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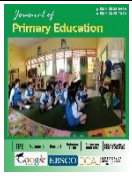

Influence of SETS Science Learning Program Towards Scientific Literacy Improvement

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Abstract

The purpose of this study was to determine the effect of SETS visionary science learning program in improving the students' scientific literacy in their energy material and changes. SETS visionary science learning program, students are expected to be able to integrate concepts that are being learned with everyday life, then applied in real life. This type of research is the Quasy Experimental Design research with nonequivalent control group design research design. This research was conducted in class III SDN 1 Kalikoa. The sample consisted of 72 students, the research sample was divided into two groups: the experimental class and the control class. Both groups were given a pretest to find out the students' initial abilities. The experimental class was treated with SETS visionary science learning programs and the control class was treated with conventional learning. After giving the treatment the two groups were given posttest. Data analysis techniques using independent sample t-test and N-gain. Based on the analysis test obtained the average difference for the control class is 70.86 and the experimental class 80.64. The results of this study are that there is a significant influence of SETS visionary science learning programs on improving the scientific literacy of students. The average increase in scientific literacy is 0.48 (medium category). The students' response to the learning is very good so that the SETS vision learning can be recommended to be applied in elementary schools.

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INTRODUCTION

The purpose of curriculum development in 2013 is to face the future challenges are: (1) environmental issues, (2) advances in information technology, (3) the convergence of science and technology, (4) the influence and impact teknosains, (5) quality, investment and the transformation of the education sector, (6) material TIMSS and PISA

Science education has great potential to prepare resources quality human beings in the face of the era of globalization. The potential of science education is seen from communication skills, thinking skills, problem-solving abilities, dominate technology abilities, have adaptive ability to change and development of life.

Science is a knowledge that humans need to be able to develop their competencies in facing future challenges. Learning scientific literacy is learning based on the knowledge of students in various lives, finding solutions to problems and can make decisions about these problems (Holbrook, 2009).

The teacher is the spearhead in education, the success of a learning process is influenced by the preparation of the teacher in learning. Mastery of the material, the ability to convey teaching materials, the use of appropriate methods, the ability to answer questions and make students understand the learning objectives clearly are the main responsibilities should owned by the teacher.

Science literacy must be built early in elementary school because by having the ability to scientific literacy learners have the knowledge and understanding of science concepts and processes that will enable learners to make a decision with the knowledge he had. According to Isnaeni (2015), science will give learners opportunities to develop their knowledge. But, the fact showed that in the field of science learning process in primary schools has not led to the achievement of scientific literacy.

The low level of scientific literacy is caused by the ability to read and the lack of understanding of the scientific concepts that have been taught as of students are not able to interpret data and solve problems.

This is evidenced by the achievement of Indonesian students' scientific literacy in the Trends in International Mathematics and Science assessment in Table 1 below.

Table 1. Results of TIMSS 2015 Achievements in Natural Sciences

Country	Cognitive domain		
	Knowledge	Applying	Reasoning
Indonesia	37	29	26
International	53	49	44

http://puspendik.kemendikbud.go.id

Based on Table 1 these achievements show that the reading and science skills of students are still relatively low. The results of TIMSS achievements in Indonesia science were ranked 40th out of 42 countries with a score of 406. These low skills indicate that the learning process in schools has not led to the competencies and interests of students towards knowledge.

TIMSS result of this low can be caused by several factors. One of the factors is partly because students in Indonesia are less trained in solving contextual problems, demanding reasoning, argumentation, and creativity in solving them. The TIMSS assessment framework which is tested will be divided into two dimensions, namely domains content and domain cognitive by taking into account the applicable curriculum in the participating countries. This study refers to TIMSS in the field of science where the domain of scientific literacy that is rated for elementary school level is only in the cognitive domain.

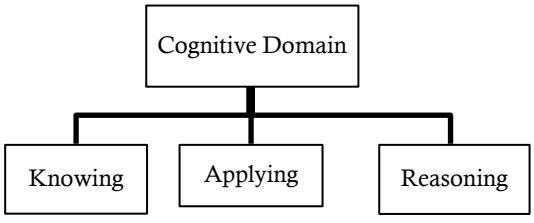

Figure 1. Domain Scientific Literacy (TIMSS 2007)

In accordance with the mandate Kemendikbud No.23 of 2015 that in order to

develop the school as a learning organization, it needs to be developed in each school or Gerakan Literasi Sekolah or known as GLS. GLS is a comprehensive effort involving all citizens in schools, teachers, learners, parents/guardians and the community, as part of the education ecosystem.

Scientific literacy can be defined as the knowledge and skills scientifically to be able to identify questions, acquire new knowledge, explain scientific phenomena, and take the conclusion based on the facts, understand the characteristics of science, awareness of how science and technology shape the natural environment, intellectual, and cultural, as well as a willingness to engage and concerned about the issues related to science (OECD, 2016).

Scientific literacy help learners to shape the mindset, behavior, and build character to care and be responsible for themselves, society, and the universe, as well as the problems faced by a modern society that are highly dependent on technology.

Science literacy skills are explicitly taught in the subjects, the students are given opportunities to use science outside of science subjects in various situations. Using science skills across the curriculum to enrich the learning of other subject areas and contribute to the broadening and deepening understanding of science (Kemendikbud, 2017). Basam, et al. (2017) states that learning science literacy is also easily implemented according to the demands of the 2013 curriculum, allowing students to better understand the learning material provided.

SETS visionary science learning has relevance in developing scientific literacy, because in the SETS elements teach students to understand science, technology, environment and its application in public life, besides that SETS visionary learning is able to increase, creativity, understanding, and problems that occur in everyday life Kumar (2017). Whereas Kim (2011) states that the relationship between science and technology is increasing, the role of teachers is very important in conveying learning not only in theory but students get direct experience through real learning with the environment. According to Yusro (2015) learning that can enhance students 'conceptual understanding and creativity is learning that connects science, environment, technology, and society become one, SETS is an approach that can train students' scientific literacy and develop an understanding of what they are learning (Shwartz, et al. 2006). From some of the opinions above, it can be concluded that learning science, but must connect contextual learning that utilizes science to the form of technology and considers its benefits and disadvantages for society.

This was confirmed by Firdaus (2017) in his research that technological advances that were not balanced with environmental concerns could cause environmental damage. The activeness of students in learning activities that connect directly with the real situation according to Kurniawan (2013) is able to improve understanding of concepts, in receiving information because what students do can be absorbed directly and give a longer impression in memory. Concept change occurs when there is growth and changes in the concept structure that students already have (Setyorini, et al. 2011), this can be seen from the responses and activeness of students when learning activities take place (Subali, et al. 2012). On table 2 are SETS learning phase that can improve students' scientific literacy

Table 2. Phase of SETS Vision Learning Program in the Elaboration of the NSTA

Phase	The Ability Trained
Phase 1 Invitation student orientation on the problem	Eksplory problems related to the material
Phase 2 Exploration	Training the scientific attitude of students during the experiment
Phase 3 Solutions	Finding solution to information obtained
Phase 4 Application	Developing hypotheses
Phase 5 Concept strengthening	Understanding of concept

Based on the background that has been explained, it is necessary to do research on the effect of SETS visionary science learning

programs to improve the scientific literacy of third-grade elementary school students on Energy and Change.

METHODS

This type of research was quasi-experimental research method, with nonequivalent control group design. This research was conducted at SDN 1 Kalikoa, Kedawung District, Cirebon Regency. The research subjects were students in grade III elementary school in the even semester of 2017/2018 school year. The sample of this study was 72 people with 36 student in control class, and 36 experimental class. The sampling technique used was saturated sampling techniques (Sugiyono, 2016).

This research was conducted for five meetings. The research activity begins with the initial test (pretest) which aims to find out the initial abilities of students. Then the learning process is carried out during four face-to-face meetings with the aim of mastering learning material on energy material and its changes. the control class uses traditional learning with the expository method which is learning that emphasizes the process of delivering material verbally from a teacher to students. While in the experimental class given SETS visionary learning program that connects science, environment, technology and society. The research activity ended with a final test (posttest), which aims to determine the profile of scientific literacy skills of students after SETS visionary science learning.

The variables of this research consisted of independent variables that science teaching program envisions SETS and the dependent variable is scientific literacy and understanding of the concept of students' concept.

The research procedure includes 3 phase, (1) planning; (2) implementation; (3) conclusion. The hypothesis of this study is whether there is an increase in scientific literacy and understanding of students' concepts after being given a science learning program with SETS vision. Data collection techniques used a pre-test and post-test, learning program observation sheets and student questionnaire responses to learning activities.

Technical analysis of the data used is quantitative analysis techniques. Quantitative data analysis techniques include validity test calculated with product moment correlation formula, reliability test measured using Alpa Cronbach, Independent Sample t-test and Normalized gain test.

RESULTS AND DISCUSSION

Analysis of scientific literacy data in science learning with SETS vision uses statistical tests. Based on the pre-requisite test, the data obtained shows that the data is normally distributed, then the statistical test that the researcher uses parametric statistical tests Independent Sample T-test and N-gain.

Table 3. Normality Test Results

Class	Shapiro-silk		
	Statistics	df	Sig.
Control	.985	36	.888
Experiment	.980	36	.761

Based on Table 3 the value of sig. the control class 0.888> sig 0.05 (5%) and the value of the experimental class 0.761> sig 0.05 (5%) means that the value of the pretest control class and experimental class is normally distributed.

The difference in the increase in scientific literacy between the control class and the experimental class that follows SETS visionary science learning is calculated using the formula of the independent sample t-test.

Table 4. Differences in Mean Science Literacy

Class	N	Mean	Sig. (2-tailed)
Control	36	70.8611	.000
Experiment	36	80.6389	.000

Based on the results of the independent t-test, the results obtained that the value of Sig. (2 tailed) 0.000 < Sig value 0.05 so it can be concluded that there is a significant difference in increasing scientific literacy of students who take SETS visionary science learning compared with traditional learning methods expository. The

average yield for the control class is 70.86 and for the experimental class at 80.64.

This is consistent with research conducted by Pratidina, et al. (2016), Fatchan, et al. (2014), Binadja, et al. (2008), Priatmoko, et al. (2008) From the results of the analysis found that learning SETS vision forms a positive impression in students that has a positive effect on learning outcomes.

SETS visionary learning has a close relationship with the environment, technology, and society. The learning process carried out is to shape students' understanding and build their own knowledge through their interaction with the environment. During the learning process, students are actively involved in participating in learning activities, bring new ideas and creativity acquired during learning. This shows that SETS vision learning has an influence on students' scientific literacy.

According to Abidin (2014) as cited by Asyhari & Hartati (2015) in order to be able to carry out a series of learning activities, students must be nurtured their sensitivity to phenomena, enhanced ability to ask questions, trained their accuracy in collecting data, developed for accuracy in data processing to answer questions and guided in making conclusions as answers to their questions.

The gain test is used to determine the increase in scientific literacy of students at the time before being given treatment and after being given treatment. The increase in pretest and posttest gain can be calculated using a formula which is often called factor Hake (1999) is presented in Table 5.

Table 5. N-gain Test for Scientific Literacy Students

Category	Control class		Experimental class	
	Pretest	Posttest	Pretest	Posttest
The lowest value	35.00	85.00	38.00	65.00
The highest score	73.00	85.00	85.00	93,00
Average	51.60	70.69	60.64	80.44
N-gain	0.37		0.48	
Criteria	Medium		Medium	

Based on Table 3 shows that there is an increase in scientific literacy in the experimental class which was originally an average of 60.64 to 80.44 (medium category).

Scientific literacy skills in the aspects of knowledge analyzed consist of knowledge about energy and changes. The average scientific literacy skills of students in the knowledge aspects are presented in Table 6.

Table 6. Average Science Literacy During Learning

Cognitive domain	Science literacy achievement				Average
	1	2	3	4	
Knowing	68	78	81	85	78.00
Apliying	66	73	78	81	74.50
Reasoning	64	75	78	80	74.25
Percentage (average)	66.00	75.33	79.00	82.00	75.58

Based on Table 6 it was known that during the four times of meetings conducted, the achievement of scientific literacy in the cognitive domain increased. The highest increase is in the aspect of knowing (knowledge) of 78.00, while the lowest increase is in the reasoning aspect.

The increase occurs because during the learning process students are actively involved in acquiring knowledge through a series of stages of activities based on scientific methods such as investigating problems, designing experiments, formulating hypotheses, collecting data, and determining the process and solution with the help of teacher guidance. this shows that SETS visionary science learning has an influence on students' scientific literacy improvement, although there are aspects that are still low because students are not used to communicating the image in the form of diagrams and tables. In Figure 1, this is a classical completeness after participating in the SETS vision-based learning program.

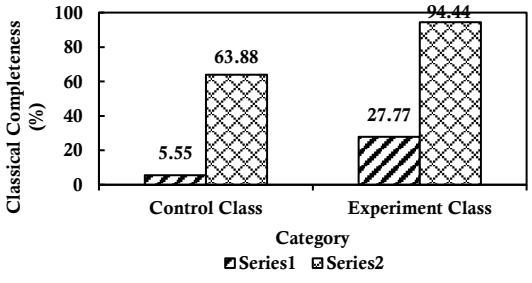

Figure 1. Percentage of classical completeness

From Figure 1, it can be explained that the students who completed the thematic learning science literacy theme 7 energy and the changes in the control class have increased by 58.33%, while the students who completed the thematic learning energy materials and changes in the experimental class increased by 66.67%. According to Sudjana (2017) that the students are successful if he controlled or can reach about 75-80 percent of the value that should be achieved. This shows that as much of 94.44% there is a significant increase in students after being given a vision of science learning program SETS.

This increase occurred in the educational program of science visionary SETS is a learning process that guides students to identify problems related material studied, then through the exploration phase students are trained to be able to solve the problem through experiment activities, and in the next phase students are able to deduce what they learned through careful planning activities, careful data collection, and analysis of the data thoroughly to produce a conclusion.

Students' Responses to SETS Visionary Science Learning

The response of students to SETS visionary science learning can be seen based on the questionnaire data of students' responses and observations during learning. The following response data is presented in Figure 2.

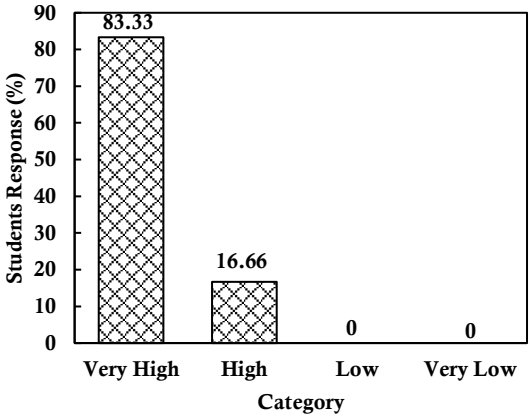

Figure 2. Student's Response Rate

Based on Figure 2, shows the response of students is very high on vision science learning program SETS. Of the 10 items were considered to provide the percentage of ≥ 80%, This means that the students respond very well to the application of SETS visionary science learning to the material on Energy and Change.

According to Arends (2008) as cited by Sartika (2014) studies of class and teaching show that students' motivation and learning are influenced by the processes and structures that were created by teachers in certain classes. meanwhile, according to behavioristic theory, someone deemed to have learned something if he can show changes in his behavior. According to this theory of learning the most important thing is the input in the form of stimulus and output in the form of response. Stimulus is the given by the teacher to students, while the response is in the form of reactions or responses of students to the stimulus given by the teacher.

From the results of the students 'responses to SETS visionary science learning gave a very good response, this is because the SETS visionary science learning program can arouse students' interest and interest in the material to be learned through the exploration phase, where the role of the teacher as facilitator is able to create a conducive learning atmosphere, attracting students' interest and curiosity. This phase involves the activeness of students in learning activities through the discovery process. Through the experience given by the teacher, students can make conclusions about what they have learned. In addition, the teacher must be able to convince students that what they learn is important and useful for students.

CONCLUSION

Based on the results of the study and the discussion that has been described it can be concluded that there is an influence of increasing scientific literacy of students after participating in the SETS visionary science learning program. The response of students was very high after being given a SETS science learning program. This learning can stimulate the curiosity and

interest of students in learning so that it can then be recommended to be applied in elementary schools

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