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APPLICATION OF GROUP INVESTIGATION LEARNING MODELS AND LEARNING STRATEGIES INQUIRY TO IMPROVING LEARNING OUTCOMES OF STUDENTS CLASS XI SMA NEGERI 4 AMBON

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ABSTRACT

Group Investigation is a learning model whose learning activities are filled with agreements between teachers and learners in terms of group sharing, sharing of tasks or sub-themes to be studied, schedule of presentations, etc. Inquiri learning strategy is a series of learning activities that emphasize the process of thinking critically and analytically to find and find answers to questions or problems in question. Miniature is a medium used in learning that resembles an original object or is smaller than the original object by a specific scale and is 3D-shaped and visually transmitted. Cognitive is, the capacity to observe, observing, remembering, and reasoning involves learning using social findings such as language, systematics, and memory tools. Metacognitive is the skill of the student in organizing and controlling the thinking process of the learner who learns to have certain skills to regulate and control what is learned. The aim of this study is to find out how the Integration of Learning Model Group Investigation and Learning Strategy Inquiry impact on cognitive and metacognitive learning outcomes in SMA Negeri 4 Ambon students. The methods used in this research are descriptive statistics and iferential statistics. Based on the cognitive learning results have a sig value of 0,000 because of the sig value 0,000 ≤ 0,05 then the research hypothesis accepted means that there is an influence of learning model group investigation and strategy of inquiries on the improvement of learning results in students of class XI IPA SMA Negeri 4 Ambon. The metacognitive learning result has a significant value of 0,006 because of sig value 0.006 ≤ 0.05, then the hypotheses accepted mean that there are influences of learning models of group investigations and learning strategies of enquiries against improvement in learning results of metacognitive in students in class XI IPA SMA Negeri 4 Ambon.

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INTRODUCTION

Group investigation is a form of cooperative learning model that emphasizes student participation and activity to search for lesson information to be learned through available materials such as from textbooks or searching through the Internet. (Wena, 2011). Rusman, (2012) mentions that the cooperative learning model of the type of group investigation was developed by Shalomo and Yael. Generally, the planning of class organization using the technique of cooperative group investigations is a group formed by the students themselves with a population of 2-6, each group is free to choose sub-themes from the entire unit of material (a language tree) to be taught, and then or to propose group reports. Next, each group presents its report to the whole class, to share and exchange information with them. The Group Investigation cooperative learning model will be more effective if the teacher understands the important components of cooperative education. Moreover, in the Group investigation model, the teacher acts only as a source and facilitator. Teachers oversee the course of group investigations, to see if they can manage their tasks, and help with any difficulties they encounter in group interaction, including problems in performance to tasks related to learning. (Slavin, 2011). Based on previous research and the theory that has been described shows that the learning model of GI focuses on the process of investigation and collaboration of learners, while the inquiry approach also focused on the research and activity of students. Therefore, the two can be combined into a single ageing, the Group Investigation Inquiry Learning, or abbreviated as the GI learning model carried out in eleventh grade students in the study of the circulatory system.

Inquiry learning has been widely used in biology learning. Some researchers have applied inquiry teaching to the concepts of anatomy and physiology of vertebrate animals. (Bagatto, 2009; Chaplin, 2003; Kolhorst, 2001; Meuler, 2008; Brown, 2010). The researchers showed that the inquiry approach is suitable for biology lessons in schools. Inquiry in learning emphasizes the discovery activities carried out by students and requires intensive activity. Barlia (2006), inquiry on the fact that his intention was to guide the pupil so that he can find something by and for himself. Natalina et al (2013) stated that the guided inquiry model can be used as one of the alternative learning models that can build students' scientific attitudes. The integration of GI and guided inquiry learning models is a learning method with the following syntax. Phase I: Identifying topics and organizing students in groups (Guided GI and Inquiri integration). Phase II: Discussion of problems (guided inquiries). phase III: Planning learning tasks (Guided GI integration and inquiry integration); phase IV: Implementation of infestation (Guideled GI Integration and Inquiry); Phase V: Preparation of the final report (GI); stage VI: Presentation of final reports (GI); phase VII: Conclusions (GI). stage VIII: Evaluation (GI), phase IX: Extension/repeatment (Inquiri). (Pujiastuti, 2016).

The intended collaboration is a collaboration between Group investigation (GI) and the Inquiry Learning approach. According to Santyasa, (2019) the GI learning model is suitable for learning experiences that are oriented to the results of investigation, analysis, and synthesis of information in an effort to solve a problem, so it is appropriate for use in science learning. Pandi et al, (2015) also concluded that by using the learning model cooperative model type group investigation students can play an active role in the learning process thus influencing the elevation of student learning outcomes. According to Doymus (2009) learning Group investigation is suitable for science lessons that aim to involve students in scientific research and encourage students to contribute to learning in the classroom. Meanwhile, Arinda et al. (2019) that the GI learning model collaborated with the Phet media (Physics Technology) could lead the academic attitude of students to be improved. Collaborations by previous researchers have shown that the GI learning model is suitable to be combined with an inquiry learning approach. According to Sanjaya (2006), the cognitive domain means the level of knowledge of the student, which according to Bloom's taxonomy consists of six stages, namely: (1) Considering: relating to the knowledge of specific things; ways and means to deal with particular things; things that are universal and abstract, such as principles, generalizations, theories and structures; (2) Understanding: related to translation, interpretation, estimates of information; (3) Applying: relates to the use of abstraction in particular situations and implementing procedures in existing situations; (4) Analyzing: relate to the dissolution of something intact into pieces and distinguishing these pieces into 9 in elements, relationships, and organizational principles; (5) Evaluating: concerning the assessment in terms of internal evidence or logical consistency and external evidence or coherence with facts developed elsewhere; (6) Creating: Collecting: putting various elements together to form a total conformity and recognizing the whole element in such a new pattern or structure.

Metacognitive thinking is an assessment of the ability of consciousness to the learning process and the strategy to learn. Fitri (2017) concludes metacognition as a person's ability to learn, which includes how best learning is done, what is already and what is not known, which consists of three stages of planning what to do, monitoring self-development in learning; and evaluating what is learned. Yusnaeni and Corebima (2017) argue that empowering metacognitive skills in learning is essential because it plays an important role in solving

student learning problems. In the meantime Nurmalasari et al (2015) revealed that metacognition abilities enable students to manage cognitive abilities and be able to see their weaknesses so that improvements can be made. Budiman and Marianti (2020) added GI learning activities such as planning, information management, monitoring, reviewing, and evaluating are a network of empowering metacognitive skills. Miniature is a model of the simplification of a reality but also shows activity or shows a process. This miniature is capable of explaining to students the details of an object that has become a topic of three-dimensional discussion. (Munadi, 2008). While according to Daryanto (2010) stated that the imitation media is also called the model. A model is a three-dimensional object that represents a real object (Rohman, 2013). So a miniature medium is a medium used in learning that resembles the real object or is smaller than the original object with a specific scale and shape of three dimensions and visual delivery. SMA NEGERI 4 AMBON has a laboratory room but its equipment is not sufficient to be used as a learning medium of the blood circulation system, in addition to the learning media, the knowledge of the students about the circulatory system is also not maximized due to several things as follows: 1) Teachers have not used the proper learning, 2) Teacher is more likely to be more active than students, 3) Teacher only gives lessons and expects students to read, memorize and remember lessons. This condition means that knowledge in class XI today is still passive to the material of the circulatory system. SMA NEGERI 4 AMBON has not yet implemented an inquiry learning strategy, so I am interested in doing research using GI learning models and integrating GII learning in making miniatures in the biology learning process on circulatory material.

MATERIALS AND METHOD

The type of research that is used is the type of quasy experimental research.

Class	Pre Test	Treatment	Post test
Experiment	Y1	X	Y2
Control	Y1	-	Y2

(Sukardi, 2009)

Description:
Y1 : Initial Test
Y2 : Final Test
X : Treatment Integration Learning Model Group Investigation and Learning Strategy Inquiry in making Miniature Blood Circulation System to improve cognitive and metacognitive learning outcomes in Class XI SMA Negeri 4 Ambon
- : No treatment

Population and Samples

In this study are students of Class XI IPA SMA Negeri 4 Ambon which has a total of 5 Classes. The sample in this research is class XI IPA 4 as a control class that has a number of students 17 and Class XIIPA 5 as an experimental class which has the total of students 17, the total number of both classes is as many as 34 students.

Stage of Research

The next stage of the research is how to gather data and group it.
1. Initial Tests
2. Implementation of Integration of Learning Models and Inquiry Strategies in Making Miniature Blood Circulation Systems for Improvement of Cognitive and Metacognostic Learning Results in Class XI IPA SMA Negeri 4 Ambon.
3. Final Tests
4. Assessment of Learning Outcomes Cognitively and Meta Cognitively

Data Analysis

Data analysis is descriptive statistical techniques and inferential statistics. The results of statistical data descriptives for the initial test and final test of students on cognitive learning outcomes and

metacognitives, uses the sturges formula to find out the intervals, frequencies, and relative frequency of students towards learning heels.

Sturges formulas used are:

a. Determine the range of data
   (R) = NT-NR
b. Determination of the number of classes intervals
   (k) = 1+3,3 log n.
c. Class length (interval)
i = Range
   classes.

Many inferential class statistics, which are used in the study of Analysis of varian (ANACOVA) for cognitative learning results using the SPSS version 20.

RESULTS AND DISCUSSION

Descriptive Cognitive

Cognitive learning results of students of Class XI SMA Negeri 4 Ambon which describes the initial ability of students in performing initial and final tests before and after using the learning model group investigation and learning strategy inquiry. Based on the data of initial test and final test values for such cognitive study results, the next step is to determine maximum values, minimum values and intervals using the sturges formula in the following way:

Table 1. Results of statistical tests descriptive cognitive learning outcomes

Control Class (Cognitive)						Experiment Class (Cignitive)					
Initial Test			Final test			Initial Test			Final Test		
Interval	F	FR	Interval	F	FR	Interval	F	FR	Interval	F	FR
29-31	10	58,82	53-59	3	17,64	34-36	2	11,76	75-77	4	23,52
32-37	4	23,52	60-64	2	11,76	37-40	4	23,52	78-80	5	29,41
38-41	1	5,88	65-67	4	23,52	41-44	7	41,17	81-85	5	29,41
42-47	2	11,76	68-70	8	47,05	45-47	1	5,88	86-89	3	17,64
						48-50	3	17,64			
total	17	100		17	100		17	100		17	100

Based on table 1. shows the initial and final test values of the control and experiment class for cognitive learning results with the number of students in the control class is 17 students whereas in the experiment class is 17. For the initial control class the average test score is 100, for the final test the average relative frequency value is 100, whereas for the experimental class the relative average of frequencies is 100 and for the finals the average of the relative Frequency is 100.

Descriptive Metacognitive

Students' cognitive learning outcomes are viewed on the basis of the initial and final test results of students' metacognitive learning outputs in the control and experimental classes, which can be seen in table 2 below.

Table 2. Descriptive statistical test results of metacognitive learning

Control Class (Metacignitive)						Experiment Class (metacognitive)					
Initial Test			Final Test			Initial Test			Final Test		
Interval	F	FR	Interval	F	FR	Interval	F	FR	Interval	F	FR
25-28	5	29,41	46-48	3	17,64	36-40	8	47,05	53-55	10	58,82
29-30	5	29,41	49-50	5	29,41	41-45	3	17,64	56-60	3	11,76
31-40	5	29,41	51-52	6	35,29	46-50	1	5,88	61-63	4	23,52
41-44	2	11,76	53-54	3	17,64	51-59	5	29,41			
total	17	100		17	100		17	100		17	100

Based on table 2, show the initial test and final test values of the control and experiment class for metacognitive learning results with the number of students in the control class is 17 students while in the experiment class is 17. For the initial control class the average test score is 100, for the final test the average relative frequency value is 100, whereas for the initial experiment class the relative freqüence average value is 100 and for the end test the relative average frequencies value is 100.

ANACOVA Analysis

Analysis of ANACOVA to examine whether the learning model group investigation and learning strategy inquiry have a significant influence on the cognitive and metacognitive learning outcomes of students eye on Biology subjects in class XI at SMA Negeri 4 Ambon. This analysis also examines the influence of pre-test on post-test.

Learning Models and Learning Strategies for Students' Cognitive Learning Outcomes

Data on anacova test on cognitive learning capabilities of SMA Negeri 4 Ambon obtained under the learning process by applying learning model group investigation and learning strategy inquiry can be seen in table 3 below.

Table 3. Kovarian Analysis Results (Anacova) Cognitive Learning Results

Source	Type of Squares	Df	Mean Square	F	Sig.
Corrected Model	2088.049[a]	2	1044.025	45.420	.000
Intercept	2612.163	1	2612.163	113.641	.000
kognitif_awal	22.608	1	22.608	.984	.329
Model	952.130	1	952.130	41.422	.000
Error	712.568	31	22.986		
Total	185303.000	34			
Corrected Total	2800.618	33			

a. R Squared =.746 (Adjusted R Square =.729

Table 3, showing early cognitive learning outcomes (prepresses) and integration of models (treatments) against postes values. The F value for the initial cognitive learning outcome is 0.984 with a probability sig. (P) value of 0.329. A P value ≤ 0.05 indicates that the pretext gives influence on the post at a 5% significance level. The value of the F for the model integration is 41,422 with a sig. or probability of 0,000. Cognitive learning outcomes are an overview of the level of mastery of the student in the subject he or she is studying or mastering something in the learning activity of knowledge or theory that involves the knowledge and development of

intellectual skills that includes the recall or recognition of facts, procedural patterns, and concepts in the development of the intellective ability and skills of the pupil (Potter & Kustra, 2012). Winarni (2006) in his research concluded that guided inquiry can improve understanding of IPA-Biology concepts, critical thinking skills, and student scientific attitudes. Further research by Indriati & Indriwati (2012) explains that practical learning implemented on the basis of inquisition can improve student activity in the study and student biology learning outcomes. Another study conducted by Sudarisman (2012) explains that inquiry learning guided by variations of techniques (fishbone diagrams and vee diagram) positively influences learning outcomes including cognitive, apsychomotor, and affective areas.

The learning model and strategy used is Group Invetigation and Inquiry where the learning model group investigation emphasizes the implementation of collaboration in groups so that students can solve a problem and develop research skills especially in the field of science, while the learning strategy inquiry emphasises on the process of finding and finding. In learning students are required to be more active in searching and finding the materials they learn, educators only act as facilitators who are tasked to guide and direct students. According to Deni (2019) that learning results have something to do with memory thinking or intellectual abilities.

Table 4. Additional LSD Test Results Cognitive Learning Results

Class	Avarage (mean)	Notation
Control	65,47	a
Experiment	81,06	b

Based on table 4, it shows that the highest average score in the experimental class was 81.06 while the lowest average in the control class was 65.47. Further LSD notation provides information that learning control class and experiment is different.

Learning Models and Learning Strategies for Students Metacognitive Learning Outcomes

Data on anacova test of metacognitive learning outcomes of SMA Negeri 4 Ambon students obtained during the learning process by applying learning model group investigation and learning strategy inquiry can be seen in table 5.

Table 5. Anacova Analysis Results Metacognitive Learning Results

Source	Type of Squares	Df	Mean Square	F	Sig.
Corrected Model	398.487[a]	2	199.243	35.645	.000
Intercept	1950.582	1	1950.582	348.965	.000
metakognitif	68.016	1	68.016	12.168	.001
Model	47.726	1	47.726	8.538	.006
Error	173.278	31	5.590		
Total	98424.000	34			
Corrected Total	571.765	33			

a. R Squared = 697 (Adjusted R Squared = 677)

Table 5, Showing early metacognitive learning outcomes (pre-presses) and model integration (treatments) against postes values. The F value of the initial cognitive learning outcome is 12.168 with a probability sig. value (P) 0.001. A P value $\leq$ 0.05 indicates that the pretext gives influence on the post at the level of 5% significance, the F value for the integration of the model is 8.538 with the sig. or probability (P), 0.006. The value P $\leq$ 0.05 shows that the treatment gives a significant influence in influencing the post on the 5 % significance level.

Table 6. Further testing of LSD metacognitive learning results

Class	Avarage	Notation
Control	50,53	a
Experiment	56,76	b

Based on table 6 shows that the highest average score in the experiment class is 56.76 while the lowest average in the control class is 50.53. Furthermore, the LSD notation gives information that learning control class and experiment is different. Metacognition is a cognitive process that relates to knowledge and consciousness, or knowledge of the mind and the way it works. This metacognition has a very important meaning, because the

knowledge is arranged and selected to enhance its cognitive capabilities in the future. (Nurani, 2017). Therefore, metacognitive abilities play an important role in biology learning, especially in regulating and controlling the cognitive activity of students in learning and thinking so that the learning and thought done by students becomes more effective and efficient. (Nurmalasari, 2015). The results of this study prove that metacognitive skills trained through a guided inquiry learning model can be delivered very well. This statement shows a consistency with the results of the study (Irawati dkk, 2019) which explains that there is a significant difference between the inquiry-led learning model and metacognitive skills. The results of the analysis showed consistency with the results of Adita & Azizah (2016), concluding that the metacognitive skills of students can be well trained through guided inquiry learning by Izzah & Azizah (2019), also concluded that metacognitive skills can be trained by means of guided learning models. These results are also consistent with the results of Tamsyani (2016) research explaining that between learning models and metacognitive consciousness have interactions that can affect learning outcomes.

Metacognitive skills and learning results indicate a positive correlation. A good learning outcome will be obtained by a learner's subject when he has good metacognitive skills (Azizah et al, 2019; Andini & Azizah, 2021). This statement is also demonstrated by the results of research Rosyida et al, (2016) using a sample of control class trained metacognitive skills with conventional learning methods showing less maximum results, so cognitive results are also less maximum. According to some research results, Sudjana and Wijayanti (2018) explain that metacognitive has an important role in learning success, so students need to know their metacognitive skills, to know and apply their learning strategies to the desired learning achievement. Wicaksono (2014) also concluded that learning outcomes and metacognitive skills have a significant correlation. Danial's study (2010), also concludes that metacognitive consciousness has a significant corrélation with metac cognitive abilities. According to Fitria et al, (2020) research, there is a correlation between metacognitive awareness and student learning outcomes. Tamsyani (2016) also explained that metacognitive awareness affects student learning outcomes.

CONCLUSION

1. There is an influence of Learning Model Group Investigation and Learning Strategy Inquiry on improving cognitive learning outcomes in eleventh grade students of State IPA SMA Negeri 4 Ambon with cognitivo belajarr have sig 0,000.
2. There is an influence of Learning Model Group Investigation and Learning Strategy Inquiry on improving metacognitive learning outcomes in eleventh grade students of IPA SMA Negeri 4 Ambon with cognitive study output has sig 0.006.

AUTHORS CONTRIBUTION

Ifaksasily, T. designed and conducted the study, analyzed and interpreted the data, and wrote a draft of the manuscript. Muskita, M. Designed the research, analyzed and interpreted the data.

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