

The Effect of the I-SETS (*Islamic- Science, Environment, Technology, Society*) Approach on Science Learning Outcomes of Elementary / MI Students

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Abstract

This study aims to determine whether there is an effect of the I-SETS (Islamic, Science, Environment, Technology and Society) approach on student science learning outcomes. This study uses quantitative methods with Quasy Experimental Design type Control group pretest-posttest, with the presence of another group called the comparison group or control group, it can be seen from those given treatment compared to those who do not get treatment. The data analysis technique used is descriptive analysis to calculate the mean, median, mode, standard deviation, and variance. Prerequisite analysis with normality test, homogeneity test, and to test the hypothesis in this study used independent t-test. Based on research using the t-test, the Sig. (2-tailed) value is 0.016 < 0.05, so H_0 is rejected and H_a is accepted, which means that there is an effect of the I-SETS (Islamic- Science, Environment, Technology, Society) approach on student science learning outcomes. For future researchers, in addition to learning outcomes, the I-SETS approach can also be applied to 21st century learning based on 4C skills, namely Critical thinking, Creativity thinking, Collaboration, and Communication.

Keywords: I-SETS Approach, Learning Outcomes, Science

Introduction

Education is a conscious effort planned to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual-religious strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation and state (National Education System Law No. 20 of 2003, Chapter 1, Article 1).

According to Soedijarto, learning outcomes are the level of mastery achieved by students in following the learning program in accordance with the specified educational objectives. Furthermore, Soedijarto also mentioned that learning outcomes include cognitive, affective areas and the ability of a student's learning speed (Soedijarto, 2006). The level of success in the learning process can be seen from the learning outcomes achieved by students. Learning outcomes are a measure of the abilities that students have achieved after carrying out learning actions during a predetermined time together (Hasibuan et al., 2021).

One of the goals of national education is to develop the potential of students to become knowledgeable human beings, the benchmark in educational institutions is student learning outcomes. (N. Siregar, 2019). Learning outcomes can be used as a benchmark to determine the level of success of students in knowing and understanding a lesson. Based on the above description, it can be concluded that the learning process can involve cognitive, affective, and psychomotor aspects (Perkasa, 2020).

Regarding student learning outcomes, the research (Perkasa, 2020) explained that the low student learning outcomes were due to the learning model presented by the teacher which seemed boring and monotonous. This is in line with research conducted by (Ponidi et al., 2023) examining the KKM that has been determined by student learning outcomes in learning activities there are still students who have not reached KKM.

Based on the results of the Indonesian PISA (*Program for International Student Assessment*) study in 2018 which shows that Indonesia occupies a fairly low position among other countries. Based on the results of the PISA and TIMSS surveys, the cause of low science learning outcomes in elementary schools is the lack of conceptual learning. The basic concepts of science have not been linked to everyday life. So that students cannot understand something from the phenomena that occur around them. The family environment, school environment, and community environment have not fully supported science learning. Therefore, the results of PISA scores have not increased significantly in a period of fifteen years.

Student learning outcomes are one of the problems that are always a thought in the world of education. In improving student learning outcomes, it is necessary to innovate the learning process (Riwu et al., 2018). One of the innovative learning models that can be used is the SETS (*Science Environment Technology Society*) learning approach which is a type of learning designed to make learning in the classroom more enjoyable, so that students are interested in carrying out learning (Sugiharti & Sukowati, 2020).

The success of the learning process cannot be separated from the role of the teacher. Teachers as the frontline and key to the success of education are required to have quality skills and abilities (Anas & Syafitri, 2019). In this case the teacher must master the principles of learning, namely the selection and use of approaches, learning strategies, learning models, teaching methods, skills to assess learning outcomes, students are at an optimal level. (Ponidi et al., 2023). One of them is the ability to choose and create models that are in accordance with subject matter, especially science subjects in MI.

Learning is a dynamic process and includes various components. Some components in the teaching and learning process include the application of strategies, approaches, and various teaching methods that are implemented and developed in the process (Adlini et al., 2023). In the world of education, one of the elements that is often studied in its influence on student activeness and learning outcomes is the learning model used by teachers in the classroom. Through learning models teachers can help learners get information, ideas, skills, ways of thinking and expressing ideas (L. N. K. Siregar, 2019).

The idea of SETS education was introduced by Binadja at RECSAM Malaysia starting in 1996. The strategy used in the SETS approach can begin by raising issues that are developing in *society (Society)* or events that occur in the environment (*Environment*) as a result of advances in technology (*Technology*). Furthermore, it is connected to science as the topic of the material to be taught, so that there is a connection between the SETS components. Binadja stated that the SETS approach is a science approach (S-first) to the form of technology (T) in meeting the needs of society (S-second) which needs to think about its various implications for the environment (E) physical and mental. SETS vision is a way of looking forward that leads to an understanding that everything we face in this life contains aspects of science, environment, technology and society as a unit and influences each other reciprocally (Binadja et al., 2015)(Binadja et al., 2008).

Alamsah (2013) states that the application of SETS education will have a more real impact on students if it is given a religious element. In other words, SETS can also be connected with Islamic religious values contained in the Qur'an and hadith or called the I-SETS-based approach (*Islamic, Science, Environment, Technology, Society*) (Agus Alamsah et al., 2013).

SETS (*Science, Environment, Technology, Society*) strategy is a learning strategy that can help students understand that science, technology, society and the environment are interrelated with each other and have a great impact on each other (Yusnaldi et al., 2023)(Yusnaldi et al., 2023). Biology learning which is also one of the fields of science should have a lot to do with SETS elements to the elements of science itself (Science) and there is also a connection with religious elements. An educator (teacher) is still not accustomed to teaching the relationship between science, technology, society, and religion. To make biology learning more meaningful, it is necessary to develop I-SETS (*Islamic, Sciene, Environment, Technology and Society*) learning (Rahmaniati & Supramono, 2015).

Learning with the I-SETS approach is complete enough to develop student competencies in spiritual aspects, attitudes, knowledge, and skills. Understanding of Islam, science, environment, technology, and society can be applied in science learning. Therefore, science learning is not only limited to the achievement of improved learning outcomes, but also produces scientific attitudes in students to be responsible for the environment and society. The I-SETS approach has a positive impact on getting students used to thinking in an integrated manner. The learning concept in the I-SETS approach will shape students' religious character and develop their scientific attitudes. The application of science that is based on the environment and technology will be beneficial to society (Fazrina et al., 2023).

Given that educators and teachers are an important element in the world of education, improving the quality and quality of educators is a very important process. For this reason, everything that affects the learning process must be optimized in order to achieve better learning outcomes. Highly qualified educators use a variety of appropriate tools and methods to best serve students as objects and majors in the world of education (Safran et al., 2024). Natural Science or Science is one of the subjects that occupies an important role because science can be a lesson for students during the global era. One of the efforts that can be made by teachers in overcoming the problems of learning Biological Sciences is starting from developing more interesting teaching materials that can be used in learning science and can be combined with learning models into teaching materials. So that in the learning process students can be more active and create a pleasant learning atmosphere (Jannah et al., 2023).

One of the things studied in science subjects is the universe. Discussing about the universe certainly cannot be separated from the energy sources that exist in this nature. There are many natural potentials that can be renewed to become energy sources. The potential is very abundant, but has not been utilized optimally. This is also in line with the arguments contained in the Koran and hadith. The potential includes sunlight, green trees, flowing water, tides, geothermal and wind. If the potential of energy is utilized properly, the need for energy is very beneficial for plants, the surrounding environment, technology and society (Kaslam, 2020).

Allah SWT says in the Qur'an surah Sal-A'raf: 54 which means "Verily your Lord is Allah who created the heavens and the earth in six periods, then He resides on the 'Arsh. He covered the night with the day that followed it quickly, and (created) the sun, the moon, and the stars (each) subject to His command. Remember creating and commanding are only the things of Allah. Glory be to Allah. Lord of the universe (Q.S Al-A'raf: 54)". Based on this verse, it is explained that one of the energy sources in this world is the sun. The sun is the largest source of energy in the world, and Allah created it to be utilized by his creatures in this universe.

Table 1. Steps of the I-SETS Approach

I-SETS Stages	Learning Activities
Invitation Stage	The teacher puts forward information about the problem related to the learning material, the problem given by the teacher will be observed / understood by students

	and can stimulate students to be able to participate in solving it. Then the problem can be related to the holy verse of the Qur'an.
Exploration Stage	Students try to gather information on their own related to the problems given by the teacher.
Solution Stage	Based on the results of exploration, students analyze the problem by conducting group discussions
Application Stage	Students apply the concepts they have learned.
Concept Stabilization Stage	The teacher provides feedback or reinforcement on the concepts obtained by the students.

Furthermore, the relationship between I-SETS elements is taken according to Figure 1.

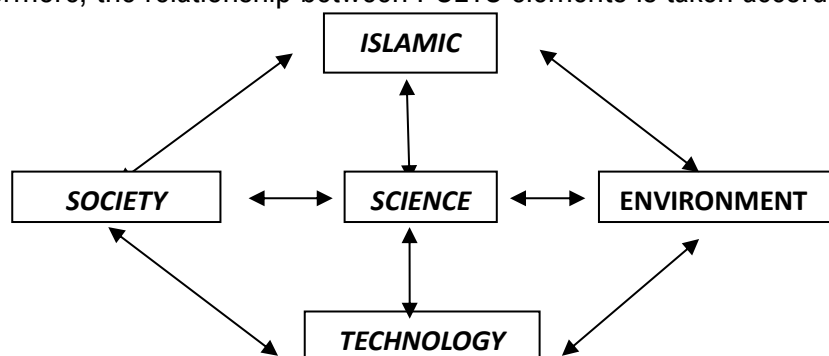


Figure 1. Relationship between I-SETS Elements

Based on previous research conducted by (Fazrina et al., 2023) It was found that the implementation of learning with the I-SETS approach had an influence so that student learning outcomes increased on average. However, there are limitations in the study, namely, the lack of student enthusiasm at the beginning of teaching and learning activities. Research using the I-SETS approach is also still rarely done at the elementary level. Relevant research using the I-SETS approach is mostly conducted at the junior and senior high school levels. In line with research (Rahmianiati & Supramono, 2015) by using the I-SETS approach students not only master the learning material but are also sensitive to the problems that exist in society and can relate them to Islamic values and in research (Munazilah & Yulianto, 2015)(Munazilah & Yulianto, 2021) the I-SETS approach is feasible to use in the learning process and is able to have an impact on students to apply learning material to the environment. Based on the above research, researchers are interested in conducting research related to whether or not there is an effect of the I-SETS approach on the science learning outcomes of elementary school students.

Method

This research uses quantitative methods, according to Sugiyono (2019) quantitative methods can be interpreted as research methods based on the philosophy of positivism, used to research on certain populations or samples, data collection using research instruments, data analysis is quantitative / statistical, with the aim of testing predetermined hypotheses. This study uses experimental research with *Quasy Experimental Design type Control group pretest-postest* research, with the presence of another group called a comparison group or control group, it can be seen from those given treatment compared to those who do not get treatment.

This quasi-experimental research design is *Nonrandomized Control Group Pretest-Postest Design* research. Where in this design there are two control groups that are not randomly selected. Both groups were then given a pretest to determine the initial ability of each group.

After receiving treatment, the posttest results are used to determine the final state of each group.

In quantitative research, population is a generalization area consisting of: objects / subjects that have certain quantities and characteristics set by researchers to study and then draw conclusions (Sugiyono, 2019). The population in this study were all grade IV students of MIS Nurul Fadhillah and the samples taken were all As-Sami' grade IV students totaling 27 students as the control class and all Al-Basyir grade IV students totaling 27 students as the experimental class.

Research instruments are defined as measuring instruments in research to answer questions and test research hypotheses. The type of instrument in this study is a multiple choice test. Before the questions were used for research, they were first tested for validity, reliability, differentiation and difficulty level. The data analysis technique used is descriptive analysis to calculate the mean, median, mode, standard deviation, and variance. Prerequisite analysis with normality test, homogeneity test, and to test the hypothesis in this study used independent t-test.

Results

After analyzing the data from the *pretest* and *posttest* results of the experimental class and control class, statistics were obtained. Below are presented descriptive statistics of the *pretest* and *posttest* results of the experimental class and control class respectively student learning outcomes data using *SPSS version 29 for Windows software*.

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std.Deviation
Experiment <i>Pretest</i>	27	46	80	61.70	9.526
Experiment <i>Posttest</i>	27	47	100	78.77	11.820
Control <i>Pretest</i>	27	33	80	56.11	12.029
Control <i>Posttest</i>	27	47	100	70.14	13.673
Valid N (<i>listwise</i>)	27				

Based on Table 2, it can be seen that the number of samples in the control and experimental classes each amounted to 27 students. The minimum *pretest value* in the control class was 33 and in the experimental class 46. The minimum *posttest value* in the control class and experimental class was 47. The maximum *pretest value* in the control class and experimental class was 80 while the maximum *posttest value* in the control and experimental classes was 100. The average value of the *pretest* in the control class was 56.11 while the experimental class was 61.70. The average value of the *posttest* in the control class was 70.14 while the experimental class was 78.77. *Pretest* and *posttest* data that have been obtained in the control class and experimental class, then data analysis is carried out in the form of normality test using *Kolmogorof-Smirnov*, homogeneity test with *Levene Statistic*, as a prerequisite for knowing the t-test hypothesis test. The results of the *pretest* and *posttest* data normality test in the control class and experimental class can be seen in the following table:

Table 3. Normality Test Results

Data Type	Class	Sig. Kolmogorof-Smirnov	Description
<i>Pretest</i>	Control	0,119	Normal
	Experiment	0,093	
<i>Posttest</i>	Control	0,177	Normal
	Experiment	0,065	

Table 3 shows the results of the normality test analysis with the *Kolmogorof-Smirnov* test above showing all data are normally distributed, namely the significant level $> \alpha 0.05$. The

control class *pretest* value sig. 0.119 > 0.05 and the experimental class has a sig value. 0,093 > 0,05. While the control class *posttest* value sig. 0.177 > 0.05 and the experimental class has a sig value. 0,065 > 0,05. Furthermore, the homogeneity test was carried out, as follows:

Table 4. Homogeneity Test Results

Data Type	Sig Value.	Description
<i>Posttest</i> Score of Control and Experiment Classes	0,277	Homogeneous

Based on Table 4, the homogeneity test results show the sig value. 0.277 > 0.05 which means the data is declared homogeneous. Furthermore, conduct hypothesis testing (t test) to determine whether the I-SETS (*Islamic- Science, Environment, Technology, Society*) approach has an influence on student science learning outcomes. Based on the results of the previous test, it was found that the data was normal and homogeneous. In this hypothesis test, using the Independent t test. The provisions in making this decision are based on the criteria if sig. (2-tailed) < 0.05 then (H_0) is rejected and (H_a) is accepted.

*Table 5. Hypothesis Test (T Test)
 Independent Samples Test*

<i>t-test for Equality of Means</i>				
		df	Sig.(2-tailed)	Mean Difference
Results	<i>Equal variances assumed</i>	52	0,016	8.630
Learn	<i>Equal variances assumed</i>	50.934	0,016	8.630

Based on Table 5, the Sig. (2-tailed) value is 0.016 < 0.05, so H_0 is rejected and H_a is accepted, namely there is an effect of the I-SETS (*Islamic- Science, Environment, Technology, Society*) approach on the science learning outcomes of fourth grade students of MIS Nurul Fadhilah.

Discussion

Based on the data obtained, the results of the pretest and posttest descriptive statistical data analysis in the control class and experimental class obtained different average values. Where the average *posttest* value of students in the experimental class was 78.77 and in the control class obtained a value of 70.14. The results of the data analysis show that the average value in the experimental class is higher than the average value of the control class. Thus, it can be seen that the learning outcomes of students who are treated are better than those who do not get treatment.

The prerequisite test results in this study consist of normality test, homogeneity test and hypothesis test (t-test). The normality test was carried out to determine whether the data were normally distributed or not using *Kolmogorof-Smirnov* with a significant level of $\alpha = 0.005$, the normality test results obtained the results that the data were normally distributed. Furthermore, the results of the homogeneity test with *Levene Statistic* show the result that the data is homogeneous. Furthermore, hypothesis testing was carried out, using the *Independent T Test* which obtained results with a Sig value. 0.016 < 0.05 then H_0 is rejected and H_a is accepted. This proves that learning using the I-SETS (*Islamic Science, Environment, Technology, Society*) approach in the experimental class has a significant difference compared to the control class using conventional learning.

Learning by using the I-SETS (*Islamic- Science, Environment, Technology, Society*) approach on energy source material can improve students' science learning outcomes, not only improve their learning outcomes but also can add insight and benefit students' daily lives. This is reinforced in the research of Fazrina, et al. Explaining that learning by using the I-SETS approach student learning outcomes have increased on average and the I-SETS approach can be used as an option by teachers to be applied in teaching and learning activities because it

affects student learning outcomes (Fazrina et al., 2023). In line with the results of Rita Rahmawati and Supramono's research, it is explained that learning with the I-SETS approach makes it easy for students to understand the subject matter, they not only master the concept of material but are also sensitive to problems/issues in society, and can make decisions on problems that are happening (Rahmaniati & Supramono, 2015).

Energy source material also contributes to students' knowledge that the concepts learned are easy to understand and occur in the surrounding environment. Learning using the I-SETS approach has 5 stages, namely: 1) Invitation, namely the teacher puts forward information about problems related to learning material, the problems given by the teacher will be observed / understood by students and can stimulate students to be able to participate in solving them. Then the problem can be related to the holy verse of the Qur'an. 2) Exploration, namely students try to gather information on their own related to the problems that have been given by the teacher. 3) Solution, namely based on the results of exploration, students analyze the problem by conducting group discussions. 4) Application, namely students apply the concepts that have been learned. 5) Concept consolidation, namely the teacher provides feedback or reinforcement on the concepts obtained by students.

The advantages of learning with the I-SETS approach are that it can foster students' spiritual attitudes and religious characters, learning is not only teacher-centered but students can use various learning resources to find information, students more easily understand the material through natural events that are happening and students' inquisitive attitudes are continuously fostered and can foster critical, systematic, open and honest attitudes in dealing with a problem. Not only has advantages, there are also disadvantages in I-SETS learning, namely lack of resources, time and different socio-economic and cultural backgrounds.

Thus, proving that in this study learning with the I-SETS approach has a positive influence on students. In learning with the I-SETS approach can attract students' attention because it links the aspects studied with the environment, technology, society, and Islamic values that exist in it as a form of interactive linkage. In addition, energy source material is contextual and many problems can be related to everyday life.

Conclusion

Based on data analysis and discussion, learning using the I-SETS approach can significantly improve student learning outcomes. The improvement of student learning outcomes in the experimental class is supported by the application of the five stages of learning that run optimally, student participation and cooperation in following the learning. Although student learning outcomes in both classes have increased, learning with the I-SETS approach is better at improving student learning outcomes than conventional learning. As from the results of data analysis, the average value of student learning outcomes in the experimental class is higher than in the control class. This can be seen based on the results of the t-test with a Sig value. $0.016 < 0.05$ then H_0 is rejected and H_a is accepted. Thus it can be concluded that the hypothesis test shows the influence of the I-SETS (*Islamic- Science, Environment, Technology, Society*) approach on the science learning outcomes of grade IV students of MIS Nurul Fadhilah.

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