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## THE EFFECT OF SCIENCE TECHNOLOGY AND SOCIETY MODEL ON SOCIAL PROBLEM SOLVING SKILL AND STUDENT LEARNING OUTCOME OF THE FOURTH GRADE STUDENTS

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### Abstract

This research aimed to analyze the effect of science technology and society model on the social problem solving skill and student learning outcome of fourth grade students. This research was experimental research with pretest-posttest control group design. The dependent variable in this research was science technology and society model while the independent variable was social problem solving skill and student learning outcome. Subjects of this study were students in grade IVA and IVB of SDN Bulutengger, Sekaran, Lamongan respectively 20 students. The techniques for collecting data in this research were tests (pretest-posttest), interviews, observation, and documentation. Data analysis technique used descriptive statistical analysis technique. Calculation on data analysis was carried out with the assistance of computer software program SPSS 17. The results showed that the science technology and society model had an effect on the social problem solving skill and student learning outcome in social science learning. Science technology and society model had an effect on social problem solving skill shown by  $t_{\text{test}} - 4.459 < t_{\text{table}} 1.686$ . The science technology and society model affected student learning outcome as shown by  $t_{\text{test}} 2.916 > t_{\text{table}} 1.686$  and Sig. 2-tailed value by  $0.006 < \alpha (0.05)$ . This means that the science technology and society model has a significant effect on social problem solving skill and student learning outcome on social science learning.

**Keywords:** science technology and society model, social problem solving skill, student learning outcome

### INTRODUCTION

Currently thematic learning is employed in primary schools. Kadir (2014) stated that thematic learning can facilitate students to build a linkage between one experience and other experiences or certain knowledge and other knowledge or between knowledge and experience which creates interesting learning (p.7). Through thematic learning, students are required to be active in the learning activity. In addition, students are also required to dig their own information sources through their surroundings as well as from various technologies (internet, social media, online news, etc.) which have been improved as the era development. The rapid development of science and technology requires students to follow and utilize it appropriately. The development of science and technology affects society for both business and working field. Based on this case, it is necessary to develop personal, vocational, academic, and social skills. Students as part of community members should get accustomed to know the problems occurred in the local and global environment. If the students start to recognize the problems, they are expected to formulate solutions by linking them with the science concepts.

Education reform begins with the development of approach or method of learning which is beneficial in global era. In fact, conventional approach in primary school is still found whereas teacher needs to improve his learning methods.

According to Curriculum Developed at Educational Unit or KTSP (2006), Social Sciences has an important role in developing society life skill and educates students to be a person who thinks logically and critically, has high curiosity, inquiry, problem solving, and social life skill (p. 575). Along with the development of the learning activities, primary schools need to apply innovative methods. One which is STS model (Science Technology and Society).

Based on the preliminary observation and interview conducted by the researcher, it was found that social science learning in the classroom used conventional model which was more teacher-centered. In fact, social science demands the students to memorize that causes saturation for them. The students' activity during the lesson is simply listening to the teacher's explanation and noting some important things. In addition, the material has not been linked to the problems in the surroundings

or not in accordance with the reality. The material on social science learning is expected to give useful implication related to students' everyday life as part of the community members. The problems existed will have an impact on the lack of interest and motivation of the students to learn and create meaningless teaching.

Through social science learning, students will gain beneficial experience for the future. They will be able to face and handle the complexity of society life which can develop unexpectedly. For sure, such development will have a big impact on society life and the existence of social problems. Students need to be aware of the challenges and face the symptoms which will occur when they are involved to the society.

Through social science learning, students gain knowledge, attitude, and sensitivity in dealing with life as well as its challenges. Furthermore, students are expected to take rational action in solving social problems. In order to develop awareness and sensitivity about social symptoms and problems, social science will involve students and the surroundings. The sensitivity which needs to be improved in the 21<sup>st</sup> century is about the mastery of science and technological advances.

Currently in the implementation of primary education should be able to equip students with knowledge, skills, and attitudes (character). If these three things are achieved, students will become individuals who have competence to live in modern times as it is today. The preparation efforts have been applied through formal and informal education. Introduction to science and technology has been given since primary education. One method which can be employed by the teachers to create qualified human resources is to use learning model and approach which suits the development of science and technology, in this case is science technology and society approach (STS).

Science technology and society learning model can provide the context of human experience in science and technology during the learning process. Learning activities using science technology and society model will present an actual problem or issue commonly faced by students and society in daily life, so that it is relevant to the students' experiences. This can provide an opportunity for students to be aware of the relationship between the science they learn and what they encounter in everyday life. This is in line with Meyer (2002) who stated that the teachers should use the science technology and society model in this 21<sup>st</sup> century is because this model provides opportunity for students to connect learning with the real world in the surroundings.

The model of science, technology, and society used is not only limited to the concepts taught in schools but also emphasizes the role of science and technology in the society life. Thus, the model can foster students' responsibility to the impact of science and technology in society. Meyer (2002) argued that developed technology has much affected society more directly than science. This is because technology can solve problems practically and serve human needs while science affects society especially by stimulating and satisfying the curiosity of people and sometimes by enlarging or changing their view of what the world is like.

According to Poedjiadi (2010) the objective of science technology and society approach is to form individuals who have science and technology literacy and concern on the problems of society and the environment (p 123). A person who has science literacy is the one who has the ability to solve problems using the concepts of science gained in education according to his level, know the technology products existing and the impacts, able to use and maintain technology products, creatively create simplified technology results, and able to make decisions based on value.

Fajar (2009) argues that the development of science and technology often leads to the impact of society change process (p.34). The entry of technology in society is not only able to change the living conditions of society, but also can change the way people live in that society, so that there is a relationship which affects science and technology with the community.

To overcome the problems existed, each individual must be equipped with the ability to solve social problems. The ability to solve social problems is very important for students because the students' inability in solving the problems will affect on their life. If the students cannot find the best solution, they probably take negative options such as, taking drugs, drinking liquor, racing, and others.

By using simple technology, waste disposal problem can be resolved. It is hoped that STS model on thematic learning in primary schools will prepare students to face the upcoming challenges which are likely to increase and be able to make right decision to face social problems caused by the development of science and technology. In addition, it trains students to be sensitive to the development of science and technology which suits their life. This is intended to achieve the expected goals in the teaching-learning process, namely how learners are able to gain knowledge and apply it in everyday life.

Science technology and society finds out beneficial technology which can be produced

for environmental improvement and how social situations or issues developing in society about environment and technology affect the development of science and technology which contribute to science's latest contribution. Science technology and society instruction encourages teachers to use more explicit methodology than traditional textbooks. Akcay & Yager (2010) stated that students have the opportunity to choose problems from real life to investigate. They are encouraged to seek social problems in their everyday environment and also apply their concepts on new situation.

Kızılkaya and Aşkar (2009) stated that problem solving skill can be trained by reflective writing, thoughtful thinking, and group discussions. In the practice of problem solving, students can be assisted by teachers. If students have difficulty in discussion, teachers can provide input or suggestions for the solution to be achieved.

Dostal (2014) stated that the problem solving is an attempt to obtain a solution of a problem by using the knowledge, skill, and comprehension obtained previously into a new situation.

Sivaci (2017) argued that teachers should be able to make practical connections in problem solving, be kind, and be role models to achieve a sufficient level of social skill. One of the social skills is problem solving skill. To contribute on society development, teachers must have high problem solving skill which they face in school.

Students who master particular lesson are characterized by a change in behavior in accordance with the indicators to be achieved. If there is no positive change, it is considered that there is no learning activity.

Sudjana (2011) stated that learning outcome is an ability possessed by students after obtaining experience from the learning process (p.22). Thus the learning outcome can also be referred to as students ability level after attending a lesson for a certain period. Learning outcome is the final outcome of student scores during the learning process. Learning is said to work if the students level of knowledge increases.

## RESEARCH METHOD

This research was a quantitative research. Quantitative research is a research which required to use numbers, from data collection, data interpretation, and data display. Research method used by researcher was experimental method with pretest-posttest control group design. The experimental method is an attempt to investigate the presence or absence of a causal relationship by comparing one or more experimental groups treated

with one or more comparison groups without treatment.

The subjects of this research were students of SDN Bulutengger Kecamatan Sekaran. The samples used in this research were students of IV A (experimental class) and IV B (control class) amounted to 20 students, respectively. The study was conducted for more or less 1 month in the even semester of 2017/2018 academic year.

Data collection is technique to search and collect information or facts in such a way that it is really the same as reality or in other words called it is objective. The data presented is completely in accordance with the facts which exist in the field or factual data without minus or plus. Data collection techniques used in this research were test (pretest - posttest), documentation (to investigate the subjects of research and students' score of previous social science exams), observation (to observe how students solve social problems given by the teacher at the time of the lesson), interview (to explore various information related to what happened or experienced during the implementation of science technology and social model).

## RESULT AND DISCUSSION

Based on validity test results, it shows that all assessment criteria indicate a correlation value with significance of more than 0.4 with a significance level of less than 5%. It can be concluded that all items about social problem solving are valid. To analyze data of social problem solving on variable, the researcher utilizes SPSS 17. The instrument reliability test is performed simultaneously with the validity test, because validity and reliability test can be carried out in one activity.

The instrument with the reliability value coefficient of 0.925 is said to have a strong or high level of reliability so that the instrument is included in high reliability category.

The average score of students' social problem solving skill on pretest in the control class amounted to 69.25 and in the experimental class amounted to 75.75. Based on t-test result, it is obtained  $t_{\text{calculate}}$  of - 0.430 and  $t_{\text{table}}$  of 1.686 resulting  $t_{\text{calculate}} < t_{\text{table}} = - 0.430 < 1.686$ . In the Sig. 2-tailed results of 0.670  $> \alpha$  (0.05),  $H_0$  was accepted and  $H_a$  was rejected. It means there was no difference in average of social problem solving skill between the experimental and control group on pretest.

The treatment given to students on learning can be seen on the posttest score. The average score of posttest in control class was 75.75 and in experiment class was 87.50. In t-test result, it is obtained Sig. 2-tailed of  $0.000 < \alpha$  (0.05) with  $t_{\text{calculate}}$

amounted to  $-4.459$  then the result consulted with  $t_{table}$  for one tail t-test where  $t_{table}$  was  $1.686$  ( $df = 38$ ) resulting  $t_{calculate} < t_{table}$ . It means there was difference for both samples. Then it can be said that  $H_0$  was rejected and  $H_a$  was accepted. This shows that there is difference on students' social problem solving skill in the control class and experimental class. Based on the analysis it can be concluded that problem solving skill using science technology and social model is higher than using conventional learning.

The average pretest score of student learning outcome in the control class was  $65.50$  while in the experimental class was  $63.25$ . The result of independent sample t-test obtained  $t_{calculate} < t_{table}$  namely  $0.568 < 1.686$  while the result of Sig. 2-tailed was  $0.573 > \alpha$  ( $0.05$ ) then  $H_0$  was rejected and  $H_a$  was accepted. This shows that there was difference in student learning outcomes between control class and experimental class.

The average score of posttest in control class was  $83$  while in experiment class was  $90.75$ . The result of independent sample t-test of learning outcome was obtained  $t_{calculate}$  amounted to  $2.916$  and  $t_{table}$  amounted to  $1.686$  resulting  $t_{calculate} > t_{table}$  ( $2.916 > 1.686$ ). In t-test, it was obtained Sig. 2-tailed of  $0.006$  with  $\alpha$  amounted to  $0.05$  so  $sig < \alpha$  ( $0.006 < 0.05$ ). The decision taken from t-test result was that  $H_0$  was rejected and  $H_a$  was accepted.

Based on the hypothesis result, it shows that there is an effect of science technology and society model to students' social problem solving skill and learning outcome. There is difference in social problem solving skill between experimental class which taught using science technology and society model and conventional learning. The students' initial ability difference before being given treatment is not too significant. The treatment using science technology and society model in experimental class performs better than the control class. Students' learning outcome using science technology and society model also shows better results compared with student learning outcomes using conventional learning.

## CONCLUSION AND SUGGESTION

Based on the discussion on the research results, it can be concluded that the science technology and society model has an effect on students' social problem solving skill. This can be seen from the analysis result obtained  $t_{calculate} < t_{table} = -0.430 < 1.686$ . In the Sig. 2-tailed of  $0.670 > \alpha$  ( $0.05$ ) that there is no difference in average of social problem solving skill between experimental and control group on the pretest. The treatment given to the students can be seen on the results of posttest as shown Sig.

2-tailed amounted to  $0.000 < \alpha$  ( $0.05$ ) and  $t_{calculate} < t_{table}$  ( $-4.459 < 1.686$ ). It means there is difference in both samples. This shows that there is difference in students' social problem solving skill between control and experimental class.

Science technology and society model affects students' learning outcomes. This can be seen from the analysis obtained from t-test indicates  $t_{calculate} < t_{table}$  namely  $0.568 < 1.686$  while the results of Sig. 2-tailed amounted to  $0.573 > \alpha$  ( $0.05$ ). This shows that there is difference in students' learning outcomes between control class and experimental class. Test result of t-test obtained  $t_{calculate}$  amounted to  $2.916$  and  $t_{table}$  amounted to  $1.686$  resulting  $t_{calculate} > t_{table}$  ( $2.916 > 1.686$ ). In t-test obtained Sig. 2-tailed amounted to  $0.006$  with  $\alpha$  amounted to  $0.05$ , so  $sig < \alpha$  ( $0.006 < 0.05$ ). This shows that there is difference in students' learning outcome between control and experimental class. Therefore, it can be concluded that the students have good learning outcomes using science technology and society model. This can also be seen from the students' average score of pretest-posttest.

Based on the results of research, suggestions that can be given by researchers are for teachers, it is suggested to use science technology and society model as one alternative of learning activities. This is because the model can improve students' social problem solving skill and their learning outcomes. The use of the science technology and society model also allows students to actively learn to find solutions to the social problems around them.

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