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## **SETS (Science Environment Technology and Society) Based Learning Implementation in Junior High School**

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### **ABSTRACT**

Science, Environment, Technology and Society (SETS) based learning need to be developed in junior high school, because it can improve student's critical thinking skills. This study aimed to analyze the learning process in National Junior High School 2 of Jatisrono to implement SETS based learning. This study design was descriptive qualitative. Data were analyzed used Miles & Huberman by observation, depth interviews, and questionnaires. This study focused on the learning process, learning materials, as well as the results achieved by students cognitive abilities in the learning process. The results showed that the learning was done in National Junior High School 2 of Jatisrono not used SETS process-based learning. This is because teachers do not have a guide to innovate learning approaches, students are less interested in science learning and caused low cognitive abilities results..

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### **INTRODUCTION**

The rapid development of science and technology causes information flow faster and without limit. This has a direct impact on various areas of life, including education field. Therefore, it needs an increase in human resources, so that Indonesian state can compete with other countries. To improve the quality of human resources, education field plays an important role, because education can develop skills and improve the quality of

Indonesian nation life. In addition it will manifest skilled human resources, and qualified as the implementation of development in an effort to make the national goals come true. Human resources can be realized optimally in accordance with expectations through education. Students can learn various things about science.

Learning process holds very important role in creating quality of educational graduates. Therefore, the main thing that should get attention more seriously by educational stakeholders is to create quality learning. Learning model is defined as a teaching pattern that explains the process, learners can interact and communicate that ultimately result in a special change in student behavior (Suparwoto, 2004). Various efforts made by a school to improve schools quality through the procurement of facilities and infrastructure, educators and education and development and refinement of the curriculum used.

Science education as one that has an important role in improving the quality of education and able to respond to issues in society resulting from the development of science and technology. Science education also plays a role in efforts to produce quality learners in accordance with the curriculum and the existing situation. The learning process of science should not only emphasize the understanding of science concepts but must connect with other elements of environmental, technological and community elements incorporated in SETS (Science, Environment, Technology and Society), so that in the learning process students are able to link four elements in a unity of learning. In the learning process in junior high school, teachers are more likely provide materials in the form of science concepts only, without linking science with the environment, technology and society. In the learning process is only oriented in the completion of all learning materials without associating with daily life. As a result, students lack the ability to view science learning as a whole related to the environment, technology and society (Binadja, 2008).

Based on the results of preliminary observations conducted at the schools that serve as the place of this study, it is known that the average value of understanding about the concept of science is still in the low category. From the Minimum Exhaustiveness Criteria (KKM) is 75, there are only some students who have value above it. Learning is still carried out conceptually only without linking science to the environment, technology and society. Whereas the circumstances surrounding the environment is very supportive of applied SETS learning because the environment around the school is closely related to nature that can be utilized in learning such as combining material through daily life. Learning process which done by teachers mostly still using conventional methods that is through lectures, write the materials and assignments, so that in learning students are less interested and tend to be boring.

As an effort to improve the understanding of science learning concept, the learning offered by the researcher in solving the problem is learning Science, Environment, Technology, and Society (SETS). Rusilowati, et al (2012) states in the educational context, SETS brings the message that to use science (S- first) to form technology (T) in meeting the needs of society (S-second) it is necessary to think about the implications on the environment (E) physically and mentally. The main reason for choosing SETS is because SETS learning is oriented towards students' active participation. Students are more guided to have the ability to think critically on environmental issues, technological developments and the community and also actively seek the problem (Sutarno, 2009).

Students are not only invited to think about the use of the concept of science to the

form related technology in SETS learning, but also the various possibilities that occur in the learning process of science being studied into the form of technology to society and its environment. The core purpose of SETS education are students understand the main elements of SETS such as the elements of science, technological environment and society and the interrelationships between these elements at the time of studying science. In other words, critical thinking is needed to learn every element of SETS (Binadja, 1999).

The results of the Rosary study (2009) show that the SETS approach is an effective teaching approach for improving academic and science achievement. Akcay (2015), stated that students using the SETS approach can improve their understanding of the nature of science and attitudes toward science significantly than students who use traditional learning. This study aims to analyze the learning process conducted in National Junior High School 2 of Jatisrono by implementing the learning Based on the Science Environment Technology and Society.

## **METHODS**

This is a descriptive qualitative research. Researchers use descriptive method to describe the data obtained during the data retrieval process. This research was conducted in National Junior High School 2 of Jatisrono, Wonogiri Regency. The subjects of this research are 30 students of class VII chosen by simple random sampling and 5 science teachers of SMP Negeri 2 Jatisrono. Methods of data collection obtained through observation of two science learning activities in the classroom, in-depth interviews to science teachers and students' cognitive value. Data analysis is focused on the learning process, teaching materials, and the use of school facilities and infrastructure in the learning process. Qualitative analysis techniques refer to the Miles & Huberman analysis model performed in three components: data reduction, data presentation and drawing conclusions and verification.

## **RESULTS AND DISCUSSION**

### **Learning process conducted by students and teachers**

Based on the observation, before the learning process took place, the teacher has prepared learning tools consisting of syllabus, Learning Implementation Plan (LIP) and Student Worksheet. Syllabus, LIP and Student Worksheet are prepared based on Curriculum KTSP (Education Unit Level Curriculum) in accordance with Regulation of national education ministry. In reality, most teachers (85%) are not match with the RPP which they made in the learning process. Teachers tend to use conventional learning, ie learning by using lecture and question and answer methods.

Though not all the material in accordance with the method used. In this case it is known that only 22.22% of teachers who use innovative learning model or approach that is able to build students' creativity, motivation and interest. Teachers still dominate in the learning activities in the classroom so as to make learning activities have not been effective.

Based on the data analysis results obtained that the implementation of the implementation of the teacher's learning is in accordance with the LIP that is used that contains three main components of the preliminary activities, core activities and closing activities. Preliminary activities are an attempt by the teacher to condition the mental, emotional, spiritual and enhanced attractiveness of the reader, as well as the motivation of student learning. The core activity consists of three stages of exploration, elaboration

and confirmation. Core activities are activities that most determine the quality of learning and direct influence in determining the success of students achieve the planned competencies. Closing activities are activities to end learning activities in the form of conclusions, conduct assessment and reflection as well as feedback and follow-up. But in the core activities there is no single activity that reflects the model or approach of learning. This learning tends to be monotonous, students are only equipped with knowledge about science only without being associated with the environment and daily life. There is no single LIPor learning activity that integrates the SETS (Science, Environment, Technology and Society) approach.

Implementation of learning is done only centered on the teacher, the teacher explains the material through the lecture method, while the students only passively listen to the explanation of the teacher, student questions are sometimes ignored and activities in the class just write and listen. In learning it is seen that only the students in the front row are paying attention, but the students whom in the back seat are busier with their own activities such as talking to a friend, playing, and even sleepy.

### **Teaching materials used by students and teachers**

Learning process should be supported by books or teaching materials that can be used by students to learn independently, but based on observations, both students and teachers in the learning process still rely on Student Worksheet from publishers that only contain questions and material summary only, so in fact the students tend to only learn to do the problem rather than deepening the material that has been taught teachers in the classroom. Students only record and memorize what the teacher records on the board. Teaching materials are less developed because the teachers themselves are also difficult to develop teaching materials in accordance with the needs and characteristics of students, so that will affect the lack of understanding and knowledge of students and influence on student learning outcomes. It can be proved by most of students (75%) get daily test scores under Minimum Criteria of Completion (MCC).

Teaching materials used by teachers and students especially the module or science book are very limited. Teaching materials are insufficient to distribute to all students. Teaching materials are still separated between subject areas. The availability of reference to science books is also still minimal, the books available in the library amounted to only 50% of the number of students, so the book can not be distributed to the students evenly. In addition, teachers also have difficulty to develop teaching materials.

### **Use of facilities and infrastructure in the learning process**

Facilities and infrastructure in this research consist of all the infrastructure facilities that used in the learning process at school. Based on the observation results, this school already has a science laboratory, but not adequate and still minimal such as the number of microscopes are less (8 pieces), the number of measuring tools are limited such as thermometer most of it can not be used or broken (80%), and materials for experiments are not complete such as benedict and lugol are not exist. It causing teachers rarely done practicum activities. In addition, teachers occasionally bring only one tool from the laboratory into the classroom used for demonstration. In addition to the existence of laboratories, other infrastructure facilities such as libraries also greatly affect the learning process. This school already has adequate library, but the number of books of science literature in the library is still very minimal. The number of science books

owned library is from the government only amounted to half or 50% of the number of students and there is no textbook or book package development results. Lack of complete facilities and infrastructure in the laboratory and library will have an impact on the low skill of students in experimenting, students are less skilled at identifying problems in practical activities and students have difficulty using laboratory equipment, in addition to the number of books available in the library as a supporter of learning is still less so that it will impact in terms of student knowledge also become low. It is proved that, the value of cognitive aspect or knowledge aspect obtained by students is 75% still under MCC.

### **Learning process conducted by students and teachers**

Learning activities is an activity directed to achieve the educational goals that have been set. This activity involves teachers whose tasks include guiding, educating students and delivering material including creating a conducive learning environment for students. Conducive learning atmosphere is very influential for optimal learning in the classroom.

Learning activities are essentially the provision of environmental systems that result in the learning process in students by optimizing the growth and develop the potential that is in the students themselves (Ministry of Education and Culture, 2013). To achieve the desired competencies, learning needs to use principles such as student-centered learning, giving students more opportunities to explore, creating a fun learning atmosphere and providing a variety of exciting experiences for students. Thus the teacher likened to a director who should plan carefully the scenario in the LIP for high-activity students through the various models, methods and learning approaches used.

Based on the results of observation, interviews and questionnaires by students and teachers note that the learning process conducted in this school still less effective. This happens because the teacher is still dominant in the learning process (Teacher centered), so students become less active in learning. This is in line with the results of research from Duckworth (2009), asserting that teacher-centered learning actually prevents student growth in education, whereas student-centered learning makes students actively learn and they have greater input than what they learn, how they learn it and when they learn it. This means that students take themselves and are directly involved in the learning process.

Teachers have made the lesson before implementing the learning activities, but in reality in the learning process the teacher has not implemented the LIP well. The learning process is still student- centered and all the learning information comes from the teacher. This leads to less interesting and boring lessons and less motivated students in learning. With such learning, students' science skills are not well contained, such as problem-solving skills, reasoning, communication and connections. This resulted in low understanding of students on learning materials.

Teachers also have not been able to create learning innovations that can generate student motivation, one of them is SETS approach. If teachers are able to apply the SETS approach, students become more active and creative to seek linkages between SETS elements. As revealed by Yoruk (2010), said that in practice, students who receive education in SETS are related to teaching approaches, more competent in dealing with new situations and concepts.

In the science learning process with SETS approach, students are invited to explore and investigate, the students are also invited to study the technology or application of

the material that has been studied into four elements at once namely science, environment, technology, and society. Thus students are able to explain and resolve issues or issues related to technology, as well as its impact on the environment and society. SETS approach as one of the alternatives in learning to improve the activity, motivation and learning outcomes of students and interpreted as a series of mutually related concepts developed from the results of experiments and observations and in accordance with the next experiment and observation (Supriyono, 2008). SETS learning will provide more opportunities for students to be more independent and share experiences together in a group. Approaches and learning experiences can encourage them to think more clearly about the learning process (Park, 2003).

SETS stems from the belief that the relationship between students and the real world must be established. This process will lead the students to recognize the positive problems they have. Environments are created, where students can gather data for their problem solving, consider alternative solutions, determine the best way to solve problems and practice them (Yager, 1990).

Based on the results of interviews with teachers, in the process of teaching in the classroom teachers have actually adjusted to the LIP made, but it only lasted a few meetings only. After 2-3 meetings, the teacher feels the acquisition target of the material obtained does not match the target. This is what causes teachers more often to use more effective lecturing methods to reach the target and complete more material.

### **Teaching materials used by students and teachers**

The results show that there is a limited amount of teaching materials or books in the library. The availability of teaching materials in schools can not be distributed as many as the number of students. Whereas according to Parrish (2004), explaining the benefits of using textbooks to meet the needs of learners or the hope of having something concrete to do and take home for further study.

Textbooks remain central to the school curriculum around the world, presenting teachers and students official knowledge of school subjects as well as the values, attitudes, skills, and behaviors favored by experts in the field (Shannon, 2010). According to Bitterlin research in 2003, stated that the textbook has a process to develop a curriculum that is based on the needs assessment of learners and includes participation and input from other stakeholders. In this case, it is expected that the teaching materials are easily accessible, up to date, suitable for learners, culturally sensitive, oriented to the language needs and literacy of learners, as well as suitable for various learning styles.

According to KTSP, teachers are given the opportunity to develop their own learning indicators. This should make teachers more creative in choosing and developing learning materials that will be delivered at school. In accordance with the demands of professionalism of teachers, then a teacher must have the ability in developing methods and teaching materials, so as to explore the learner's activities in the learning process.

Some of the difficulties experienced by teachers in developing teaching materials are lack of time in the manufacture and development of teaching materials, lack of knowledge or references on the development of teaching materials, and limited facilities and supporting infrastructure in the development of teaching materials. There are several reasons why teachers need to develop teaching materials. Some of the reasons

are based on: the availability of teaching materials according to curriculum demands, target characteristics, and the demands of solving learning problems. In addition, the development of teaching materials should pay attention to the demands of the curriculum, meaning that the learning materials that we will develop must be in accordance with the curriculum. In the Education Unit Level Curriculum, the Graduate Competency Standards (GCS) has been established by the government, but how the strategy to achieve it and what the teaching materials to be used is full authority of the educators as professionals. In this case, teachers are required as a curriculum developer, including having the ability to develop their own teaching materials. Therefore, based on the problems that occur then the development of teaching materials by teachers must be tailored to the needs and characteristics of students, so the problem of learning can be overcome and can achieve the expected learning objectives.

### **Facilities and Infrastructure in Learning**

Aspects of the use of facilities and infrastructure in the learning process related to the learning resources used. According to Government Regulation Number 19 year 2005 article 42 paragraphs 1 and 2 of educational infrastructure standards that each educational unit shall have facilities covering furniture, educational equipment, educational media, books and other learning resources, as well as other necessary equipment to support a regular and continuous learning process . Each educational unit is required to have infrastructure covering land, classroom, leadership room, educator room, administrative room, library, laboratory, workshop space, production unit space, canteen, sports venue, place of worship, playground, and other places needed to support a regular and continuous learning process

Based on the observation results in this school, shows that teachers have the ability to optimize the use of facilities and infrastructure in schools, because the facilities and infrastructure in the school is able to support learning activities, so it can support the achievement of educational goals. According to Klenner (2014), it is quite difficult to provide learning materials in accordance media availability. In this case the teacher is required to be creative and able to make innovations to the surrounding environment, so it can be used as media and means of good exploitation. There is no proper education or we can even say that there is no effective education if there is no provision of school facilities and infrastructure for the learning process.

Facilities and infrastructure is one of the factors that influence the learning process, especially in achieving learning objectives. Actually there is a belief that the condition of the learning environment in schools including facilities and infrastructure has an important impact on teacher effectiveness and student academic achievement. Facilities and infrastructure are needed to facilitate effective teaching and learning in educational institutions such as teachers' rooms, offices, libraries and laboratories. According to Earthman (2002), reported that in California a comfortable classroom atmosphere and smaller classes can improve the effectiveness of learning and provide opportunities for teachers to give more attention to each individual. It is also supported by Afolabi (2002), reporting that in the country Ondo mentions that most of the classrooms are inadequate, the ventilation and insulation are not installed properly, and the plants around the school that are not terwat cause the gap in improving the quality of education, so The achievement of competency standards and the goals set by schools is difficult to achieve. Ajayi (2001) also said that the availability of facilities and infrastructure such as classrooms, offices, libraries and laboratories is important to

achieve effectiveness in school instructional and supervisory supervision.

## CONCLUSION

Based on the results of data analysis obtained that in the process of learning in the classroom, science teachers are not yet applied SETS approach. It happens because teachers do not have guidelines for learning with SETS, so teachers choose to use conventional methods in the learning process. Bettencourt (2011), pointing out the fact that obstacles in designing, planning and implementing this approach make teachers fearful of innovating in the classroom. Thus, one of our goals for further research is to see the perceptions of using the SETS approach for other subjects.

Researchers made a suggestion that, it is required to introduce effective teaching methods that emphasize the use of advances in science and technology that enable students to resolve relevant social issues. It is hoped that the findings of this research will help curriculum planners to make the necessary changes in content related to the application of SETS.

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## REFERENCES

- Afolabi, F. O. (2002). The school building and its environment. Implication on the achievement of functional Universal Basic Education programme in Ondo State. In T. Ajayi, J. O. Fadipe, P. K. Ojedele, & E. E. Oluchukwu (Eds.), (pp. 101-110). Ondo: National Institute for Educational Administration and Planning (NIEPA).
- Ajayi, I.A. and Ayodele, J.B. (2001). Introduction to Educational Planning, Ado-Ekiti: Yemi Printing Services.
- Akca, (2015). Effectiveness of Science-Technology-Society (STS) Instruction on Student Understanding of the Nature of Science and Attitudes toward Science. *Journal of Education in Mathematics, Science and Technology*, 3 (1). ISSN: 2147-611X.
- Binadja, A. (1999). Pendidikan Bervisi SETS dan Master Plan Percepatan Peningkatan Mutu Pendidikan Dasar dan Menengah di Propinsi Riau, Universitas Islam Riau. 10-15 Maret 1999. Pekanbaru.
- Binadja, A., S. Wardani, & S. Nugroho. (2008). Keberkesanan Pembelajaran Kimia Materi Ikatan Kimia Bervisi SETS pada Hasil Belajar Siswa. *Jurnal Inovasi Pendidikan* 2 (2): 256-262.
- Bitterlin, Gretchen (2003). TESOL Standards for Adult Education ESL Programs. TESOL: Alexandria, Virginia.
- Buttencourt, Catia. (2011). Biology teachers' perceptions about Science-Technology-Society (STS) education. *Journal Procedia Social and Behavioral Sciences*, 15, 3148-3152.
- Duckworth, E. (2009). Helping students get to where ideas can find them. *Journal of the New Educator*, 5 (3).



- Earthman, G. I. (2002). School facility conditions and student academic achievement. Los Angeles: University of California's Institute for Democracy, Education and Access. (<http://www.ucla-idea.org>).
- Klenner, Michael. (2014). A Technological Approach To Creating And Maintaining Mediaspecific Educational Materials For Multiple Teaching Contexts. *Journal Procedia-Social and Behavioral Sciences*, 176, 312 - 318.
- Kemendikbud. (2005). Permendikbud Nomor 19 Tahun 2005 pasal 42 ayat 1 dan 2. Jakarta: Kementerian Pendidikan dan Kebudayaan RI.
- Permendikbud Nomor 81A, 2013. Implementasi Kurikulum 2013. Jakarta: Kementerian Pendidikan dan Kebudayaan RI.
- Miles, B. M & Huberman, M. A. (1994). *Qualitative Data Analyze*. London: Sage Publication.
- Parrish, Betsy. (2004). *Teaching Adult ESL A Practical Introduction*, McGraw Hill: New York, NY.
- Park, Chris. (2003). *Engaging Students in the Learning Process: The Learning Journal*.
- Rosario, B. I. D. (2009). Science and Technology Section Science, Technology, Society and Environment (STSE) Approach in Environmental Science for Nonscience College.
- Rusilowati, A., Supriyadi. Binadja, A., & Mulyani, S. (2012). Mitigasi Bencana Alam Berbasis Pembelajaran Berbasis Science Environment Technology and Society. *Jurnal Pendidikan Fisika Indonesia*, 8, 51-60.
- Shannon. (2010). Textbook Development and Selection. *International Encyclopedia of Education (Third Edition)*, p397-402.
- Suparwoto, (2004). Yogyakarta. Yogyakarta- FIP Universitas Negeri
- Supriyono, (2008). *Penilaian hasil Proses Belajar Mengajar*. Bandung : PT Remaja Rosda Karya.
- Sutarno, Nono. (2009). Jakarta: Universitas Terbuka.
- Yager, R.E. (1990). The science/technology/society movement in the United States: Its origin, evolution, and rationale. 54, 198-200.
- Yoruk, Nuray. (2010). The Effects of Science, Technology, Society, Environment (STSE) Interactions on Teaching Chemistry. *Journal of Natural Science*, 2 (12): 1417 - 1424..

