



Analysis of the Creative Thinking Ability of Students SMA N 1 Pecangaan Jepara on Environmental Change Material

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Abstract

Creative thinking is an ability to create a new thought as a result of a combination of previous knowledge. It is needed to be developed in the 21st century because it is important in the work world. This study aims to analyze the students' creative thinking of SMA N 1 Pecangaan on the environmental material. The research used an observational method. The population is whole students of the tenth grade of SMA N 1 Pecangaan. The samples used purposive samplings were X MIA 1, X MIA 2 and X MIA 4 with the total number of 116 students. The students' creative thinking was tested by essay test and instrument non-test which is scoring rubric of writing article about environmental problems. The result showed that students' creative thinking of SMA N 1 Pecangaan in answering the question is 14.7% very creative, 31% creative, 20.7% creative enough and 33.6% less creative. The students' ability in writing article showed 0% very creative, 16.4% creative, 30% creative enough, 49.1% less creative and 4.3% not creative. The research concluded that the creative thinking ability of students SMA N 1 Pecangaan is low. The highest aspects of creative thinking that are reached by students are originality and fluency, while the lowest is elaboration.

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INTRODUCTION

In the 21st century, individual lives in an environment full of technology, information and technological advances. Education becomes more important to ensure students have the skills to learn and innovate, use of technology and media information, and also in work and life (Dewi 2015). Curriculum for education in Indonesia is currently adapting the three concepts of the 21st century. The three concepts are 21st century skills, scientific approach, and authentic assessment. 21st century skills include (1) life and career skills, (2) learning and innovation skills, and (3) information, media and technology skills (Wijaya et al. 2016).

The ability to think creatively is one component of learning and innovating skill (*learning and innovation skills*). Turkmen (2015) states creative thinking is the ability to generate new thinking as a variation of an old thought or a combination of previously owned knowledge. The ability is looked-for the world of work, thus becoming one of the determinants of the human resource of a nation in the global era (Mahmudi 2010). Creative thinking is characterized by the ability to think smoothly, flexible (flexible), original, and elaborative or detailing (Munandar 2014).

In fact, the applicability and ability to solve problems by Indonesian students are in a low category. Based on PISA test results (*Program for International Student Assessment*), Indonesia is still far below the average score of OECD countries (*Organization for Economic Co-operation and Development*). By 2015, Indonesia is ranked 62nd from 70 countries are taking the PISA test (OECD 2015). Based on critics from the experts, formal education in school is too pushed the child's brain with a variety of materials to be memorized (Sanjaya 2014). The result of Suastra's research (2007) showed that the ability of students' creative thinking is less empowered and optimally developed.

Education is the basic capital for improving the quality of human resources. The development of the latest education system is the existence of the 2013 curriculum that seeks to improve the quality of education to produce creative and capable graduate's life in the future (Sani 2013). Improving the ability of creative thinking can be through reducing theoretical rhetoric learning and emphasizing the contextual learning more to overcome problems that exist around students. Creative thinking is easy to manifest in the learning environment that directly provides opportunities for students to think openly and flexibly without fear or shame (Tawil & Kemala 2012).

Learning with a case-based is appropriate to facilitate creative thinking. Teaching staff from some institutions reported that the use of case studies in learning can be improving critical thinking and learning, especially in viewing world issues from multiple perspectives and can apply the core concept of learning on real issues (Yadav *et al.*, 2007). One of the Biology materials that can be facilitated with case based learning is environmental change material. According to the 2013 curriculum's recommendation, the competencies expected from learning environmental change material is students are able to propose problem-solving ideas environmental changes in the context of environmental issues in the region. Based on those problems, then research was conducted to know how to profile the creative thinking ability of students of SMA Negeri 1 Pecangaan on learning environmental change material.

RESEARCH METHOD

This research is an observational research. Sampling technique used in this study is purposive sampling. The samples are taken from the entire student population of class X MIA SMA N 1 Pecangaan. Samples obtained are students of class X MIA 1, X MIA 2, and X MIA 4 with the total of 116 students. Data was collected by of test with 9 items of essay test as the posttest and non-test technique in the form of assessment sheets of writing article. The posttest value is calculated based on the obtained score divided by total score, then multiplied by 100.

The level of creative thinking is analyzed based on the posttest value and the value of the article. Interpretation the level of creative thinking refers to the criteria developed by Siswono (2014) with some modifications: (1) Level 4 (very creative): students are able to achieve a minimum score

of 3 on the four aspects of creative thinking ability. (2) Level 3 (creative): students are able to score at least 3 on three aspects of creative thinking ability. (3) Level 2 ("creative enough"): students able to achieve the minimum score of 3 on two aspects of creative thinking ability. (4) Level 1 (less creative): students are able to achieve a minimum score of 3 on only one aspect of creative thinking ability. (5) Level 0 (not creative): students are not able to achieve a minimum score of 3 on all aspects the ability to think creatively.

The level of achievement from each aspect of creative thinking ability is checked based on posttest and article score. Each aspect is said to be achieved if it meets a minimum score of 3. The following formula is used to compute The achievement of creative thinking aspects are calculated by the number of students got minimum score 3 divided by the total number of students, then multiplied by 100%. The scoring formula and analysis of the level of creative thinking of students in writing articles are similar to formulas and interpretations on posttest questions.

RESULT AND DISCUSSION

The data on students' creative thinking ability is obtained by the test instrument in the essay question form. The result of posttest value of creative thinking ability is presented in Table 1 and Table 2.

Table 1 Posttest Result of Creative Thinking Ability

Subject	Class			Total
	X MIA 1	X MIA 2	X MIA 4	
Number of Students	38	39	39	116
Score \geq 75	13	22	17	52 (44,8%)
Score < 75	25	17	22	64 (55,2%)

Table 1 showed that most students are less maximal in working on the posttest's questions of creative thinking ability. Based on the value of the posttest, the level of creative thinking each student is analyzed which can be seen in Table 2.

Table 2 Results of Creative Thinking Ability Analysis

Creative Criteria	Class			Total
	X MIA 1	X MIA 2	X MIA 4	
Very creative	4	8	5	17 (14,7%)
Creative	9	14	13	36 (31%)
Quite creative	6	7	11	24 (20,7%)
Less creative	19	10	10	39 (33,6%)
Not creative	0	0	0	0 (0%)
Number of very creative and creative students				53 (45,7%)

Table 2 shows that the students' creative thinking ability responds to the problem is relatively low in general. It is marked by the percentage of categories very creative and creative can not be reaching 50% of the total sample which is only 45.7%. Based on the result, it showed that learning had not encouraged students to think creatively because of the method of learning which has not been accustomed to the school Abadzi *et al.* (2009) states that one important aspect in learning or training is sustainability. Training the creativity should be done within a long and sustained period of time. Based on research by Scott *et al.* (2004), exercising creativity within 14 weeks of causing an effect of limited divergent thinking. Following studies in the 9 months later showed the achieved training effect needed more time and more structured programs.

The analysis of students' creativity level is also based on the value of article writing. Through writing activity, creativity can arise through the pouring of students' ideas into the form of

writing. Azis (2015) in his research proves that learning creativity more accurate when integrated with writing skills. Writing activities will sharpen the student's creativity. In line with Puspitasari's (2017) research, that there is a relationship between creative writing and creative thinking skills. The result of creative thinking ability analysis in writing article can be seen in Table 3.

Table 3 Results of Analysis of Creative Thinking Ability through Article Writing

Creative Criteria	Class			Total
	X MIA 1	X MIA 2	X MIA 4	
Very creative	0	0	0	0 (0%)
Creative	4	10	5	19 (16,4%)
Quite creative	15	5	15	35 (30,2%)
Less creative	14	24	19	57 (49,1%)
Not creative	5	0	0	5 (4,3%)
Number of very creative and creative students				19 (16,4%)

In Table 3, it can be seen that the students' creative thinking ability in making the article also still low. It is characterized by a very creative and creative category percentage is not reached 50% of the total sample, even only by 16.4%. In writing articles, students in general still use the entire others' ideas and less enriching own ideas. The most important aspect of creativity that must be highlighted is original thinking (originality) where the aspect shows the original thinking of the students themselves. In accordance with Siswono's (2011) research which states that one of the most important indicators in creative thinking is authenticity.

Creative thinking abilities of students based on four aspects which are current thinking (fluency), think supple (flexibility), original thinking (originality), and detail thinking (elaboration). The student said to be very creative if able to get a minimum score of 3 on all four aspects of thinking creatively, while students are said not creative if students are not able to obtain a minimum score 3 in all four aspects. On the task of writing articles still found 5 students who are not creative in compiling articles, whereas nobody has no creative at all. This matter according to Supriadi's (2001) statement that nobody has absolutely has no possession of creativity. Actually, the student has been able to compile the article but each score the creative thinking aspect acquired does not meet the minimum limit. Achievement of each aspect of creative thinking ability is presented in Tables 4 and 5.

Table 4 Achievement of Aspects of Creative Thinking Ability on Posttest Value

KBK (Creative Thinking Ability) Aspects	Class			Total
	X MIA 1	X MIA 2	X MIA 4	
Fluency	24	22	29	75 (64,7%)
Flexibility	19	26	26	71 (61,2%)
Originality	22	31	25	78 (67,2%)
Elaboration	9	21	11	41 (35,3%)

Table 5 Achievement of Aspects of Creative Thinking Ability on Article Values

KBK (Creative Thinking Ability) Aspects	Class			Total
	X MIA 1	X MIA 2	X MIA 4	
Fluency	19	29	20	68 (58,6%)
Flexibility	10	15	19	44 (37,9%)
Originality	15	10	15	40 (34,5%)
Elaboration	15	10	10	35 (30,2%)

The ability to think fluency is shown by diversity (assortment) answers made by students in solving problems correctly. On the matter of posttest, aspect smooth thinking is shown by asking students to reveal many alternative solutions to the problems presented with a minimum of 3 ideas. Aspects of fluency listed on the question number 1 and 2. Students have been able to answer the problem correctly but not many students can get the maximum score on this aspect. Based on the posttest question, the student who can reach the minimum score of the aspect of fluency is only 64,7% that is 75% students of the total sample.

In the task of writing an article, the fluency aspect is shown precisely how the students formulate problems and hypotheses. The achievement of this aspect is the highest compared to the achievement of the other which is 58.6%. That aspect can be done well by students because of teachers still mentoring while doing. In addition, according to Siswono (2011), fluency aspect is the lowest aspect that makes it easier for students to work with another aspect.

The flexibility aspect of the posttest question is shown by the ability to interpret the image or the story becomes a hypothesis, in addition students are also required to make a classification different based on the data presented. Munandar (2014) defines thinking skills flexibility as skills in generating ideas or varied questions, able to change the way approach, and have a different direction of thinking. Achievement of this aspect is quite good at 61.2% yet still under the achievement of the fluency aspect.

In the task of article writing, the flexibility aspect is shown by the determining ability of relevant sources of ideas to be compiled. Achievement of this aspect is based on Table 5, it is quite low that only 37.9% which means that students have not been able to determine some appropriate sources to be raised as material in compiling articles. Generally, the sources listed are also unclear.

The ability of original thinking (originality) at the posttest value is also achieved well adequately by the students. Flack (2016) in his journal mentioned that originality is the ability to generate new and original ideas. In the posttest problem, this aspect is shown by the student's ability provide one idea of problem-solving accompanied by a logical reason by the students. It is to identify that each student has different reasons and based on the results of his own thinking. In addition, students are also asked to mention the product cycle which may be made from presented used goods. Achievement of this aspect is the highest compared to other aspects of 67.2%, it shows that on average each student is able to put forward a logical reason and different based on the results of his own thinking.

The original thinking aspect of article writing is demonstrated by the students' ability to make article use their own sentences and articles that are reviewed differently than others. Articles that are made students lift different discussion, but in compiling the article still many use sentences taken from other sources without being enriched with ideas own. This is possible because students are less experienced in making ideas write. Woolfolk (2012) reveals that extensive knowledge is the basis for creativity. The wider the knowledge, the more likely it is to generate new ideas, so it can affect one's original thinking ability. Based on Table 5, students who can achieve this aspect well only 40 students with a percentage of 34.5%. The amount of achievement is lower than the fluency and flexibility aspects. An aspect of originality is an important aspect as a marker of creativity (Siswono 2011). If the student is still difficulty reaching this aspect can be concluded that student's creativity still less.

The last aspect is detailed thinking or elaboration. On the matter of posttest, that aspect loaded by asking students to detail something such as detailing the design steps of waste recycling products. Thinking in detail according to Munandar (2014) is a skill of developing, adding, enriching an idea, or detailing details, as well as expanding an idea. There are still some students answering questions in less detail and there are some answers that are still empty. Based on Table 4, students can reach elaboration aspect well is only 41 students (35,3% from the total sample). The result indicates that students have not been able to solve problems in a systematic and coherent way.

In article writing, elaboration is demonstrated by students' ability to point the obtained data with their own sentences and add pictures to the article. Data raised students to reinforce ideas in articles that are reviewed in less detail, not developed, and less enriched with their own ideas. In compiling the article, students who have been ably fulfilling elaboration aspect with good enough equal to 30,2% that is 35 students. The rest of the students cannot fulfill this aspect well. Achievement of students in this aspect is the lowest compared to achievements in other aspects of creative thinking. It shows that elaboration aspect is the most difficult aspect to think innovatively.

Results from all students who became the sample of the study still found students who are not creative in completing the article task. According to Honneck (2016), every person (student) has creative potential, but in reality, not all turn up into creative ability. Internal factors in among students and external factors, namely the learning environment are one of the factors that cause differences in students' creative thinking ability. Internal factors of students such as intellectual ability can also affect the ability of creative thinking. According to Sternberg (2009), there are differences in ways of thinking between people with a high level of cognition with a low class. In line with Setyabudi (2011) there is a relationship between levels of intelligence with creativity, so to increase the creativity required high level intelligence.

CONCLUSION

Based on the results of research and discussion, it can be concluded that the students' creative thinking ability of class X SMA Negeri 1 Pecangaan Jepara on environmental change material is low. The highest achievement of creative thinking ability is the aspect of original thinking (originality) in posttest and the aspect of thinking fluency (value) in article writing task. While the aspect which got the lowest achievement is the aspect of thinking detailed (elaboration).

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