

Conference Paper

GI Assisted Go: An Innovative Learning Model to Improve Students Creative Thinking Ability

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Abstract

The purpose of this research is to improve students' creative thinking ability through Group Investigation (GI) learning model assisted by Graphic Organizer (GO) in science education subject by using classroom action research. The subjects of the study were class II/E PGSD, FIP, UNY students. Data collection techniques used observation and test. Data analysis techniques used quantitative descriptive and n-gain. Indicators of creative thinking ability include fluency, originality, flexibility, and elaboration. The results of this study indicate the implementation of GI assisted GO, in Cycle I, the implementation reached 81.25% with good category, increased up to 97.90% in cycle II with very good criteria. The result of creative thinking ability test in Cycle I reached 69.95 with creative category, up on Cycle II to 80.35 with creative category. In addition, the improvement of students' creative thinking ability before and after action is also increasing, the normalized gain test result between Pre-cycle and Cycle I is 0.20 with low category, whereas between Pre-cycle and Cycle II it increases to 0.48 with category medium. The conclusion of this research indicates that the implementation of GI assisted GO can improve students' creative thinking ability in the process of learning activity of science education course.

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The purpose of this research is to improve students' creative thinking ability through Group Investigation (GI) learning model assisted by Graphic Organizer (GO) in science education subject by using the classroom action research. The subjects of the study were class II/E PGSD, FIP, UNY students. Data were collected from observation and test. Data analysis techniques used quantitative descriptive and n-gain. Indicators of creative thinking ability include fluency, originality, flexibility, and elaboration. The results of this study indicate the implementation of GI assisted GO, in cycle I implementation reached 81.25% with good category, increased up to 97.90% in cycle II with very good criteria. The result of creative thinking ability test in cycle I reached 69.95 with creative category, up on cycle II to 80.35 with creative category. In addition, the improvement of students' creative thinking ability before and after action is also increasing, the normalized gain test result between pre-cycle and cycle I is 0.20 with low category, whereas between pre-cycle and cycle II it increases to 0.48 with category medium. The research concludes that the implementation of GI assisted GO can improve students' creative thinking ability in the process of learning activity of science education course.

Keywords: creative thinking ability, group investigation (GI) learning model assisted graphic organizer (GO)

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1. Introduction

Quality human resource is strongly required in national development of the 21 century, especially the development in education. The Department of Primary School Teacher Education (*Program studi Pendidikan Guru Sekolah Dasar (PGSD)*) is a part of the university that can give contribution to develop quality human resources and create professional classroom teachers (Setyaningsih, 2009, p. 12). This department aims to create educational staff who are competent and have good characters (Setiyawati & Rocmah, 2017, p. 32).

As the professional prospective teachers of the 21 century, students should be more creative and innovative facilitators to create a learning process condition that is conducive so their students would have the ability of learning how to learn actively. One of the learning activities requiring teacher's creativity is in the field of science. It is in line with (Mujakir, 2017, p. 88) that teacher's continuity in the learning process of science is determined from teacher's creativity in utilizing all learning sources. Besides, according to (Wannapiroon, 2014) the learning process of science is emphasized to construct knowledge through active learning and high level thinking.

Referring to that statement, the development and teaching practice of science subject in primary schools should be directed to develop students' creative thinking ability so they can be professional teachers. The Department of Primary School Teacher Education has role to prepare its students as professional primary school teachers one of which is to make them have creative thinking ability by giving science education lecture as the mandatory course. It is in line with the curriculum applicable in the Department of Primary School Teacher Education, Faculty of Education Science, Yogyakarta State University.

Creative thinking is a part of high level thinking and it is the highest level of cognitive ability (Anderson, *et. al*, 2001, p. 84). It is the ability of thinking to manage and to construct the existing elements into a new pattern or structure (Arends & Kilcher, 2010, p. 233). In other hand, according to Johnson (2009, p. 214) creative thinking is a thinking result of being attentive to intuition, lighting up imagination, revealing new possibilities, opening amazing perspective, and conveying unexpected ideas. Therefore, creative thinking is a process used when making new idea, creating something new or making quality work.

Creative thinking in the context of learning in university is a thought of implementing imagination and finding solution of learning duty which is also a skill that is as important as attitude and confidence of skills (Coughlan, 2007, p. 3). There are four indicators of creative thinking namely fluency, originality, flexibility and elaboration (Kaufman, Plucker,

& Baer, 2008, p. 17). The form of a teacher's creative thinking in the learning of science in primary school covering the abilities in selecting and utilizing media in the learning of science, developing the teaching materials, developing his creativity, and developing methods in the learning of science (Mujakir, 2017, p. 85). It can be synthesized that as the prospective primary school teachers, students should have creative thinking ability so they would be able making various ideas of learning such as making learning innovation, solving learning problems so creative ideas could improve the quality of learning in primary school.

The lecture of science education is initially focused on material understanding through interpreting the teaching material together and it had not implemented student center learning model in accordance with the curriculum of university so students tend to be passive by not trying to explain the material and they did not get any facilities to develop a thought of how to implement imagination and find solution of science learning in primary school. It became the trigger of students' low level of creative thinking and the result of the initial test showed that the average of students' creative thinking was 62.25 in less creative category.

Facing such condition, the lecture of science education should change the image from mechanical learning into humanism that is interesting, also the learning that emphasizes on students' creative thinking ability. The change meant here is by implementing research model on the learning process of science education. Cooperative learning model can help students to improve their high level thinking ability (Arends, 2004). Therefore, to overcome the problem of the existing learning, the researcher implemented Group Investigation (GI) learning model to improve students' creative thinking ability.

GI learning model emphasizes on heterogeneity and team work among students. The class setting for GI learning model involved students to work in small team by giving them a problem interested to solve, then they will discuss it together in a group, they should investigate and eventually find solution to solve the problem (Joyce, Weil & Calhoun, 2009, p.318). The steps of GI learning model according to Slavin (2015): (1) Identifying topic and adjust it into research groups; (2) Planning investigation in groups; (3) Doing investigation; (4) Preparing final report; (5) Presenting final report; (6) Achievement evaluation.

GI is suitable for lecture activity in the Department of Primary School Teacher Education because it is designed to guide and give assignment to student with intention to make problem clear, to review the problem together so students master information, ideas, skill and they can develop social competence. It is in line with the opinion of

(Mustadi, 2013) who stated that giving assignment to students is a form of activity that is in accordance with the lecture process in the Department of Primary School Teacher Education.

The use of this model in the learning would be optimal if it is followed with the utilization of teaching media. The teaching media that can be used to support GI learning model is Graphic Organizer (GO). GO is a visual graphic presenting the relation of various ideas, concept, facts, and terms in a main topic (Bromley, Irwin- DeVitis & Modlo, 1995). GO is arranged as an aid for students to process all information they obtain from learning both from the activities in laboratory and other sources such as internet, book, newspaper, and magazine (McKnight, 2010).

GO has some characteristics that are similar to learning activities in GI learning model which can facilitate students to think a main topic for discussion, to discuss the material and represent the findings. The characteristics of GO can help students to plan investigation activities in their groups. Therefore, the implementations of GI learning model assisted GO can make the learning to be more effective and it can facilitate students' creative thinking.

Based on the explanation of GI learning model and GO media mentioned, the learning steps of GI learning model with assisted GO can be synthesized in this research: (1) Identifying lecture topic materials and place students into investigation groups, (2) Planning investigation assignment that would be learnt by the help of GO, (3) Doing investigation; (4) Preparing investigation result report; (5) Presenting investigation report; (6) Achievement evaluation. The lecture of science education is expected to be more meaningful, students can actively participate in the learning and they will work in groups to solve the problems related to the topics being discussed so the learning would be more effective and their creative thinking improved.

Based on the explanation above, the researchers conducted classroom action research with purpose to improve students' creative thinking ability. The purpose is formulated in the following statement: "Can the implementation of GI learning model assisted GO improve students' of II/E in the Department of Primary School Teacher Education at the State University of Yogyakarta?" This research is expected to give information and add knowledge on the implantation of GI learning model assisted GO to improve students' creative thinking ability and create professional and quality prospective teachers of primary school.

2. Method

This is a classroom action research. In this research, all of the group members including the researchers and collaborators participated directly in the research. The procedures of the research were done to give actions by analysing situation and condition in the lecture and then arranging action plan that would be done. Next, the researchers were wholly involved in planning the action plans, implementing and observing the actions, reflecting the actions until the improvement in accordance with the indicator of the research result occurred. The actions were repeatedly conducted (cycle) until the success of the action made the researchers confident. The following are the indicators of classroom action research success research;

1. The implementations of learning by using GI learning model assisted GO had fulfilled the steps of learning as a whole with minimum percentage of 80% implemented in "good" category.
2. Students' creative thinking ability reached 80 in the creative category and the improvement of gain through normalized gain test in moderate category (0.3 - 0.7).

This research referred to the spiral model of Kemmis & McTaggart which consisted of planning, implementation and reflection activities (Kemmis, McTaggart & Nixon, 2014, p. 19). The action conducted in this research was the implementations of GI learning model assisted GO.

It was conducted in the S1 Department of Primary School Teacher Education in the Faculty of Education at the Yogyakarta State University of located on the street Mandung, Pengasih, Kulon Progo Regency, the Special Region of Yogyakarta, zip code 55651. The research was conducted in the even semester started from February 2018 until May 2018. The subjects were students of the 2nd semester in II E class of the S1 Department of Primary School Teacher Education at the State University of Yogyakarta consisted of 42 students where 6 of them were male and the rest 36 were female students in the academic year of 2017/2018.

Data collection of this research was done by using observation and test techniques. Observation was used to see the implementation of the action GI learning model assisted GO while the test was used to measure students' creative thinking ability.

The data of observation result on the implementation of GI learning model assisted GO and the result of students' creative thinking test were analyzed by using quantitative descriptive analysis technique as explained in the score distribution and percentage on the set scoring scale category. After the data were presented in percentage, the

next step was describing and drawing conclusion of every indicator. The categories of scoring scale on the implementation of GI learning model assisted GO action were: very good (81%-100%); good (61%-80%); moderate (41%-60%); bad (21%-40%); very bad (0%-20%) (Riduwan&Sunarto, 2011, p. 23). The categories of creative thinking scoring scale were: very creative ($81.25 < x \leq 100$); creative ($62.50 < x \leq 81.25$); less creative ($43.75 < x \leq 62.50$); very less creative ($25.00 < x \leq 43.75$) (Prabowo, 2012, p. 49). Next, the improvement of bound variable (creative thinking ability) could be known by using N-gain score $\langle g \rangle$ with criteria of: high (0.71-1.00), moderate (0.3 -0.70), low (0.0-0.30) (Hake, 1998, p. 65), to know the improvement of students' creative thinking before (pre-cycle) and after action (cycle I and cycle II).

3. Findings and Discussion

The initial condition on the learning of science education had not implemented the learning method that could improve students' creative thinking and the result of the test before the actions were conducted showed that every indicator of creative thinking namely fluency reached 64.4 in creative category, originality reached 60.2 in less creative category, flexibility reached 62.8 in creative category and elaboration reached 61.6 in less creative category. The average of those four indicators was 62.25 which included in less creative category. After doing the preliminary study, the researchers looked for solutions for the existing problem by implementing GI learning model assisted GO to improve students' creative thinking.

The actions in cycle I was firstly started by planning lecture activity covered redesigning *Rencana Pembelajaran Semester (RPS)*, creating *Satuan Acara Perkuliahan (SAP)* for meeting 1 and 2 in cycle I by implementing GI learning model assisted GO and arranging research instruments. Second, it was conducting the lecture that had been designed. Third, it was doing observation on the implementation of action and students' creative thinking ability. The result of cycle I showed that the implementation average of GI learning model assisted GO for 2 meetings achieved 78.5% in good category while the result of the test in cycle I showed that each indicator of creative thinking ability namely fluency achieved score of 71.4 in creative category, originality achieved score of 66.8 in less creative category, flexibility achieved score of 68.6 in creative category and elaboration achieved score of 73 in creative category. The average score of those four indicators was 69.95 in creative category. The improvement of students' creative thinking between pre-cycle and cycle I showed the N-gain $\langle g \rangle$ of 0.2 in low category. Fourth, reflecting the learning actions. The result of the reflection showed that

the implementation of the learning and students' creative thinking had not fulfilled the indicator of research success, such as was caused by the voice of the lecturer that did not reach all students so the explanation was often repeated, besides the students were less orderly in gathering with their groups, those two obstacles made the implementation of the learning was not effective by time.

The actions in cycle II was firstly started by creating *Satuan Acara Perkuliahan (SAP)* of meeting 1 and 2 in cycle II by implementing GI learning model assisted GO. Second, conducting the lecture and solve any occurring obstacles in cycle I. Third, the implementation and students' creative thinking implementation. The result of the actions in cycle II showed that the average of GI learning model assisted GO implementation conducted in 2 meetings achieved 97.90% in very good category while the result of the test in cycle II showed that every indicator creative thinking ability namely fluency achieved score of 80.4 in creative category, originality achieved score of 80 in less creative category, flexibility achieved score of 78.6 in creative category, and elaboration achieved score of 83 in very creative category. The average of those four indicators was 80.35 in creative category. The improvement of students' creative thinking ability before and after the actions (cycle II) showed N-gain $\langle g \rangle$ was of 0.48 in moderate category. Fourth, reflecting the learning actions. The result of the reflection showed that the implementation of the learning and students' creative thinking had met the indicator of research success, thus this classroom action research was stopped in cycle II and the practicum activity was still conducted.

Based on the result of the research, there were improvements in pre-action (pre-cycle) and after action (cycle I and cycle II). Below is the result recapitulation of the research on Table 1:

TABLE 1: Research Result Recapitulation.

Cycle	GI assisted GO Implementation		Students' Creative Thinking Ability	
	Percentage	Category	Score	Improvement
I	78.5 %	Good	69.95 (creative)	0.20 (low)
II	97.90 %	Very Good	80.35 (creative)	0.48 (moderate)

Meanwhile, the figure below is the description of action implementation and students' creative thinking ability improvement.

Students' creative thinking ability of II/E class could improve since there were internal and external factors. The internal factor affecting students' creative thinking was supported by three preconditions namely adequate intellectual ability, motivation and intelligence. And, the external factor of creative thinking improvement was affected by the implemented GI learning model assisted GO. It is in line with Munandar (2009)

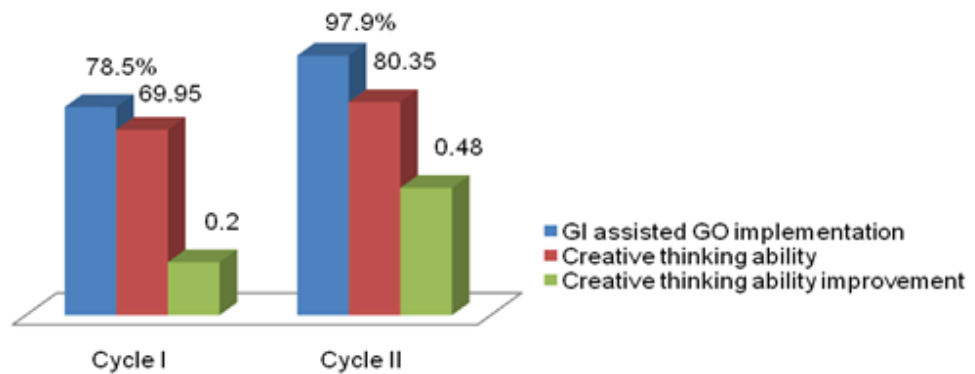


Figure 1: The Improvement of GI assisted GO Implementation and Creative Thinking Ability.

that creative thinking was also supported by internal factors derived from intellectual, motivation and intelligence of an individual as well as the external factor from teacher's support.

Lecturers and students play important role to achieve the goal of the learning. Before the lecture started, the lecturer always made lesson plan by using GI learning model assisted GO and arrange investigation assignment well that could grow curiosity and give challenge to students. The initial learning was started by the lecturer who gave apperception and briefly explained the teaching material; then students were given opportunity to select and make groups in accordance with the topic of investigation that would be studied. Students were given the chance to do creative activity by using Graphic Organizer (GO) and they were directed to implement the skill they have in drawing conclusion when arranging the report of group investigation. The lecturer also gave support to the students by growing belief that every problem can always be solved, so students were became more challenged to get involved actively. Next, in the final teaching the lecturer always gave support and appreciation as well as compliment to the students. It was in line with the work of (Harianti & Margaretha, 2015; Wiranata & Aisyah, n.d.) that students' creativity could be implemented through structured learning; it was where the learning contained opening, point of teaching and closing. Students were given opportunity to do the assignments through group discussion so they could gather ideas, opinions, knowledge and experience from all of the group members and a new excellent idea would occur.

Therefore, the 6 stages of GI learning model assisted GO which were repeatedly conducted for 4 times of meeting in 2 cycles could improve students' creative thinking slowly. Creating a creative thinking obviously requires long process and time. Students' creative thinking ability could improve if they were trained often by doing challenging assignments to occur new ideas and various creative activities along with environmental

condition fulfillment and also supporting facilities and infrastructure. However, the key of success in developing students' creative thinking ability is strong motivation from within of themselves.

4. Conclusions and Suggestions

The implementation of 6 stages innovative learning model GI assisted GO, namely (1) Identifying lecture topic materials and place students into investigation groups, (2) Planning investigation assignment that would be learnt by the help of GO, (3) Doing investigation; (4) Preparing investigation result report; (5) Presenting investigation report; (6) Achievement evaluation, on science education course had been well conducted and it could improve students' creative thinking. The improvement of creative thinking ability occurs because GI learning model assisted GO directs students to play an active role in learning activities, starting from identifying lecture materials together, planning and investigating in groups, reporting the results of group investigations to be discussed together in class, and solve evaluation questions. These activities can direct students to always bring new ideas about learning innovations and solving learning problems so that students' creative thinking ability can improve. In every cycle, both the percentage of each indicator and the average of students' creative thinking always improved. Students' creative thinking significantly improved in pre-cycle and cycle II, it was proven by the result of normalized gain test which was 0.48 in moderate category.

The implementation of GI learning model assisted GO could be implemented again in the learning process of science education even though the implementation of actions had finished; it can also be implemented in other courses in case there is suit ability. Besides, lecture activity should be innovative and creative in accordance with the development of science and technology so the generation of the nation will have quality and implement, develop and create science.

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