Implementation of Explicit-Reflective Approach to Improve Creative Thinking Skills of Students in Junior High School on Environmental Pollution Matter

Husnul Khatimah[1, a] and Parsaoran Siahaan[2,] Agus Setiabudi [3, b]

[1]*Student of Science Education Study Program on School of Postgraduate Studies Universitas*
[2]*School of Postgraduate Studies Lecturer Universitas Pendidikan Indonesia*

[a] husnul.khatimah318@gmail.com
[b] sao_smart@yahoo.co.id
[c] agus_setiabudi@upi.edu

Abstract. The purpose of this study was to describe the effect of the implementation of explicit-reflective approach to the improvement creative thinking skills of students. This study used weak experiment with one-group pretest-posttest design. Participants in this study consisted of 33 students who are in first class on junior high school. Data was obtained from essay test of creative thinking skills of students who do done twice are before learning (pretest) and after the implementation of learning (posttest) and questionnaire. Explicit-reflective approach in this study which were conducted in 4 steps namely black box, tracky tracks, puzzle solving activity, and reflection. Implementation of explicit-reflective approach done by 3 times. The results of this study showed that implementation of explicit-reflective approach to science learning can improve creative tinking skills of students with n-gain score is 0.42 (medium category) with significance value is 0,00. This improvement was supported by positive respond from students respond about the implementation explicit reflective approach. The improvement of creative thinking skills of students in environmental pollution matter, especially visible on the indicator fluency, flexibility, elaboration, and evaluation

KEYWORD : creative thinking skills, Explicit-Reflective Approach, environmental pollution

INTRODUCTION

Essentially of learning science is students can understanding of scientific literacy. This mean students can understanding itself and the surrounding of nature through direct experience so that students are able to use their thinking skills to resolve the problems and respond to the issues that occur in the community (Kemendikbud, 2013). In Indonesia understanding of scientific literacy is still low if we compared with other countries. It can be seen from the results of PISA *(the Programme for Internatonal Student Assessment)* in 2012, showed that the scientific literacy of students in Indonesia is still at a very low level which is ranked 64th out of 65 participating countries. One cause why scientific literacy of students in Indonesia is lower than the other country because the learning process in the classroom that still tends to be *teacher centered* so that students are not involved to the maximum in finding a concept, besides learning is *teacher centered* that do lead to the ability of understanding course content so that most students learn science by rote without understanding the meaning of the material he studied, this led to the thinking skills of students are not well trained and they are not able to apply the concepts learned in the real world to solve the problem, in line with the results of interviews conducted with some of the teachers stated that learning should done with in-depth explanations of the material in order to understand the material well because most students have the motivation to read and study the material independently of science is still low.

To make learning process more meaningful and can improve thinking skills of students especially creative thinking is by using the explicit-reflective approach. The use of this approach in learning promoting scientific understanding and meaningful learning experiences so that students are able to understand the content to be studied in depth and develop skills needed for future students (Capps, 2013; Akerson *et al.,* 2007). The learning process using explicit-reflective approach that can effectively be done if using materials that relate to sociocientific issues (Eastwood, *et al.* 2012). The material is based socioscientific issues related material phenomena that develop in communities associated with the concepts of science, technology, and social dimensions either in the form of norms and values embraced by the surrounding community (Sadler, 2014). Explicit-reflective approach based socioscientific *issues* provide an opportunity for students to discuss aspects of NOS related to real-world situations they encounter in everyday life so that students are able to know the material in depth starting from the basics on the material until how to apply the concepts acquired so they can use their thinking skills to solve the problem (Khishfe, 2013).

In the process of learning science by using explicit-reflective approach based socioscientific issues, students are not only required to be able to develop the potential of cognitive but also required to develop the skills of thinking to be able to face the problems that obtained in particular during the learning process and to face the challenges of global generally. This is consistent with that put forward by Thinking Skills and Assessment for Learning Development Programme (2009) that develop thinking skills enable students to gain a greater understanding of the topic, were more critical of the evidence, has thought of a variety of viewpoints, make judgments so as to make conclusions right. Such thinking skills that are needed both at school and in her neighborhood.

Thinking Skills and Assessment for Learning Development Programme says thinking skills is the coverage of the indicators contained in creative thinking skills. Creative thinking skills by Nelson (Tawil, 2013) can be defined as a thinking skills which have relevance to the knowledge, motivation, find the problem, find ideas or new ideas, and evaluate. This creative thinking skills students need to solve the problems that are found in everyday life. This is consistent with that put forward by Munandar (1999) that creative thinking skills is needed by the student so that children can see a wide variety of possible solutions to a problem.

Based on the opinions expressed related creative thinking skills, it can be concluded that creative thinking skills required by the student in solving a variety of problems found to be associated with the natural phenomena that occur in the environment. Besides creative thinking skills are also required to develop aspects of NOS one of which is the creative aspect (Schwartz & Crawford, 2004), as well as creative thinking skills is also one important aspect that must be developed in science learning so that students are able have scientific literacy well (Kemendikbud, 2013). Based on the analysis of competency base towards science subjects in SMP/MTS Curriculum 2013, the environmental pollution can be used with socioscientific issues because this material directly related to the students' lives, where they often hear and see events in the environment associated with pollution environment, is able to provide a challenge for students to find appropriate solutions to overcome them, and increase the interest of students because they feel the need to learn the material so that students can practice the skills of creative thinking. The basic competencies related to environmental pollution in the curriculum materials 2013 there were at KD 1.1 Admire the order and complexity of God's creation on the physical and chemical aspects of life in the ecosystem, and the role of humans in the environment and make it happen in practice the teachings of their religion; KD 2.1 Demonstrate behavioral science (curiosity; objective; honest; careful; meticulous; diligent; careful; be responsible; open; critical; creative; innovative and caring environment) in their daily activities and 2.2 Rewarding individual work and groups in daily activities as a form of implementation in carrying out experiments and report the results of the experiment; and KD 3.9 Analyzing pollution and its impact on life. Thus the authors carry out further research to explore and determine the effect of applying explicit-reflective approach for creative thinking skills of students with a research question is how to increase creative thinking skills of students after the application of explicit-reflective approach?

METHOD

Research methods in this research is weak experiment with The One-group pretest-posttest design. This design was used for this study explores more deeply about the effect of the use of explicit-reflective approach to creative thinking skills. The design used in this study can be seen in the following Table.1:

TABLE 1. The One-Group Pretest-Posttest Design

Pretest	Treatment	Posttest
O_1	X	O_2

(Frankle, 2009, **hlm.265)**

Participants in this study are 33 students consisting of 13 male and 20 female of student in VII grade at one junior high school in Bandung who have been selected through a random class sampling techniques. Data retrieval creative thinking skills students use essay test consisting of 16 questions divided into four parts on any matter of discourse. Problem on every discourse includes four indicators of creative thinking skills are fluency, flexibility, elaboration, and evaluation. Data retrieval creative thinking skills students performed twice: before and after the adoption of explicit-reflective approach in learning process. Data resulting from essay tests related to creative thinking skills students are also supported through the questionnaire of students to the learning undertaken.

Explicit-reflective approach in learning process done by presenting the phenomenon of the growing environment of the community through three different ways, namely through the presentation of read, pictures and video. After that students demonstrate and formulate various problems of the phenomenon (black box). Then the students collect data or information (alternative answers) about the steps that can be done to solve underlying problems were found based on issues that are given based on their interpretation (tracky traacks), and Students compile, process information based on evidence obtained either from experiments or from sources that support their opinion so as to find proper solutions to problems (puzzle solving activities). The last thing to do in this study is to reflect or discuss the results of the main problems is determined (reflection). To determine the effect of the application of explicit-reflective approach to learning the creative thinking skills of students, then the data generated after learning compared with the national standard IPA is 65. The data generated from essay test related creative thinking skills students are also supported through the questionnaire of students to learning have done.

RESULT AND DISCUSSION

Data from the pretest, posttest, and posttest comparisons with standard values of science at the four indicators measured can be seen in Table 2 below:

TABLE 2. The average of pretest, posttest, N-gain, and significance Result of Creative Thinking Skills of Students

Creative Thinking Skills Indicators	Average value (%)		N-Gain	Category	Significance
	pretest	posttest			
Fluency	58.33	71.72	0.30	Low	0.00
Elaboration	69.70	81.57	0.41	moderate	0.00
Flexibility	47.73	69.70	0.40	moderate	0.04
Evaluation	50.00	74.75	0.49	moderate	0.00
Whole	56.44	74.56	0.42	moderate	0.00

According to Table 2 shows that the overall creative thinking skills students on each indicator has increased before and after implementation of explicit-reflective approach to learning. But although the four indicators creative thinking skills students can be different from one another. In addition, Table 2 show that the adoption of explicit-reflective approach is effective in improving student skills in solving various problems that they find in life. Increased creative thinking skills caused the hallmark of learning using the explicit-reflective approach, students are encouraged to make the observation of a phenomenon that can facilitate them to think as a scientist who can solve the problems identified and discover new concepts through phenomena observed. These findings are in line with the findings obtained by Tanner & Jonnes (2000) which states that learning can be said well if learning can facilitate of students in developing creative thinking skills through the provision of good issues in the form of experiments, investigations, and observations.

Phenomena presented in the learning approach explicit-reflective in this study is a phenomenon that is closely related to student life (Socioscientific issues) so that when students are given the task to observe the phenomenon either through discourse, watching pictures, and watch the video, students can motivated to find out what happens in

that phenomenon. This is in line with the opinion of Harris (Munandar, 2002) which revealed that the characteristics of creative children are children who have a great curiosity, had broad interests, and liked the passion, and the discount creative activities. Additionally, Supardi (2012) also stated that creative thinking skills should not be in touch with the latest discoveries, nice and interesting, but creativity is more about how the invention can be applied.

Explicit-reflective approach is applied in teaching also has a quirk in the fourth stage of committed from the formulation of the problem, looking for evidence, relating it to the concept, as well as find a solution to issues raised. In the implementation of the fourth stage of this, teacher just as a facilitator for the student and the student must play an active role in carrying out these four steps. Therefore, through the four steps in the explicit-reflective approach then students will practice the skills of creative thinking. This is consistent with that proposed by The National Strategies (2008) that the creative thinking skills can be developed using the learning is presented through the phenomenon so that students are able to question, to challenge, to make connections, and to make choices in solving various problems.

The explanation for each indicator creative thinking skills of students before and after the implementation of learning using explicit-reflective approach in this study is as follows:

Fluency

Fluency in this research is the students' abilities to express various problems either in the form of a statement or in the form of questions. In the process revealed various problems, students firstly must be understanding the fundamental problems that occur on the phenomenon presented. In this process of understanding the students will experience the process of thinking like scientists who think about things related to what is happening in its environment. This means that the process is able to develop the skills of current thinking *(fluency)* of students. It is also evident from the results of data analysis showed that fluency aspect increased before and after the implementation of the learning is done in the amount of 0.30 (Table 2). This finding is also supported by Munandar (1999) which states that by giving students the chance to resolve questions can improve the creative thinking of students as encouraging students to be active in giving ideas as much as possible.

Table 2 shows that fluency indicator is an indicator that the increase creative thinking skills are in the low category compared with the three other indicators are in the moderate category. This is because before learning students are able to reveal various problems in the form of questions without thinking about the question raised related to the subject matter of the phenomenon that is served or not so that the value pretest which students earn high enough. These findings are supported by the findings of Djupanda *et al* (2015) which states that the current thinking skills is one right way towards resolving the problems given in the learning though sometimes expressed by students is still not quite right. In addition the results of research conducted by Arvyati *et al* (2015) also suggested that one of the indicators in the creative thinking skills that have an increase in the lowest is an indicator of fluency, it is because the basic capabilities of students who still lower so they put forward a variety of problems not in accordance with the given the subject matter.

After going through the learning process using explicit-reflective approach, totally students give only problems relating to the subject matter so that the results are not much different from the value *pretest*. Moreover, the questions given to students to measure fluency indicator, not specified how much they should be mentioned, this was done so that the researchers actually were able to see whether the students are able to think about matters related to the phenomenon presented. It is also a factor causing an increase in creative thinking skills in fluency indicators are in a lower category, because after learning of students just write down the problems that the students feel much related to the main issue. So the value of thinking skills especially of students in the posttest varies smoothly there is increasing, decreasing, and there are fixed.

Elaboration

Elaboration in this experiment is how the students were able to enrich their ideas on the issues raised. Based on the results of *pretest* and *posttest* and calculations given *N-gain* average value obtained successively students are 69.70, 81.57, and 0.41. This increase included in the medium category. Based on students answer in test shows that the student is able to elaborate on ideas in addressing issues raised. Skills detailing students can increase because student learning is trained to investigate for evidence based phenomena are presented and connect it with the concept derived from a variety of sources, so they get used to writing all the information found on the problem before solving the problems, so that completion issues raised appropriately.

In addition to learning to use the explicit-reflective approach students must also reflect on the knowledge they gained to his friends. It is also able to develop the skills of detailing students, because students are required to describe in detail to her friends the answer to every question presented in worksheets so that his friends understand what the students put forward and opinions expressed may be accepted by the other students.

Flexibility

Thinking skills supple *(flexibility)* in this study is the student's skills dam see a variety of mitigation measures and the settlement of the problem of environmental pollution from the viewpoint of different like settlement from the public, government, and of the cause of the problem *itself.*. At the time *pretest* students only answer from one point of view only, while the *posttest* students are able to express a wide range of settlement issues from different viewpoints. This causes the value *pretest* students to flexible thinking skills *(flexibility)* is lower than the value *posttest.*

Based on Table 2, Increased order thinking skills of students in a category is indicated by the *N-gain* value obtained is 0.40. That is, *the explicit-reflective approach* is able to bring the students to think from different angles. This is because in the learning process of students accustomed to elaborate in advance the causes of the problems that occur so that the solution put forward the idea of solving problems related to their make of the evidence found that and associate it with concepts found.

Evaluation

Evaluate or assess skill shows the behavior of the students were able to take the decision to open situation. In this study, the indicators evaluate this, the students are expected to provide and explain the reasons in an opinion related to the reduction and prevention of environmental pollution problems that occur are presented in the phenomenon. Evaluate the skills of students has increased before and after the learning process, it is shown from the acquisition of *N-gain* obtained in a category is with a value of 0.49 (Table 2). This is due after learning to use the *explicit-reflective approach,* students can reason correctly and precisely why students Why is the students take steps to resolve the problems written on the previous problem. This is because prior knowledge students have constructed independently by searching for evidence and relate to the concept. So that they could easily give a reason in giving completion of environmental problems. This is in line with the results of research conducted by (Djupanda, *et al.,* 2015) which says that:

Person who has the ability to think good in elaboration aspect, tend to resolve the problem with a systematic and successive, more detailed, and full of explanation.

The statement is also supported by the results of research that has been done. This can be seen in Table 2 that the two indicators of creative thinking skills, namely *evaluation* and *elaboration* are two indicators which highest than another indicator. Both of these indicators have N- *gain* value respectively of 0.49 and 0.41 are included in the medium category. Improvingt of student test results are supported through the student questionnaire responses reinforce that learning by using explicit-reflective approach can be done well and be able to support the students' comprehension skills related be for overall students gave positive feedback.

SUMMARY

Implementation of explicit-reflective approach in the learning process significantly affect the increase creative thinking skills of students.

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