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Effect of method of learning and the ability to think of critical of learning outcomes IPA (Experiment Student Class V SDN Limbangan Central III District of BI Limbangan Garut 2017)

Septie Elpridha¹, Yetti Supriati², Riana Bagaskorowati³

^{1 2 3}Pascasarjana Universitas Negeri Jakarta-Indonesia
elpridhaseptie@gmail.com

Abstract. This study aims to know Influence Learning Method (Group Investigation and Guided Inquiry) and the ability to think critical of the results ipa learning. The research was conducted on students at Central Elementary School III Kecamatan Limbangan BI Limbangan Garut, with research subjects are students of class V. This study is an experimental method with 2 x 2 (factorial design). In this study, there are three variables that were examined are: Learning Outcomes IPA as the dependent variable (Y). While the independent variables are (1) Method of learning (Group Investigation and Guided Inquiry) (2) Critical Thinking Skills (high Critical thinking skills and critical thinking skills high). In this study, Yang became the target population (target) is all students of State Elementary School Middle Limbangan III Kecamatan BI Limbangan Garut. While the population is affordable is the class V SDN Middle Limbangan III Garut. The number of samples in this study are numbered students. Sampling using simple random sampling. Hasil showed that: (1). Learning outcomes IPA students that using model Group Investigation more high of Learning Outcomes Science students use learning methods Guided Inquiry, (2) There is an interaction effect between the use of teaching methods and ability Berpkiri Critical to the ability of learning outcomes IPA. (3) Students who have the ability Critical thinking high value IPA higher learning results when using the learning Group Investigation. (4) Students with Low Critical thinking skills, value learning outcomes IPA lower when using Guided Inquiry Learning.

Keywords. Methods of learning, critical thinking, learning outcomes

1. Introduction

Education is a process of learning in which learners (students) receive and understand knowledge as part of her, and then process them in such a way to kindness and common progress. Based on the mandate of the Act of 1945, the definition of primary school education in an effort to educate and print life of the nation who fear, love and pride in the nation and the state, skilled, creative, well-mannered polite and able to solve the problems in the environment. On the basis of the then education should be a top priority in a good nation. Education will foster a man who has a good personality in thought and morality.

Improving the quality of education is necessary in a nation that wants to go forward, because of the quality education can support development in all field. Education is conscious or deliberate effort given by educators to students in order to reach maturity. Therefore, in addition must have a clear basis and purpose, education must get also determine the direction in which the students will be taken, as well as educators must have the content of education for

the students. Educators are professionals in their field, have high moral values, have a high motivation to work, and have a spirit and a strong desire to improve quality and create a more advanced learners is one indicator of a good education system. Educators is successful if it is able to encourage, organize, and direct all their students to achieve national education goals. Educator holds a very important role in establishing the character of the nation through the development of character and personality as well as moral values and religion. The role of educators in education can not be replaced even though today's technological development is so rapid. Educators have a duty and responsibility as a mentor for students, in order to provide assistance to students in solving its problems, although basically the student is an active creature. He had an urge to do something and have the will and the desire itself.

A good education builds upon the activity of students in the learning process. Thus education will focus on what students do to search for information in answering the curiosity of students towards science subjects, instead of referring to what made the teacher. In other words the teacher only as a facilitator and motivator and as a curriculum developer. The teacher's task is to determine the student's interests and the interests optimize a learning experience for students.

But the reality of education in Indonesia, especially at the level of primary school education (SD) are still using conventional methods, ie teacher-centered learning only. Activities students may say just listening to the teacher's explanation and record things that are considered important. Students are less geared to active learning activities. Students are only considered as objects that only accept materials that educators say. Teacher explains only a little product and process. One reason is the density of the material to be discussed and resolved by the applicable curriculum. In fact, in discussing the subject matter is not enough emphasis on the product, but more important is the process of proving or get a theory or law. Things like this in our education is certainly very big influence on the quality of graduates (output), which is a product of our education. Students' knowledge is limited to what the educator explained, while explanation educators in accordance with the mastery of the material, so that the knowledge students will depend on the mastery of educators on the subject matter. It has a dominant influence on the failure in the educational goals have been formulated. Students do not have a strong desire to participate in the learning process, students' knowledge was minimal and did not develop optimally.

On the results of preliminary observations on the SDN Central Limbangan III found the problem related to a method of learning, learning is still using the conventional method, which is teacher-centered learning process students are only required to listen to the explanation given by the teacher. The learning activities seem uninteresting and boring, is the meaning conveyed by the students based on interviews that learning activities, especially in science this is considered very boring, student activities just listen and record what is conveyed by teacher. Students tend to be less active because learning activities take place in the same direction. The situation of teaching and learning activities such as above would be very tedious and the results were less productive. matching explanation fifth grade teacher at SDN Central Limbangan III through an interview, that learning outcomes, especially in science subjects has decreased. In this study, researchers conducted a data collection results of science teaching in class V with the material to understand the changes that occur in nature relation to the use of natural resources in the last 3 years at SDN Limbangan Central III, of the data can be obtained a description of the learning outcomes of students learning process using methods conventional. Such data can researchers use to see the extent of learning by using a method that only gives learners as objects rather than as personal enabled.

Problems In connection with the above, then with the right learning method selection can certainly help in order to improve student learning outcomes. Teachers should think about what proper method to be applied in science learning in order to improve student learning outcomes in science subjects. The learning method will use in learning science teachers should refer to the main purpose of learning science itself, namely to help students understand science in the content - the process - the wider context, especially in everyday life. At the basic education level of these efforts can be done by combining elements and practices in science teaching, through reading science, science writing, and talking about science. Learning today, especially in science subjects is expected to lead to the achievement of all the good domains of cognitive, affective and psychomotor through innovation and approaches and a variety of teaching methods. Learning should be seen as an attempt to develop all the potential of the students. Learning is not riveted to the achievement of one aspect but all aspects in order to achieve changes in the behavior of students towards educational goals. Thus the teaching methods used should be able to develop an integrated whole aspek. With the effort of the students are expected to develop an attitude of self-confidence, enhance problem-solving skills, ways of thinking kritis and able to convey the idea or ideas.

From the above description, then one solution that can solve the problem of learning is seen today is to improve the quality of education through learning approach using appropriate learning methods. The learning method plays a very important. The success of the learning strategy relies heavily on the skill and creativity of educators teaching methods. one of the methods that are considered to resolve the above problems is a contextual type guided inquiry and investigation group type cooperative model (GI). In this study, researchers wanted to determine the extent of the effect resulting from the use of models contextual type guided inquiry and the cooperative model type group investigation (GI), the learning model which gives better results in efforts to improve the ability of critical thinking and student learning outcomes in science subjects fifth grade students in elementary school SDN Middle Limbangan III

IPA learning outcomes

learning outcomes are changes in behavior after participating in the learning process in accordance with the purpose of education. Humans have the potential psychological behavior that can be educated and changed behavior includes a cognitive domain, affective and psychomotor. Learning pushing for changes in the behavior of the domains so that the learning outcomes represents a change of behavior in the domain of cognitive, affective and psychomotor. The results of student learning is essentially a change in behavior. Behavior as a result of learning in a broad sense includes the fields of cognitive, affective, and psychomotor. In the assessment of learning outcomes the role of instructional objectives containing formulation capabilities and the desired behavior controlled by the student becomes an important element as the basis and reference for the assessment. Assessment of learning outcomes by educators has a function to monitor the learning progress, and detect the need for improvement of student learning outcomes on an ongoing basis.

The learning result is the ultimate goal of school learning, learning outcomes can be seen from a positive change in behavior, both in the affective, psychomotor, and cognitive. Learning outcomes can be improved through conscious effort made to systematically and continuously to achieve positive results is referred to as a learning process. The learning process is done correctly and productive will produce good output quality. A person is said to have been successful in learning if he had positive changes both in behavior or of skills and attitudes. Learning outcomes or behavior changes that lead to the ability to form the main results of

teaching (instructional effect) and byproduct Bridesmaids (nurturant effect). The main outcome of teaching is the ability of learning outcomes that are planned to be realized in the curriculum and the learning objectives. Bridesmaids results are being achieved learning outcomes but are not planned to be achieved. For example, after attending lessons like math students previously not preferred because students are happy with the way teachers teach.

From the various descriptions above concerning the notion of learning outcomes of some of the experts I can conclude that the learning outcomes are changes that occur in students regarding changes in the value of attitude, skills changes, and changes in knowledge. The changes that occur as a result of learning should be a changer that is positive and constructive. The factors that affect student learning outcomes are external factors and factors in and of itself, such as the motivation to learn and the ability of the students have. Factors within him this has contributed greatly to the learning outcomes achieved, because essentially learning outcomes represents a change in the behavior of individuals who recognized and pursued success.

IPA is a science in personal and social constructed based on constructivism approach. Learning science requires ample opportunity for students to conduct science inquiry and construct optimal as possible in accordance with their respective capacities by utilizing collaborative climate in the classroom. Here, the role of teachers is vital to be able to manage the process of learning science well. In the perspective of constructivism learning as a process of change in the conception. Because learning is seen as a change of conception, then we can say learning is a rational activity. Learning will only happen if someone changes or willing to change his mind (West & Pines, 1985: 211-214). In the students' conceptions change is seen as a processor and information experience, not only as a reservoir of experience and information. So learning as a rational activity, the intention is to learn that what is done by a person against an idea or an idea he had. IPA (science) is an attempt by man in a systematic, organized, and structured as a creative process that is driven by curiosity, determination, and perseverance that can be repeated by others over and over again and the result is an explanation of nature's secrets expressed in the form of facts, definitions, concepts, principles and scientific theories.

It can be concluded that the nature of science includes three main elements: (1) Attitude; curiosity to know about the objects, natural phenomena, living beings, as well as the causal relationship that raises a new problem that can be solved through correct procedures: IPA (science) is open ended. (2) process; troubleshooting procedures through the scientific method; scientific method includes the preparation of the hypotheses, designing experiments or trials, evaluation, measurement and conclusion. (3) Products; a fact, konsep, principles, theories, and laws; the application is in the form of the application of the scientific method in everyday life.

From the description above it can be concluded that, in order to develop the quality of science teaching educators (teachers) can develop a variety of learning models, in this study applied learning models is Group Investigation (GI) and contextual models tipe guided inquiry. There are several things that need to be improved in order to improve the quality of science teaching them, the active role of students in an effort to construct knowledge significantly, the importance of linking knowledge of the early students with information that students can better the learning process in the classroom as well as information that students can independently (books, the internet, real-world problems, etc.), students are given ample scope to be able to discuss ideas and good ideas by means of dialogue with the teacher and discuss with friends in class. It is expected to boost thinking skills and the development of the concept of IPA IPA students.

Method of learning group investigations

Group Investigation (GI) is a learning model that emphasizes choice and control students on applying the techniques and teaching classes diruang.

In the method of Group Investigation (GI), students are given full control and choice to plan what you want to be studied and investigated. This method involves students from the planning, both in determining the topic as well as a way to learn through investigation. This method requires the students to have a good ability to communicate well in group process skills (group process skills).

Another advantage of the method Group Investigation (GI), namely: (a) Personally, the learning process can work freely, encouraged to initiate creative, active, self-confidence can be further increased, can learn to solve and deal with a problem, develop enthusiasm and a sense of the physical. (b) Socially, increase learning to work together, learn to communicate well with their own friends and teachers, learn to communicate well in a systematic, learn to respect the opinions of others, increasing participation from making a decision. (c) Academically, students are trained to membertanggung responsibility for the answers given, work sistematis, develop and practice physical skills in various fields, plan and organize work, check the truth of the answers they make, pobud think about how or strategies used in order to get a generally accepted conclusion.

Learning methods Group Investigation (GI) ensure more students have a role that is central and active role in the learning activities. Students become more independent in fact finding and data through exploratory activities that students can use to make a conclusion. The learning model Group Investigation (GI) encourage students to learn more active, students are required to always think about the problem and they are looking for their own answers to these problems. Thus, students are trained to develop their thinking skills and practice the skills knowledge so that knowledge and experience will be more meaningful learning.

Inquiry learning model

inquiry learning model is one model that can encourage students to be active in learning. Kunandar stated that the inquiry is pembelajaran learning activities where students are encouraged to learn through their own active involvement with the concepts and principles, and teachers encourage students to have the experience and conduct experiments that allow students menemukan principles for themselves. More Vienna stated that the inquiry learning strategy is a series of learning activities that emphasize the process of thinking critically and analytically to seek and find their own answer to the problem in question. Very tastefully inquiry learning activity of students while teachers could provide motivation and direction. Inquiry method is a method that is able to lead learners to realize what had been obtained during the study.

Inquiry puts the learner as an active learning resources. , Gulo stated strategy means an circuited inquiry learning activities that involve maximally throughout the student's ability to search and investigate in a systematic, critical, logical, analytical, so that they can formulate their own findings with aplomb. A study will generally be more effective if carried out through learning models that include groves of information processing. Hi this is because information processing clumps emphasis on how a person thinks and how it impacts the ways of processing information, according to Downey in Joyce stated:

The core of good thinking is the ability to solve problems. The essence of the problem solving is the ability to learn inpuzzling situations. Thus, in the particular school of Reviews These dreams, learning how to learn pervades what is the taught, how it is taught, and the kind of place in the which it is taught.

The above statement shows that a good nucleus of thinking is the ability to solve problems. The basis of solving the problem is the ability to learn in the process of thinking. Thus, it can be implemented that students should be taught how to learn covering what is taught, how it is taught, the type of condition to learn and gain new insights. One that is included in the information processing model is a model of inquiry learning.

From the various definitions of proficiency level, it can be concluded that the inquiry learning is learning that emphasizes the bagimana educator (teacher) to place students in environments that require students to learn actively, express all the thoughts and ideas, raise questions and problems and encourage students to do research or experiments or investigations to motivate the students, but provide direction and guidance for students to find answers scientifically through study and scientific research.

The purpose of the inquiry learning strategy is to develop the ability to think in a systematic, logical, critical, or develop intellectual abilities as part of the mental process. With students not only required to master the subject matter, but rather to how they can use their potential to further develop their understanding of a particular subject matter. The strategy is a form of learning approaches and learner-centered. Say so, because in this strategy students holding a dominant role during the learning process takes place.

Thus the inquiry-based learning system is very useful, both for students and for teachers, when used in the process of learning - teaching. Below is a table that shows a series of activities and benefit from the involvement of students and teachers to the four main aspects of learning-based inquiry:

Ability to think of critical

Critical thinking is a process that is focused and clear used in mental activities such as solving problems, making decisions, persuade, analyze assumptions, and conduct scientific research. Critical thinking is the ability to argue in an organized manner. Critical thinking is the ability to systematically evaluate the weight of personal opinion and the opinion of others. Critical thinking is a systematic process that allows students to formulate and evaluate their own beliefs and opinions. Critical thinking is an organized process that enables students to evaluate books, assumptions, logic, and language underlying the statements of others.

Critical thinking to analyze the arguments and bring insight to each of meaning and interpretation, to develop the pattern of a cohesive and logical reasoning, understanding the underlying assumptions and biases each position. Finally it can give a presentation model that can be trusted.

Edward De Bono believes that critical thinking is a skill that is valuable in sorting out which of the many ideas or consideration of a decision.

Elder reveals the five characteristics of someone with critical thinking skills, namely: 1) to raise questions and issues that are important and to formulate clear and precise; 2) gather and assess the relevant information as well as using abstract ideas to interpret effectively; 3) to conclude and give a good solution, and tested based on relevant criteria and standards; 4) have a thought to the idea of openness, recognition, and other values; 5) be able to communicate effectively with others to solve complex problems. While Edward reveals kendaftarkan thinking skills ktitis as follows: recognize the problem, find ways that can be used to address these problems, collect and collate the necessary information, recognize assumptions and values that are not expressed, understand and use language precise, clear, and since has, analyzing data, assessing the facts and evaluate the statements, recognize the logical relation between the problems, draw conclusions and similarities necessary, examine the similarities and the

conclusions of someone take, rearrange the patterns of a person's belief is based on a broader experience, make a proper assessment of things and certain qualities in everyday life.

2. Methodology

The study was conducted by using the experimental method to compare two methods of learning *Group Investigation* (GI) and the moderator variable Guided Inquiry with critical thinking skills.

The design of this research study *treatment by the level of 2x2*, there are three variables of the study. The variables of this research consists of one independent variable and the moderator variables, the independent variable is the learning method that consists of a method of *investigation group* (GI) (A₁) and guided inquiry method (A₂). While moderating variable in this study is the high critical thinking ability (B₁) and the ability to think critically low (B₂), while the variable berikutnya is the result of learning science. The study design is used which is as follows:

Table 1. Design of Experiments With Treatment by Level 2x2

Learning Method (A)	Methods Learning <i>Group Investigation</i> (GI) (A ₁)	Learning Model Guided Inquiry (A ₂)
The ability of Critical Thinking (B)		
Critical Thinking high (B ₁)	A ₁ B ₁	A ₂ B ₁
Critical Thinking Low (B ₂)	A ₁ B ₂	A ₂ B ₂

the research on SDN Central Limbangan III in Sub Balubur Limbangan Garut. The population of this research is class student V SDN Limbangan middle III. The choice of location research based on consideration of the condition of the school, the location, the condition of the learning environment, teacher profiles, the average level of achievement UASBN IPA included into the category of being, as well as the availability of facilities and infrastructure. Samples were all students of class V SDN Limbangan middle III. Selection grade level for students of class V SD average age of 11 years and above and is assumed to already have the basis of the critical thinking skills that can be applied in matters of concrete

The type of achievement test IPA is the value obtained after answering the question description that measure learning outcomes fifth grade science students in mastering the science that consists of cognitive, apektif, and psychomotor, can apply them in our daily lives, able to communicate about science, and respond to problems and issues concerning the IPA developing community indicators: a) identify the questions scientific, b) identify the evidence, c) draw conclusions, d) communicate conclusions, e) demonstrate an understanding of scientific concepts.

The type of instrument to see the ability to think critically is to use questionnaires /*questionnaire*.

Data analysis techniques in this research is to use a 2X2 ANOVA. In order for a hypothesis test can be done then ever necessary to test the normality test requirements and test homogeneity data.

3. Results and Discussion

1) First Hypothesis

Learning Outcomes Science student using Learning Methods Group Investigation (GI) is higher than the results of student learning using Guided Inquiry Learning Method.

The average results of students using the Learning Science Learning Methods Group Investigation (GI) (A1) is 24.45 while the average Results Learning IPA using Guided Inquiry Learning Method (A2) is 17.10. ANOVA calculation results obtained two lines of F for Learning Method of 315.204 while the F table = 4.11 at the significance level $\alpha = 0.05$. Therefore, Average Score Results Science Class students who use the Method of Learning Group Investigation (GI) is greater than the average Results Science Class that uses the Learning Method Inquiry guidance ($\mu A1 > \mu A2$) and value ($F_{count} > F_{table}$), then (H_0) is rejected and H_1 accepted it means that there are significant differences between the average results for Learning science student using Learning Methods Group Investigation (GI) (A1) and the average results for science Class that uses the Learning method Inquiry guidance (A2)

advanced test use Tuckey test showed that the value $Q_{hitung} = 25.11$ greater than $niai Q_{tabel} = 3,031$. The conclusion is that the student learning outcomes IPA using Method Learning Group Investigation (GI) is higher than the results for Learning Science student using Guided Inquiry Learning Method.

2) Second Hypothesis

Effect of interaction model of learning Group Investigation (GI) and science learning outcomes to students' critical thinking skills.

Results of ANOVA calculation that F_{hitung} for interaction factor is greater than 91.036 F_{table} is 4.11 on the real level $\alpha = 0:05$. There is the influence of the interaction between the use of teaching methods and learning outcomes of students' scores IPA critical thinking. The data concluded that H_0 rejected and H_1 accepted.

Tuckey test was conducted to see the significance of which proves that there is an interaction effect between learning method and critical thinking skills to the learning outcomes IPA. The calculation result $Q_{hitung} (A1B1 \text{ and } A2B2) = 26.99 > 3,031$. There is the influence of the interaction between the use of teaching methods and learning outcomes IPA against the students' critical thinking skills.

3) Third Hypothesis

Students who have high critical thinking ability, learning outcomes IPA is higher when using the Method of Learning Group Investigation.

The average score of science learning outcomes of students using Learning Methods Group Investigation (GI) with high critical thinking ability (A1B1) is 26.70, while the average score of Learning Outcomes IPA using guided inquiry learning method with high critical thinking ability (A2B1) is 18.80 and Tuckey test showed that Q_{hitung} ie 27.30 $> Q_{tabel}$ ie 4.34 at significance level $\alpha = 0.05$, thus it can be concluded that H_0 rejected and H_1 accepted which means that for students who have critical thinking abilities high, higher critical thinking skills when using the method of Learning Group Investigation (GI).

4) Fourth hypothesis

Students who have critical thinking ability is low, lower IPA learning outcomes using Guided Inquiry Learning Method.

The average score of science learning outcomes of students using Learning Methods Group Investigation (GI) with lower critical thinking ability (A1B2) is 22.20 while the average score of Learning Outcomes IPA using guided inquiry learning method with low critical thinking ability (A2B2) is 18.80 and Tuckey test showed that $Q_{hitung} = 8,21 > Q_{tabel} = 4,33$ at significance level $\alpha = 0,05$, thus it can be concluded that H_0 rejected and H_1 accepted which means that for students who have a lower critical thinking ability, the lower critical thinking skills using Guided Inquiry Learning method.

4. Conclusion

Based on the results of data analysis, hypothesis testing results and the results of the discussion of the research that has been obtained, it can be explained some conclusions, implications of research and suggestions as follows:

- 1) The results showed that the learning outcomes of science students given learning methods Group Investigation (GI) is higher than the results learn science students given Guided Inquiry method. Learning Methods Group Investigation (GI) can improve learning outcomes IPA Elementary School fifth grade students.
- 2) There is the influence of the interaction between learning method and critical thinking ability of students to learn science results. IPA learning outcomes are determined by methods of learning and critical thinking skills.
- 3) IPA given learning outcomes learning methods Group Investigation (GI) is higher than that given Guided Inquiry learning method on students who have the ability to think critically high. Students with high critical thinking skills more suitable given Learning Methods Group Investigation (GI).
- 4) IPA given learning outcomes learning methods Group Investigation (GI) is higher than that given Guided Inquiry Learning Method to the students who have the ability to think critically low. Students with poor critical thinking skills more suitable given learning methods Group Investigation (GI).

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