remember the material more easily after learning using self-regulated learning with the SAVI method. Through this learning model, students find their own understanding according to their learning style, whether through somatic, audio, visual or intellectual. Second, there was also a decline in the motor aspect, this was proven by the fact that students looked calm and did not tremble when science learning took place, especially during presentations. Third, in the somatic aspect, based on the science learning anxiety questionnaire, students do not feel symptoms of severe anxiety when using the self-regulated learning model with the SAVI method. Fourth, in the affective aspect, students no longer experience excessive anxiety and tension compared to before.

Apart from that, the effectiveness of the self-regulated learning model using the SAVI method to reduce anxiety in learning science is also proven by the results of the t-test, both through the two-tailed t-test and the one-tailed t-test. Based on the tests that have been carried out, it is known that the experimental class that uses the self-regulated learning model using the SAVI method is proven to be better than the control class that uses the conventional learning model. Apart from that, the anxiety of studying science experienced by students in the experimental class also decreased to the mild anxiety category.

Learning by applying the self-regulated learning model is an integration of student activity. The integration of the self-regulated learning model with the SAVI method provides students with the opportunity to find their own understanding according to the type of learning pattern, whether through somatic, audio, visual or intellectual. So the material studied will be easy to remember. The implication of implementing the self-regulated learning model using the SAVI method is that it can produce dynamic and sustainable learning. This means that what is done is

able to keep up with developments and changes over time so that in the learning process students are able to integrally adapt to the competencies they have as a result of the learning process (Adryansah, 2023). Apart from that, the self-regulated learning model using the SAVI method is suitable when applied to the independent curriculum because it is able to help teachers diagnose students' learning anxiety conditions before learning activities are carried out, especially in science subjects.

CONCLUSION

Based on research that has been carried out using the self-regulated learning model using the SAVI method to reduce anxiety about learning science, it can be concluded that 1) The implementation of the self-regulated learning model using the SAVI method to reduce anxiety about learning science is different from classes that use conventional learning models. So it can be said that learning is carried out well and effectively, 2) Student activities during learning take place through the self-regulated learning model using the SAVI method look enthusiastic and actively involved. And did not show any signs of anxiety compared to classes that used conventional learning models. 3) The effectiveness of the self-regulated learning model using the SAVI method to reduce anxiety learning science based on the results of data analysis, there is an average difference with the control class. There was an increase in students' understanding of knowledge using the self-regulated learning model with the SAVI method and students' anxiety decreased. Teachers should apply the self-regulated learning model using the SAVI method, because it is effective in reducing anxiety about learning science. Indirectly, this learning model and method involves active students through a group work system to find their own understanding. Apart from that, in this learning model, students also present the results of their knowledge discoveries. So that indirectly, through group work and presentations, students become more independent and able to solve the problems they face. However, the application of this model and method must be considered first before being implemented because it requires a lot of learning media.

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