KULIDAWA
Journal of Biology Education
e-ISSN: 2722-015x
https://ejournal.iainkendari.ac.id/index.php/kulidawa
Vol.5, No.1, Mei 2024, Pages: 30-40
DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

The Influence of the Science, Environment, Technology, and Society (SETS) Learning Model on Science Learning Outcomes for Grade VII Students on the Topic of Nature of Science and Scientific Methods

Nur Hikmah[1)*], Cita Zulhijah[2)], Ismaun[3)], Halmuniati[4)]
[1)*2) 3)] Science Education, IAIN Kendari, Indonesia
[4)] Physics Education, IAIN Kendari, Indonesia
*Correspondence email: hikmahjaddid@gmail.com

Article History	:	
Received	:	May 28, 2024
Revised	:	July 07, 2024
Accepted	:	July 08, 2024
Published	:	July 09, 2024

ABSTRACT
This research aims to: 1) interpret the influence of the Science, Environment, Technology, and Society (SETS) learning model on the science learning outcomes of grade VII students on the learning topic of the nature of science and scientific methods; 2) interpret the implementation of each stage of the SETS learning model. The present study is quantitative research carried out at SMP Negeri 15 Kendari from August to September 2023. The research sample included grade VII_1 students as the control class and grade VII_2 as the experimental class. The data collection technique for this research is tests that are analyzed descriptively and inferentially, as well as observations, to interpret the implementation of the SETS learning model. The results show that: 1) hypothesis test results show that the value of $t_{calculated}$ is 98.96 > t_{table} 1.67 , so it can be concluded that the SETS learning model influences students' science learning outcomes in the nature of science and scientific method material; 2) the teacher and student experienced difficulties when the SETS learning model was applied to the topic of nature of science and scientific methods at the stages of invitation, concept introduction, application and evaluation, yet, they did not experience difficulties at the exploration stage.
Keywords: SETS; Science Learning Outcomes; Nature of Science and Scientific Method

INTRODUCTION
Science education plays an important role in developing students' critical thinking abilities as the process manifests from effective scientific reasoning such as collecting, analyzing, and evaluating data, as well as developing strong arguments (Butcher et al., 2023). At the junior high school level, understanding the nature of science and scientific methods becomes an important basis for students to understand more complex scientific concepts at higher levels of education in the future. However, many students still have difficulty understanding these basic concepts. The situation can be caused by various factors, one of which is the use of conventional learning models that are less effective and not contextual.

Conventional learning models often emphasize providing information directly without actively involving students in the learning process (Fransiska et al., 2018). Such models tend to make students passive and less involved in learning activities. Active student involvement is very important to build a deep understanding of scientific concepts.

One learning model that is considered capable of overcoming these problems is the Science, Environment, Technology, and Society (SETS) learning model. The SETS model integrates aspects of science, environment, technology, and society in learning (Wijayama, 2019). This learning model invites students to understand scientific concepts in real-life contexts, making learning more meaningful and relevant. Students will engage more when the science learning is transferable to daily life (Jimenez & Alvarez-Hevia, 2021), and as a result, it will directly impact student learning outcomes.

Interviews with the grade VII science teacher at SMP Negeri 15 Kendari suggest that science learning material is essential and compulsory. However, so far, the teacher has assumed that her students always feel a lack of self-confidence, which makes them quiet, less communicative in class, and lack the confidence to deliver presentations in front of the class. In addition, students feel that there is too much science material, which makes them uninterested and causes them to lack concentration in learning activities. This results in low science learning outcomes for students. For example, in one of the materials on the nature of science and scientific methods, most students still scored below the Minimum Completeness Criteria/KKM of 73. Whereas, the material on the nature of science and scientific methods has been taught by various learning models, such as cooperative learning and direct instruction learning. However, these models have not maximized students' science learning outcomes.

The present study, therefore, offers a solution by applying the SETS learning model to the learning topic of the nature of science and scientific methods, assuming that these two variables have a positive correlation. The SETS learning model not only helps students understand scientific concepts more deeply and contextually, but also develops critical and creative thinking skills, scientific method skills, and increases student motivation and involvement in the learning process. Integrating technology and environmental and social awareness emphasized in the SETS model makes it very relevant and effective for grade VII science material.

Previous research shows that the SETS learning model can increase interest, motivation, understanding of concepts, learning activities, and student learning outcomes regarding science concepts by increasing student involvement in learning activities. (Dewi et al., 2020) found that the SETS learning model positively improved students' science learning outcomes, especially those related to students' scientific attitudes. (Rahmawati, 2022)'s study suggests that the SETS learning model improved student learning outcomes during two learning cycles of grade VII science material regarding environmental pollution and improved students' science attitudes and skills. These two studies have shown the influence of the SETS learning model on various educational variables. However, research that specifically examines the influence of the SETS learning model on science learning outcomes in the learning topic of nature of science and scientific methods in grade VII is still limited. Hence, it is necessary to conduct a study on this matter. Therefore, it is hoped that this research can describe the influence of the SETS learning model on the science learning outcomes of grade VII students on the nature of science and scientific methods and can contribute to developing more effective and relevant learning models in science learning in junior high schools.

RESEARCH METHOD

A. Types of Research

The present study is quantitative research, using a quasi-experimental method to look at the effect of a treatment on the dependent variable. The research was carried out in two classes, namely the control class receiving conventional learning model treatment (i.e. direct instruction model), and the experimental class receiving treatment with the Science, Environment, Technology and Society (SETS) learning model.

B. Research Location and Time

This research was carried out at SMP Negeri 15 Kendari, from August to September 2023.

C. Research Population and Sample

The population of this research is all grade VII students of SMP Negeri 15 Kendari for the 2023/2024 academic year, consisting of four classes, with the following details.

Table 1. Research population

Class	**The number of students**	**Average daily test score***
VII1	24	66.50
VII2	24	64.41
VII3	26	59.57
VII4	26	70.38
Total	100	

* : Average value of daily tests on previous learning topic

(Data source: Science Teacher of Grade VII at SMP Negeri 15 Kendari)

Based on the population data, the research sample was determined using a purposive sampling technique, where the sample was selected with special considerations, which is the number of students and the similar average daily test scores, so class VII_1 and class VII_2 were chosen. Next, the determination of the experimental class and control class was carried out randomly with the assumption that both classes had students with homogeneous abilities. It was then decided that class VII_1 was the control class and class VII_2 was the experimental class.

D. Research Design

This study used a non-equivalent control group design, which can be seen in Table 2.

Table 2. Research Design

Group	Pretest	Treatment	Posttest
Experiment	O1	X	O2
Control	O3	-	O4

Information:

O1 : Experimental class pretest
X : SETS learning model treatment
O2 : Experimental class posttest
O3 : Control class pretest
\- : There is no special treatment from researchers (using conventional learning models)
O4 : Control class posttest

(Abraham & Supriyati, 2022).

E. Data Collection Techniques and Research Instruments

1. Test;

   This research uses a pretest and posttest system, to determine differences in learning outcomes at the beginning and at the end of the learning topic of nature of science and scientific methods. The test instruments can be seen in Table 3.

https://ejournal.iainkendari.ac.id/index.php/kulidawa
Vol.5, No.1, Mei 2024, Pages: 30-40
DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

Table 3. Matrix of Test instruments

Learning indicators	Cognitive Domain of Anderson & Krathwohl's Taxonomy	Question Number
Mentioning the branch of biology that studies living things	C1	2
Mentioning the science that studies the reciprocal relationship between living things and the environment	C1	1
Identifying the science of Paleontology	C1	3
Understanding science	C2	7
Applying equipment in the laboratory	C3	9
Sequencing a flow of using scientific methods	C3	14
Understanding objectives of an experiment that can be investigated	C2	17
Understanding Albert Einstein	C2	18
Understanding functions of laboratory equipment	C2	8
Mentioning a variable	C1	6
Analyzing scientific attitudes in carrying out scientific methods	C4	10
Analyzing branches of science	C4	12
Identifying an experiment	C1	15
Analyzing hazards of chemicals	C4	4
Combining a variable	C6	5
Selecting the correct measurement statement	C4	20
Understanding types of tools for measuring materials	C2	22
Concluding the definition of natural science	C5	21
Adjusting between derived quantities and their units	C3	23
Understanding a process of scientific skills	C2	25
Analyzing dangerous symbols in the laboratory	C4	24
Analyzing security precautions	C4	26
Understanding a statement regarding test tubes	C2	11
Implementing things in accordance with the rules of accidents in the laboratory	C3	13
Taking precautions against chemicals	C3	16
Developing a procedure for lighting a Bunsen burner	C6	27
Linking physics principles	C4	19
Understanding the definition of physics	C2	30
Formulating the functions of a science laboratory	C6	28
Determining the activities for reporting experimental results	C3	29

2. Observation

Observations in this research were carried out to understand and interpret the implementation of the SETS learning model in learning activities and its influence on science learning outcomes regarding the nature of science and scientific methods. The instruments for the observation technique can be seen in Table 4.

KULIDAWA
Journal of Biology Education
e-ISSN: 2722-015x
https://ejournal.iainkendari.ac.id/index.php/kulidawa
Vol.5, No.1, Mei 2024, Pages: 30-40
DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

Table 4. Observation sheet on the implementation of the SETS learning model

No	Observed Aspects	Score			Note
		2	1	0	
I	**Introduction (Invitation Stage)**				
	a. Implementation of apperception				
	b. Encouraging motivation				
	c. Delivery of the targeted learning objectives				
	d. Group division				
II	**Core activities**				
	a. Exploration Stage contains experiments or physical activities, making observations using the five senses, social interactions, and decision making				
	b. Concept Introduction Stage contains discussions guided by the teacher by providing a context so that students can actively ask questions with the aim of clarifying the scientifically obtained knowledge				
	c. Application Stage in the form of additional activities to apply the concepts obtained in different contexts				
III	**Closing**				
	a. Evaluation Stage contains an assessment for learning outcomes during the implementation of the learning model				
	b. Implementation of feedback on learning activities				
	c. Advising the upcoming learning material				

Score Description:
2 : Executed
1 : Not implemented enough
0 : Not implemented

(Kadir, 2016).

F. Data Analysis Technique

The present study uses descriptive and inferential statistical data analysis techniques. Descriptive statistical analysis was carried out to calculate the average (mean), maximum value, minimum value, variance, and standard deviation to interpret trends in variables of students' science learning outcomes. Inferential analysis was carried out to calculate the normality test, homogeneity test, hypothesis test, and n-gain test to interpret the influence and significance of using the SETS learning model on the science learning outcomes of grade VII students on the learning topic of nature of science and the scientific method.

The normality test uses the Shapiro Wilk model with the provisions that H_0 is normally distributed data, and H_1 is not normally distributed data. The criteria used in the normality test are if the calculated-significance > α-significance 0.05, then H_0 is accepted (the data is normally distributed); and if the calculated-significance < α-significance 0.05, then H_0 is rejected (the data is not normally distributed).

The homogeneity test uses the F test model, with the condition that H_0 is an assumption that the data groups come from samples that have the same variance

e-ISSN: 2722-015x
https://ejournal.iainkendari.ac.id/index.php/kulidawa
Vol.5, No.1, Mei 2024, Pages: 30-40
DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

(homogeneous), and H_1 is an assumption that the data groups come from samples that have different variances (not homogeneous). The criteria used in the homogeneity test are if $F_{count} < F_{table}$, then H_0 is accepted (homogeneous data); and if $F_{count} > F_{table}$ then H_0 is rejected (inhomogeneous data).

Hypothesis testing uses the t test model, with the condition that H_0 is a statement that there is no influence of the independent variable (SETS learning model) on the dependent variable (students' science learning outcomes), and H_1 is a statement that there is an influence of the independent variable (SETS learning model) on the dependent variable (students' science learning outcomes). The criteria used in the hypothetical test are if $t_{count} > t_{table}$, then H_1 is accepted (there is an influence); and if $t_{count} < t_{table}$ then H_1 is rejected (no influence).

RESULTS AND DISCUSSION

Descriptive Analysis

The results of descriptive statistical analysis of student learning outcomes in the experimental class, which applies *the Science*, *Environment*, *Technology*, *and Society* (SETS) learning model and the control class, which applies the conventional model, can be seen in Table 6.

Table 6. Data on learning outcomes for the experimental class and control class

Statistics	**Prettest**		**Posttest**	
	Experimental class	**Control class**	**Experimental class**	**Control class**
N	24	24	24	24
Average (*Mean*)	57.67	48.83	67.67	56.00
Maximum Value	72	56	96	68
Minimum Value	52	40	76	52
Variance	22.14	20.84	41.62	16.70
Standard Deviation	4.71	4.57	6.45	4.09

Table 6 shows that the variance and standard deviation of the pretest variance and standard deviation values in the experimental and control classes are almost the same, thus proving that the students' abilities in both classes are almost the same. Magdalena et. al. (2021) explain that giving a pretest is one of the first steps to ensure equality in students' initial abilities. The pretest is also used to read and understand students' initial abilities regarding the learning topic. In the present study, researchers can interpret which indicators of the learning topic of the nature of science and scientific methods that students do not understand so that the treatment given will be more optimal. Furthermore, the experimental class's posttest scores differed from the control class, where descriptive statistics showed that the posttest variance and standard deviation values for the experimental class were higher than those in the control class. This data shows that the treatment given in the experimental class has more influence on learning outcomes than the control class; however, to see the significance and validity of the data, it proceeded to inferential analysis.

Inferential Analysis

Normality test

The results of the normality test for students' learning outcomes on the topic of nature of the nature of science and scientific methods in the experimental class and the control class can be seen in Table 7.

https://ejournal.iainkendari.ac.id/index.php/kulidawa
Vol.5, No.1, Mei 2024, Pages: 30-40
DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

Table 7 Normality Test Results of Learning Outcomes

Treatment	Variable	Mark Significance	Information
Pretest	Experimental Class	0.006	Not Normally Distributed
	Control Class	0.269	Normally Distributed
Posttest	Experimental Class	0.581	Normally Distributed
	Control Class	0.003	Not Normally Distributed

Note: Sig.α value = 0.05

Table 7 shows that two data are not normally distributed, which are the experimental class pretest data and the control class posttest data because they do not meet the basis for decision-making in the Shapiro Wilk normality test, which assumes that if the calculated significance value < α significance, then H_1 is accepted (data is not normally distributed). A non-parametric test was then carried out for the two learning outcome variables, which obtained data with a calculated significance value of 0.000. The decision-making in non-parametric tests is that if the calculated significance value is < α significance, then H_0 is accepted, enabling data analysis to be continued at the homogeneity test stage.

Homogeneity Test

Table 8 shows the homogeneity test results for students' science learning outcomes on the nature of science and scientific methods in the experimental and control classes.

Table 8. Results of the Homogeneity Test of Learning Outcomes

Treatment	Class	N	F_{count}	F_{table}
Pretest	Experiment	24	1.06	3.20
	Control	24		
Posttest	Experiment	24	2.49	3.20
	Control	24		

Table 8 shows that the F_{count} value in the experimental class and control class for the pretest treatment is 1.06, while the F_{count} value in the experimental class and control class for the posttest treatment is 2.49. These two values have a value < F_{table} at 3.20, which is based on the rule of decision-making in the homogeneity test, in which if the F_{count} < F_{table}, then H0 is accepted, allowing data analysis to be continued at the hypothesis testing stage.

Hypothesis testing

Hypothesis testing was only carried out on the posttest treatment of the experimental class and control class. The pretest treatment did not apply hypothesis testing because it was assumed that both classes had the same academic abilities before the SETS learning model treatment, so it would not influence the final results. The posttest hypothesis test results for the experimental class and control class can be seen in Table 9.

Table 9. *Posttest* Hypothesis Test Results for Experimental and Control Classes

Variable	DK	T_{count}	T_{table}
$\mu1 - \mu2$	45	98.96	1.67

Table 9 shows that the T_{count} value is 98.96 > the T_{table} value is 1.67. Based on the decision making in hypothesis testing, if the value of T_{count} > T_{table} then H1 is accepted. Therefore, it can be concluded that there is an influence of the SETS learning model on the science learning outcomes of grade VII students in the topic of nature of science and scientific methods.

Elaboration of the significance of the SETS learning model on students' science learning outcomes on the nature of science and scientific methods can be seen in the implementation of the SETS learning model during learning activities, which in detail can be

KULIDAWA https://ejournal.iainkendari.ac.id/index.php/kulidawa
Journal of Biology Education Vol.5, No.1, Mei 2024, Pages: 30-40
e-ISSN: 2722-015x DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

seen in Table 10.
Table 10. Results of the implementation of the SETS learning model through teacher's and students' activities

No		Observed Aspects	Scores / Meetings 1	Scores / Meetings 2	Total	x̄
I	**Introduction (Invitation Stage)**					
	Implementation of apperception					
	a	Teacher	2	2	4	2
	b	Student	1	2	3	1.5
	Implementation motivation					
	a	Teacher	2	2	4	2
	b	Student	1	2	3	1.5
	Implementation of delivery objective learning to be achieved					
	a	Teacher	2	2	4	2
	b	Student	2	2	4	2
	Group division					
	a	Teacher	2	2	4	2
	b	Student	2	2	4	2
II	**Core activities**					
	Exploration Stage					
	a	Teacher	2	2	4	2
	b	Student	2	2	4	2
	Introduction Stage Draft					
	a	Teacher	1	2	3	1.5
	b	Student	1	2	3	1.5
	Application Stage					
	a	Teacher	2	2	4	2
	b	Student	1	1	2	1
III	**Closing**					
	Evaluation Stage					
	a	Teacher	1	2	3	1.5
	b	Student	1	2	3	1.5
	Implementation of feedback on learning activities					
	a	Teacher	1	2	3	1.5
	b	Student	1	2	3	1.5
	Implementation of delivery of further learning material					
	a	Teacher	1	2	3	1.5
	b	Student	1	2	3	1.5

Based on Table 10, it is known that except for the exploration stage, all SETS stages were carried out not maximally. At the invitation stage, the teacher had maximally carried out all the steps in the learning activities. However, the students were less responsive to the steps in the activities carried out by the teacher, especially at the 1st step meeting to convey apperception and motivation, where the students did not respond to the triggering questions

https://ejournal.iainkendari.ac.id/index.php/kulidawa
Vol.5, No.1, Mei 2024, Pages: 30-40
DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

given by the teacher, so the teacher was having difficulty in developing students' motivation to learn. (Sukmawati et al., 2018) explain that the essence of the invitation stage is to stimulate students' interest so that they can observe and express their opinions about problems/phenomena that are happening in their environment so that students are better prepared to learn to analyze and evaluate solutions to solving these problems.

At the concept introduction stage, the teacher experienced difficulty accessing various reputable references regarding the material being discussed by the students. The situation impacts the accuracy of the data found and the validity and significance of the students' findings. (Nursamsudin, 2016) explains that the concept introduction stage requires teachers to direct students in finding and analyzing various reputable references to solve problems that students are discussing so that students have no doubts about the concepts they discover or new concepts developed based on the reference data. It expects teachers to understand how to find these references to avoid misconceptions.

At the application stage, the teacher requires students to be able to apply the results of their findings to the surrounding environment so that they have effective value for society. At this stage, the teacher had maximally carried out her role in guiding students. However, students could not optimally interpret and apply their findings' concepts to the surrounding environment. (Rohmatun & Rasyid, 2022) explain that the application stage allows students to use the concepts they have acquired during the exploration and concept introduction stages. In this case, students take real action to overcome problems arising from the invitation stage. Therefore, at the invitation stage, students must understand the problem to be solved to make the real action taken effective and significant. However, the data shows that students were less able to complete the invitation stage, resulting in negative impacts at the application stage.

At the evaluation stage, the teacher did not manage the time optimally. Based on the findings, it is known that the teacher focused on optimizing students' understanding of concepts because the students did not understand the material. The teacher took the initiative to use more time to overcome these problems. Eventually, the teacher had no time to provide material feedback to students because the learning time had run out. Khasanah (2015) in (Agus et al., 2022) explains that the evaluation stage requires teachers to reinforce the concepts that students have acquired during the learning process, ensuring that misconceptions do not occur and that students understand the material being studied.

Elaboration of the significance of the SETS learning model on students' science learning outcomes in the topic of the nature of science and scientific methods can also be seen in the application of each element of the SETS model, including science elements, environmental elements, technology elements, and society elements, in learning activities. In the science element, the students made green bean sprout extract using certain techniques to increase their understanding of the concept of good and correct scientific methods that students must use. In the environmental element, students have learned the positive and negative impacts of various materials used during practicum on the surrounding environment as they explored to understand and overcome these problems. Furthermore, with the technology element, students were able to develop their creative thinking skills in using laboratory equipment to create a natural product/fertilizer so that it does not have a negative impact on the environment. In the society element, the students have increased their social interaction by helping the community handle the growth of a propagule plant, the Barangan banana (*Musa acuminata Colla*), using the fertilizer they made. These elements were implemented in one unified material on the nature of science and scientific methods. (Arends, 2012) explains that in various teaching strategies (including SETS), a teacher must understand that the importance of experiments in science learning is to help students understand the scientific method and how to apply it in their community.

CONCLUSION

Based on the results and discussion, it can be concluded that: 1) the Science, Environment, Technology and Society (SETS) learning model has a positive effect on student learning outcomes at SMP Negeri 15 Kendari; 2) in the SETS learning model which was applied to the learning topic of nature of science and scientific methods, the teacher and students experienced several difficulties at the invitation, concept introduction, application and evaluation stages, yet they did not experience difficulties at the exploration stage.

IMPLICATIONS AND SUGGESTIONS

The findings of the present study can be used as a reference in implementing biology learning, especially in learning topics that involve activities in the laboratory using scientific methods and interacting with the surrounding natural environment, as it can provide an interesting learning experience and can increase students' motivation and learning outcomes. This research can be modified on other biological materials by using more interactive and interesting learning media, such as animation media, to display the SETS Model so that students can gain a more meaningful and in-depth learning experience.

ACKNOWLEDGMENTS

The authors would like to thank the Faculty of Education and Teacher Training of IAIN Kendari which has supported and assisted the authors in carrying out research, as well as SMP Negeri 15 Kendari which has accepted the authors to carry out research at the school.

BIBLIOGRAPHY

Abraham, I., & Supriyati, Y. (2022). Desain Kuasi Eksperimen Dalam Pendidikan: Literatur Review. *Jurnal Ilmiah Mandala Education*, *8*(3), 2476–2482. https://doi.org/10.58258/jime.v8i3.3800

Agus, M. A., Khaeruddin, & Ristiana, E. (2022). the Influence of Sets (Science, Environment, Technology and Society) Based Ipa Learning on Critical Thinking Ability of Students in Class V Elementary School. *Klasikal: Journal of Education, Language Teaching and Science*, *4*(2), 317–326.

Arends, R. (2012). *Learning to Teach. Connect, learn, succeed* (9th ed.). McGraw-Hill.

Butcher, K. R., Hudson, M., Lane, M., & Larson, M. (2023). Critical thinking during science investigations: what do practicing teachers value and observe? Teachers and Teaching, 29(6), 594–614. https://doi.org/10.1080/13540602.2023.2191186

Dewi, P. R., Arnyana, I. B. P., & Maryam, S. (2020). Pengaruh Model Pembelajaran IPA Terpadu Bervisi Sets (Science Environment Technology And Society) Terhadap Hasil Belajar dan Sikap Ilmiah Siswa SMP. *Wahana Matematika Dan Sains: Jurnal Matematika, Sains, Dan Pembelajarannya*, *14*(2), 177–187. https://ejournal.undiksha.ac.id/index.php/JPM/article/view/18323

Fransiska, L., Subagia, I. W., & Sarini, P. (2018). Pengaruh Model Pembelajaran Guided Discovery Terhadap Keterampilan Proses Sains Siswa Smp Negeri 3 Sukasada. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, *1*(2), 68. https://doi.org/10.23887/jppsi.v1i2.17214

https://ejournal.iainkendari.ac.id/index.php/kulidawa
Vol.5, No.1, Mei 2024, Pages: 30-40
DOI: https://dx.doi.org/10.31332/kd.v5i1.9183

Jimenez, A., & Alvarez-Hevia, D. M. (2021). Perceptions of primary school students toward learning about science: the case of Spain. *Education 3-13*, *50*(8), 1046–1058. https://doi.org/10.1080/03004279.2021.1929381

Kadir, A. (2016). Perbandingan Pengetahuan Lingkungan dan Sikap Peserta Didik Dalam Penerapan Model Pembelajaran SETS dan Konvensional. *Jurnal Hasil-Hasil Penelitian*, *11*(2), 1–18. https://doi.org/https://dx.doi.org/10.31332/ai.v11i2.451

Nursamsudin, I. (2016). Konsep dan Karakteristik Pendekatan Pembelajaran SETS (Science, Environment, Technology, Society) pada Pelajaran Kimia SMA. *Seminar Nasional Pendidikan 2016 "Peran Pendidikan, Sains, Dan Teknologi Dalam Membangun Intelektual Bangsa Dan Menjaga Budaya Nasional Di Era MEA," 1*, 450–461.

Rahmawati, E. (2022). Upaya Meningkatkan Hasil Belajar IPA pada Siswa Kelas VII MTs Negeri 5 Gunungkidul Melalui Pendekatan SETS. *IJAR: Indonesian Journal of Action Research*, *1*(2), 295–301. https://doi.org/https://doi.org/10.14421/ijar.2022.12-18

Rohmatun, H., & Rasyid, A. (2022). Model Pembelajaran SETS (Science, Environment, Technologi, Society) Berbantuan Media Video Terhadap Pemaham Konsep Siswa. *Seminar Nasional Pendidikan, "Transformasi Pendidikan Di Era Super Smart Society 5.0," 4*, 118–125. https://prosiding.unma.ac.id/index.php/semnasfkip/article/view/789

Sukmawati, N. M. S., Wibawa, I. M. C., & Antara, P. A. (2018). Pengaruh Model Pembelajaran Science Environment Technology Society Terhadap Hasil Belajar Ilmu Pengetahuan Alam. *Jurnal Ilmiah Sekolah Dasar*, *2*(3), 329. https://doi.org/10.23887/jisd.v2i3.16149

Wijayama, B. (2019). *Pengembangan perangkat pembelajaran IPA bervisi SETS dengan pendekatan SAVI*. Qahar Publisher.