Student creative thinking skills of environmental change material using group investigation learning model with interactive multimedia

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Abstract. Group investigation learning model are used to overcome the fundamental problems of students' creative thinking abilities in environmental change material. This study aims to describe the planning, analyze implementation, and test the hypothesis of the application of the group investigation model assisted interactive multimedia on students' creative thinking abilities on environmental change material. The research method used was a pre-experimental design with one group pretest-posttest. The sample was determined by purposive sampling techniques in two classes, namely class X IPA-4 and X IPA-5. The results showed that the validation of the RPP 77.24%, 82% LKS and 85% Interactive Multimedia. The average implementation of teacher activities in class X MIPA 4 is 87.50% and X MIPA 5 90%. While the average activity of student in class X MIPA 4 is 79.50% and X MIPA 5 79.69%. The results of hypothesis testing using paired t test in class X MIPA 4 obtained t count (19.70)> t table (2.03) and in class X MIPA 5 t count (19.05)> t table (2.04). The conclusion is t count > t table, then H0 is rejected and H1 is accepted, meaning that there is a significant difference between of students' creative thinking abilities in environmental change material before and after the application of the group investigation models assisted interactive multimedia.

1. Introduction

Education is the only asset to build quality human resources. Human resources are determined by the quality of education. The quality of education is the ability of educational institutions to empower educational resources to improve the learning skills of the students optimally. Shobri [1] stated that good quality of education should be supported by several factors, namely internal and external factors.

Learning is a conscious effort that teachers have made to their students by directing the process of interaction between students and other learning resources [2]. A good interaction between teachers and students in the learning process is to have a mutual relationship, whether it is a student with a teacher or a student with another student.
The development of student potential must be carried out thoroughly and integrated in learning [3]. Efforts to encourage the development of students' potential certainly cannot be measured in a very short time. Therefore, the entire process and stages of learning must lead to efforts to achieve the child's potential development [4].

From the results of interviews with biology teacher class X MIPA in the learning process, the model that is commonly used in class is the conventional model using lecture learning methods although sometimes it varies using discussion or question and answer. According to Munandar [5] the problem occurs because education in Indonesia is more emphasized on memorization and looking for the right answers to the questions given, so that high-level thinking processes including creative thinking are rarely trained. This is supported when the learning process takes place, visible passivity of students in asking questions, answering and expressing their ideas or ideas.

Environmental change material is material that is able to describe phenomena or events that exist in the environment or everyday life. Therefore, so that students better understand the material, the learning process is assisted by using interactive learning media. The utilization of media through Adobe Flash with various animations in it, students can see firsthand how the process and the effects that can result from environmental pollution.

As a step to improve student learning outcomes, various solutions in the learning process must be sought for a solution. Therefore, it is necessary to improve the quality of learning through appropriate and effective learning models. One model that can be an alternative for students to be actively involved in the learning process and be able to improve the ability to think creatively is the cooperative learning model type of investigation group.

Environmental change material is chosen in the hope that students will be able to contribute in the surrounding environment by providing solutions or ideas about environmental problems. This is in line with the implementation of a competency-based curriculum that directs students to build their awareness and concern as young people towards the natural environment and foster the ability to formulate creative problem solving on environmental issues [6]. In order to that material can easily understood by students, therefore in the learning process, students are faced directly with solving creative thinking abilities. Through the group investigation learning model, the ability to think creatively makes students active learning and provides opportunities for students to think independently [7]. The group investigation model is also aided by the use of instructional media. The use of learning resources in the form of learning media causes the process of communicating communication in the learning process to take place more effectively and efficiently [8].

Based on this background, the following problems were formulated:

- How is the implementation of learning by using interactive multimedia group assisted investigation models on students' creative thinking skills on environmental change material in class X?
- How do students think creatively by using interactive multimedia interactive group investigation models?

2. Methods

This study uses a quantitative approach. The method used is the pre-experimental design method. The design used is one group pretest-posttest. This design involves one treatment group. This design, before being given a treatment, firstly carried out a pretest (initial test) and after the end of the study conducted a posttest (final test).

The study was conducted in class X-MIPA even semester academic year 2018/2019 consisting of six classes with a total of 224 students. From the total number of students of class X MIPA this study used 2 classes as research samples with each class having a total of 35 students for class X MIPA 4 and 33 students for class X MIPA 5. The sampling technique used was purposive sampling with the consideration that the class fulfills the need to conduct research.

Data accumulation techniques used are the data of the learning process implementation obtained through observation sheets, data on the improvement of students' creative thinking skills obtained
through the description test (pretest-posttest). Data on the results of students' creative thinking abilities were analyzed using normality test, homogeneity test and t-test.

3. Results and discussion

3.1. Implementation of interactive multimedia assisted group investigation learning model implementation on environmental change material

| Class  | Meeting | Percentage of implementation | Criteria |
|--------|---------|------------------------------|----------|
|        |         | Accomplish | Not Accomplish |
| X MIPA 4 | 1       | 75          | 25          | Good       |
|         | 2       | 100         | -           | Excellent  |
| Average |          | 87,5        | 12,5        |            |
| X MIPA 5 | 1       | 80          | 20          | Good       |
|         | 2       | 100         | -           | Excellent  |
| Average |          | 90          | 10          | Excellent  |

The results of analysis of teacher observations at the first meeting in class X MIPA 4 obtained an average of 75%, meaning that it cannot be completed with an average of 25%. From these results it shows that the teacher has not been maximized in the learning process that still requires some results that have not been well implemented. At the 1st meeting the stages that were not carried out at the core activities with the stages of the teacher forming a heterogeneity group, cooperation planning, and the stage of presenting the final results. Then at the closing activity. At the phase of teacher forms a heterogeneous group and the planning of collaboration does not take place because the teacher has not adjusted to the student's condition. Then the stages of presenting the final results and evaluation were not carried out because the time available was insufficient besides the learning stages were carried out at the last hour which caused the classroom atmosphere to be not conducive.

In accordance with Ditasari [9] the concentration of learning is influenced by internal factors and external factors. Internal factors include brain fatigue and boredom, while external factors include noise, non-conducive classroom atmosphere and narrow space conditions. Furthermore, the teacher's observations at the 1st meeting in class X MIPA 5 obtained an average of 80% in class X MIPA 5 with both criteria very good meaning there were stages that were not implemented with a percentage of 20%. The aspect which is not implemented in the teacher's activity in the learning process is the stages of the teacher providing motivation. These stages make it difficult for teachers to make efforts to motivate students. However, these stages are very important in the learning process because they make students more ready to learn. As according to Sidik and Sobandi [10] the need for motivation in learning activities to encourage students' willingness and driving force for learning needs. Then the stages of task planning, evaluation, and representatives of each group to receive a reward. These three stages occur because the teacher is still unable to adjust to the student's condition and the syntax of the model applied to the learning process, and the teacher has not mastered the class well. As according to [11], classroom management is an effort to utilize the potential of the class conducted by the person in charge of teaching and learning activities in order to achieve optimal conditions so that learning activities can be carried out in accordance with the expected goals. In addition to skills in managing time, teachers have skills regarding matters related to the learning process. This is appropriate at the 2nd meeting, where the activities of teacher implementation in MIPA 4 and X MIPA 5 classes reached a maximum value of 100% meaning that all stages of the activity were carried out well.
Table 2. The implementation of student activities in class X MIPA 4 and X MIPA 5.

| Class   | Meeting | Percentage of implementation | Criteria |
|---------|---------|------------------------------|----------|
|         |         | Accomplish | Not Accomplish |
| X MIPA 4 | 1       | 71,15       | 28,85     | Good     |
|         | 2       | 86,83       | 13,17     | Excellent|
|         | Average | 78,99       | 21,01     | Good     |
| X MIPA 5 | 1       | 72,55       | 27,45     | Good     |
|         | 2       | 86,83       | 13,17     | Excellent|
|         | Average | 76,69       | 20,31     | Good     |

At the 1st meeting the stages that were not carried out well were at the apperception stage with a percentage of 71%. The activities of students who are less implemented because students do not have confidence in answering questions or expressing opinions. In addition, some of these students did not understand the material being studied so that from 35 students only 5 students answered the apperception stage. As Nita [12] says that the ability to express opinions can train students to be individuals who are brave without having to accept something that is either right or wrong. If students do not have the ability to express opinions, it is feared that they will experience obstacles in achieving success in learning because the ability to think affects their ability to think.

Then the stages of students watching videos with a percentage of 9%. The activity was not carried out properly because when the learning process took place some students chatted and were sleepy, so the material delivered by the teacher in the video was not understood by students. However, the use of instructional media can facilitate the process of interaction between teachers and students and facilitate student understanding in learning. As stated by Sadiman [13] learning media are all things that can be used to channel messages from the teacher to students so that they can stimulate the thoughts, concerns, and interests and understanding of students so that the learning process occurs. The final stage is the presentation of the final results and evaluation. Furthermore, the results of student observations at the 1st meeting in class X MIPA 5 obtained a percentage of 72.55% in class X MIPA 5 with both criteria both means there are stages that are not implemented with a percentage of 27.55%. Aspects that are not implemented in student activities in the learning process are the stages of responding to motivation given by the teacher, Then the stages of students observing videos and answering teacher questions, the stages of presenting the final results, and the stages of evaluation.

3.2. Creative thinking ability of students with the application of the interactive multimedia assisted group investigation learning model on environmental change material class X MIPA 4 and X MIPA 5

Table 3. Pretest and posttest results for class X MIPA 4 and X MIPA 5.

| Class   | Data | Average | Interpretation |
|---------|------|---------|----------------|
| X MIPA 4 | Pretest | 37.92   | Deficient      |
|         | Posttest | 65.14   | Good           |
| X MIPA 5 | Pretest | 37.87   | Deficient      |
|         | Posttest | 68.25   | Good           |

The results of the research showed that there were differences in students’ creative thinking abilities in terms of the average pretest and posttest scores. This happens because when working on the pretest questions students have not received learning material so students answer the questions based on their initial knowledge. Based on the results above, the increase in value obtained has good criteria. This is because in group investigation learning allows students more freedom to learn independently and exchange ideas with other fellow students. This is in accordance with Rusmin and Deskon [14] which states that creative thinking skills that use basic thinking processes greatly help students in solving difficulties, gathering facts about difficulties and determining the additional information needed.
Table 4. Percentage of class X MIPA 4 creative thinking ability achievement.

| INDICATOR            | Pretest | Posttest | Average Criteria | Average Criteria |
|----------------------|---------|----------|------------------|------------------|
|                      | MIPA 4  | MIPA 5   | MIPA 4           | MIPA 5           |
| Think Fluently       | 41.42   | 37.5     | Very Deficient   | 70.53            |
|                      |         |          |                  | 76.32            |
| Think Flexibly       | 36.97   | 36.68    | Very Deficient   | 61.78            |
|                      |         |          |                  | 60.22            |
| Think in Detail      | 27.85   | 29.54    | Very Deficient   | 65               |
|                      |         |          |                  | 68.56            |
| Original Thinking    | 42.5    | 51.89    | Very Deficient   | 57.14            |
|                      |         |          |                  | 60.22            |

Based on this, at posttest the average achievement of all indicators of creative thinking ability has increased. The ability to think smoothly is the ability to produce a number of ideas with the characteristics of triggering many ideas, many answers [15]. Achievement of fluent thinking indicators presented in questions number 3, 10, 17, and 18 included in the medium category with a percentage of 70.53% in class X MIPA 4 and 76.32% in class X MIPA 5. Based on the total percentage obtained shows that the ability to think fluently is the easiest indicator of creative thinking. As according to Armandita et al., [16] this indicator of smooth thinking is the highest indicator because when students are given a problem, they immediately work because they are used to working on the same problems given by the teacher. The ability to think flexibly is the ability to produce diverse ideas [15]. The ability to think originally is a skill in giving unusual answers, other than others, which is rarely given by most people [5]. The achievement of detailed thinking indicators presented in questions number 8 and 12 falls into the medium category with a percentage of 57.14% in class X MIPA 4 and 60.22% in class X MIPA 5. The low percentage of the average identifies that there are insufficient sensitivity students in answering questions that have been given. As according to Armandita et al., [16], the low average percentage of original ability identifies that there is a lack of sensitivity of students in answering the questions given. Sensitivity to the questions given is one of the factors needed in realizing indicators of the ability to think creatively so as to bring up new ideas or ideas that have never been thought of by others.

Hypothesis testing for class X MIPA 4 with a significance level of 5% obtained tcount (19.70) > ttable (2.03) and in class X MIPA 5 obtained tcount (19.05) > ttable (2.04). It can be concluded that H0 is rejected and H1 is accepted, which means that there are differences between students' creative thinking abilities before and after applying interactive multimedia-assisted group investigation models on environmental change material.

4. Conclusion
The results of the observation sheet analysis that have been carried out, it is known that all stages of the interactive multimedia-assisted group investigation learning model are well implemented. This shows that the teacher can carry out the role in accordance with the learning syntax.

The results of students' creative thinking ability by applying interactive multimedia-assisted group investigation models obtained an average value of pretest X MIPA 4 of 37.92 increased in posttest results with an average value of 65.14 with good criteria. While the average yield of pretest X MIPA 5 is 37.87, increasing the posttest results with an average value of 68.25 with good criteria. Hypothesis testing results show that tcount > ttable in both classes, then H0 is rejected and H1 is accepted, at a significance level of 5%, which means there is a good difference between students' creative thinking abilities before and after applying interactive multimedia-assisted group investigation models.

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