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THE ANALYSIS OF THINKING AND CREATIVITY SKILLS OF JUNIOR HIGH SCHOOL STUDENTS USING SCIENCE, TECHNOLOGY, AND SOCIETY APPROACH IN SCIENCE LEARNING

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Abstract

The ability to think creatively in improving the quality of education is considered as a very vital source for a nation. If carefully observed, education development efforts have not been optimal, it is because the teacher does not know the extent to which student's creative thinking ability. Therefore, in certain subjects (IPA) that require high creative thinking skills, there are still many students who lack value. The aims of the study are to determine the ability of creative thinking and the influence of learning models of Community Technology Science (CTS) in improving the creativity of junior high school students on global warming materials. The research design used is descriptive quantitative. The population in this study are students of class VII SMP N 1 Jakenan. The sample is determined by purposive sampling. Test methods, observations, and questionnaires were used to collect research data. The results showed that students creative thinking ability using CTS model for high category was 12%, medium 65%, and low 23% based on test, while for creative attitude, 100% of students were in medium category. CTS models influence on the ability of creative thinking of students increased by 6%.

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INTRODUCTION

The future of job fields is full of challenges. It does not only focus on the awareness and understanding of technology; it also concerns on people's thinking skills. One of the thinking skills which is frequently neglected is creative thinking.

According to Siahaan (2013), creative thinking is the result of interaction between individuals and their environment. The implication of it is creative thinking can be improved through education.

A subject which requires creative thinking is natural science. In Ekawati (2104), natural science is a subject focusing on natural science which is general and originated from human's activity through scientific working. Meanwhile, according to Nurohman (2006), natural science is a comprehensive subject to understand the nature through investigation.

From the observation in SMP Negeri 1 Jakenan, there is no application of learning process training students' creative thinking. The learning process is only limited to theoretical lectures and discussion. Thus, teacher does not know students' level of creative thinking. It gets worse with the absence of innovation in the learning process due to the absence of students creative development.

Besides, natural science is strongly related to the society. It is less empowered because of minimum time and costs to develop it. The predicate of *adiwiyata* school was only reflected and applied to schools' environment, through the creation of *toga* park, fish pond, compost house, and biogas. The benefit of environmental awareness does not cope the surrounding environment; it is only limited to the school instead.

The approach to conduct science learning in community context is using Science, Technology, and Society (STS) approach. STS is a creative science approach which relates the concerned fields to the actual problems in the real life (Poedjiati, 2010:99).

Based on the description, the formulation of the problems are (1) how are the thinking and creative skills of VII B class students in the material of global warming? (2) Is there any improvement to students' creative thinking in science after the application of STS?

METHODS

The method of analyzing students' creative thinking and thinking skills in this research employed descriptive quantitative approach. The research was conducted in SMP Negeri 1 Jakenan. The learning method for the students were STS, which aims to measure students' thinking skills and creativity.

The population of this research were the students of the VII grade in SMP Negeri 1 Jakenan academic year 2016/2017 consisting of eight classes. However, since this research used STS approach, the taken samples should have above average score, which was VII B. The sampling was done based on purposive sampling under the consideration of experts (teachers of science for VII grade).

The collected data were essays, questionnaire (based on Likert scale), and practicum observation. Test was used to measure students' creative thinking while questionnaire and practicum was used to measure students' creativity. The latter was done in practicum exercise and assessment of creative behavior in observation. The instruments for the practicum were essays and questionnaire.

The assessments to the instruments which were used to measure students' creativity were validity tets, reliability test, items difficulty, and items discrimination. From the four tests, ten of fifteen questions were taken as the items of the tests.

DISCUSSION

Creative Thinking Skills

Based on the essay test, the result found that the creative thinking skills of the students from each item of the test were in medium category. The result of the test is presented in Table 1 as follows.

Table 1. Creative Thinking Skills

Skills	Test Items	Score	Percentage	Category
Fluency	7 and 10	143	70%	Medium
Flexibility	6 and 8	157	77%	Medium
Originality	3 and 9	165	81%	Medium
Explanation	4 and 5	155	76%	Medium
Forumation	1 and 2	175	86%	Medium

The creative thinking of the students was categorized as medium. For individual performance, there were 7 students having high skills, 19 medium, and 8 low.

Creative Behavior

Based on the questionnaire, students' creativity were shown medium, except for item number 19 which is categorized as low averagely 42.94. The profile of students' creative behavior can be seen in Table 2.

Table 2. Students' Creative Profile

Behavior	Test Item	Score	Percentage (%)	Category
Curiosity	1, 3, 5, 13, 16, and 17	776	76,07	Medium
Imaginative	4, 10, 15, and 19	449	66,02	Medium
Challenged by different opinion	2, 7, 9, and 18	532	78,23	Medium
Brave to take the risk	6 and 12	274	80,58	Medium
Appreciation	8, 11, 14, 20	617	90,73	Medium

Based on the table, students in VII B had relatively medium creative profile. To individual performance, all students were categorized medium in the range between 89-64.

Practicum Observation

In the practicum of composing simple compost fertilizer, the activity was done well, yet some students had not shown their creativity, which were B-31 and B-18 on the aspect of brave to ask. Then, for B-27, B-3, and B-32, they showed the creativity of taking risk by answering all given questions. The behavior portrayed in the practicum can be seen in Table 3.

Table 3. Students' creativity portrayed in the observed practicum group exercises

Groups	Total Score					Score	Category
	A	B	C	D	E		
1	14	10	8	12	13	87	Medium
2	16	10	11	16	17	78	Medium
3	11	8	9	12	14	72	Medium
4	14	12	13	18	18	83	Medium
5	15	12	15	13	16	79	Medium
6	16	10	13	13	16	76	Medium

Notes :

A : Curiosity
B : Imaginative
C : Challenged by plural opinion
D : Brave to take the risk
E : Appreciative

Beside the practicum, there was a test following it. There were four items tested to each group. The result of the test were analyzed based on the criteria of students' creativity. The data of the test score can be seen in **Table 4.**

Table 4. The Score of Group Discussion Based on Practicum

Groups	Correct Answers	Score	Categories
1	15	7.5	Medium
2	16	8	Medium
3	17	8.5	Medium
4	20	10	High
5	18	9	Medium
6	18	9	Medium

The group with highest creativity score was group 4 with 10, while the lowest score was obtained by group 1 with only 7.5. Beside measuring students' thinking skills and creativity, this research also aims to measure students' improvement to think creatively. Based on the final term test, 29% of students in VII B proven had lowest creative score. Meanwhile, the result of the research with the same respondent showed that 23% students were in low category. It means the students experienced 6% of improvement. Even if the improvement was not significant, it showed that STS can improve their creativity.

The Correlation of the Result with Previous Literatures

During the practicum of composing fertilizer, the students utilize the concept to create the compost based on the guidance in the students' worksheet. The things made students' creativity raised themselves. This idea supports the statement of Mubarokah (2014).

In the material of global warming, teacher gave simple training to students that they can create simple technology of simple fertilizer as the effort of solving global warming. Students can apply science in the learning process, that the technology they made can be useful to the community. This statement is the same to Putra (2013).

Science, Technology, and Society is effective to improve students' creativity that it should be applied by teachers. It trains their creative behavior and skills that teachers can monitor how far the learning model affects the students.

CONCLUSION

The creative thinking of students in VII B were explained as:12% were high, 65% were medium, and 23% were low. Meanwhile, for the creative behavior, 100% students were in medium category. There was an improvement to students' creative thinking that 21% of them were in high category, starting from 0 to 7 students, and 6% were low, starting from 10 to become 8.

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