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| THE EFFECT OF IMPLEMENTING A COOPERATIVE LEARNING MODEL OF GROUP INVESTIGATION (GI) TYPE ON STUDENT LEARNING OUTCOMES ON ECOSYSTEM MATERIALS IN CLASS XA OF STATE MIDDLE SCHOOL 2 SINTANG  Marzuki  Universitas Kapuas  Corresponding author email: [denmaszuki@gmail.com](mailto:denmaszuki@gmail.com) | |
| ABSTRACT | **Article History** |
| *This study analyzed the effect of implementing the group investigation (gi) cooperative learning model on student learning outcomes on ecosystem material in class XA of SMA Negeri 2 Sintang. The researcher used a qualitative method to conduct the study. Thirty-four student samples from Class X A were taken using purposive sampling. The learning model implementation was going well and proven from the observation sheet; 84.62% of teachers and 88.89% of students were in the "excellent" category. The result of the normality test for pre-test data with the Chi-Square count table value is X2 count < X2 table or 6.93 < 11.070. Then, the post-test result is normal with the value X2 count < X2 table or 2.99 < 11.070. The pre-test homogeneity test obtained Fcount data at 2.5 ≤ Ftable 2.34. In the post-test homogeneity test, the data obtained was Fcount 1.6 ≤ Ftable 2.34, so the variances were homogeneous. In hypothesis testing, the data obtained was Tcount 9.35 > Ftable 2.34. Then H0 was rejected, meaning the group investigation cooperative learning model influenced student learning outcomes. The application of the Group Investigation (GI) type cooperative learning model to ecosystem material affects students' understanding and learning outcomes with a significant effect size (d) 1.64 (big criterion) because it is almost close to 2.0.*  **Keywords: Learning outcome, ecosystem, and Group Investigation (GI) Cooperative Learning Model** | **Received : 7 November 2023**  **Revised : 17 November 2023**  **Published: 28 November 2023** |
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**LATAR BELAKANG**

When selecting learning models, teachers must consider student factors as learning subjects and material characteristics. One learning model that can be used is Group Investigation (GI) type cooperative learning. Group Investigation (GI) is a cooperative learning strategy that places students into groups to investigate a topic. It can be applied to high school students with a cognitive analysis level.

Ecosystem material is complex for students because many learning objects focus on environmental problems and living creatures. This material will be easier to understand with the Group Investigation (GI) type cooperative learning model compared to lecture and conventional models (Nurhidayat, 2011:4). The advantage of using the Group Investigation (GI) learning model is encouraging students to participate actively and being able to think actively; it can improve student learning achievement (Susanti, 2012: 127).

The objectives of this study are to find out the application of the Group Investigation (GI) type cooperative learning model in Ecosystem material in Class XA of SMA Negeri 2 Sintang. It also aims to know how the Group Investigation (GI) type cooperative learning model affects ecosystem material at SMA Negeri 2 Sintang. The last is to determine the effect of implementing the Group Investigation (GI) type cooperative learning model on the learning outcomes of Class XA students on Ecosystem material at SMA Negeri 2 Sintang.

1. Group Investigation (GI) Type Cooperative Learning Model

The Group Investigation (GI) learning model emphasizes student participation and activity to search for information about the lessons through available materials (Hanafi, 2013: 11-12). Sutama (2007:2) also states that the Group Investigation (GI) type cooperative learning model is group-based learning where students are allowed to discuss, think critically, and be responsible in learning. Wahyuningsih (2012:2) added that the Group Investigation (GI) learning model provides opportunities for teachers to use more time to diagnose and correct problems experienced by students.

Slavin (2010:216-229) stated that there are 6 (six) steps in the Group Investigation (GI) learning process. They are:

a. Identifying topics and organizing students into groups.

b. Planning the tasks to be studied.

c. Carrying out Investigations.

d. Preparing Final Report.

e. Presenting the Final Report.

f. Evaluating

Implementing the Group Investigation (GI) learning model has several advantages. These advantages, according to Sumarmi (2012:127), are:

1. Students who participate in Group Investigation (GI) tend to discuss and contribute specific ideas.
2. Teachers can observe Students' speaking and collaboration styles.
3. Students can learn cooperatively more effectively, thereby increasing their social interactions.
4. The Group Investigation (GI) learning model can encourage students to participate in transferring knowledge outside the classroom.
5. The Group Investigation (GI) learning model makes teachers more informal.
6. The Group Investigation (GI) learning model can improve student performance and learning achievement.

However, this model also has weaknesses. According to Sumarmi (2012:132), the weaknesses of the Group Investigation (GI) learning model are:

1. Not supported by specific research results.
2. Group projects often involve capable students.
3. Requiring different situations and conditions, different types of material, and different teaching styles.
4. Class conditions do not always provide an excellent physical environment for the group.
5. The success of the Group Investigation (GI) learning model depends on students' ability to lead groups or work independently.

B. Learning outcomes

Learning outcomes are made by two words: outcome and learning. Outcome means something achieved by effort (Ministry of National Education, 2007:391), while learning is an individual process to obtain a new behavior change (Slameto, 2003:2).

Learning outcomes are a process for determining student learning values through assessment or measurement activities (Dimyati and Mudjiono, 2002:12), which is an indicator of basic competence and the degree of change in behavior concerned (Mappeasse, 2009:4). Djamarah (2002:13) also states that learning outcomes are a series of physical and mental activities to obtain changes in behavior as a result of individual experiences in interaction with their environment involving cognitive, affective, and psychomotor aspects.

According to Dimyati and Mudjiono (2006:3-4), learning outcomes are the interaction of learning and teaching actions result. From the teacher's side, the act of teaching ends with a process of evaluating learning outcomes. Learning outcomes are behaviors obtained by students after experiencing learning activities. Acquisition of these aspects of behavior change depends on what the student learns. If students understand concepts, then the change is in the form of concept mastery.

Learning outcomes are the end of teaching from the peak of the learning process. Benjamin S. Bloom (Dimyati and Mudjiono, 2006: 26-27) mentions six types of cognitive domains, as follows:

1. Knowledge: achieving the ability to remember and store in memory. Knowledge is related to facts, events, understanding rules, theories, principles, or methods.
2. Comprehension: including the ability to grasp the meaning of the material studied.
3. Application: including the ability to apply methods and rules to face real and new problems. For example, using principles or theories.
4. Analysis: including the ability to detail or unite into parts to understand the overall structure well. For example, reducing problems to be simpler.
5. Synthesis: including the ability to form a new pattern. For example, the ability to compile a program.
6. Evaluation: including the ability to form opinions from several things based on specific criteria. For example, the ability to assess the exam result.

According to Sudjana (2002: 76), learning outcomes are acquiring habits, knowledge, and attitudes. This acquisition includes a new way of doing things and solving problems in new situations. Meanwhile, according to Skiner, in the Conditioning theory quoted by Gladler (Sukardi, 2008: 57), learning outcomes are new responses or behavior.

The new response has the same meaning as new behavior (knowledge, attitudes, skills). From several definitions above, learning outcomes are changes in behavior, knowledge, and attitudes that a person obtains after the learning process. Learning outcomes are internal events in the sense of something that happens within a person. This event begins with cognitive changes, which then influence behavior.

A person's behavior is based on the level of knowledge of something being studied, which can then be determined through tests and results a real or non-real values. According to Iskandar (2009: 87), the educational process has goals, which can be categorized into three areas: cognitive (intellectual mastery), affective (related to attitudes and values), and the psychomotor field (ability/skills to act/behavior).

According to Sutarila (2000: 186), the types of cognitive learning outcomes include from rote knowledge (knowledge) result, comprehension learning outcomes (comprehension) result, application learning outcomes (application) result, analytical learning outcomes, and evaluation learning types. The type of affective learning outcomes relates to attitudes and values. Meanwhile, the types of learning outcomes in the psychomotor field appear in skills and the ability to act individually. Learning outcomes or achievements are the realization or expansion of a person's potential skills or capacities.

A student's learning outcomes can be seen from the behavior, both in knowledge mastery, thinking skills, and motor skills. Learning achievements or learning outcomes are obtained after implementing a teaching program. Assessment or evaluation of learning outcomes is a step to determine how far the objectives of teaching and learning activities have been achieved. So, the learning outcomes gained from the test are usually reflected in specific values. The test aims to raise students' motivation so they can organize lessons well.

According to Syah (2004:132-133), factors that influence student learning outcomes can be divided into 2 (two) types, consist of:

a. Internal Factors

1) Physiological aspects

Physical conditions can influence students' enthusiasm and intensity in participating in the lessons. A weak condition of the body's organs can reduce the cognitive domain and its effect on material absorption, which lacks and decreases learning enthusiasm. To maintain physical fitness, students are encouraged to consume nutritious drinks. Besides, students are also encouraged to choose a pattern of rest and light exercise.

2) Psychological aspect

Psychological factors are the factors that can influence the quality and quantity of student learning outcomes. It originates from the student's internal factors. However, the level of intelligence, attitudes, talents, interests, and motivation to study is the essential part that influences students' learning outcomes.

b. External Factors

1) Social environment

Factors that include the social environment are family, teachers, school staff, community, and playmates. The social environment can influence students' enthusiasm for learning because this social environment is a place where individuals receive both positive and negative teaching. If the student receives positive or good teaching, he will be more enthusiastic about learning, but if the student receives negative or lousy teaching, he will be too lazy to study; it affects the individual's learning outcomes.

2) Non-social environment

Factors included in the non-social environment are the school building, students' living place, learning tools, weather conditions, and study time. This environmental influence is generally positive and does not impose coercion on students.

C. Ecosystem

According to Dewiki and Yuniati (2006: 120), Ecosystems result from the mutual influence between biotic and abiotic components in changing energy and matter. Meanwhile, Sulistyorini (2009:210) says that ecosystems comprise living and non-living things. For example, a rice field ecosystem consists of animals and plants that live together. In the rice field ecosystem, there are grass, rice plants, grasshoppers, caterpillars, mice, birds, and many more. Plants act as consumers in the ecosystem, and microorganisms act as decomposers.

Furthermore, Sulistyorini (2009:199) also mentions that ecosystems are composed of biotic and abiotic components. An ecosystem has a balance called ecosystem homeostasis, which is the ability to withstand various changes. The changes in population numbers of abiotic components significantly impact an ecosystem.

**METODE PENELITIAN**

This research was conducted using quantitative methods. According to Sugiyono (2013: 13), the quantitative approach is characterized by conducting in the form of numbers and analyzing using statistics. For the research design, the researcher used the pre-experimental design.

The population of this study was all students of class X Science of SMAN 2 Sintang, consisting of class XA with 34 students and class XB with 33 students. However, the sample from this research was all students in class XA of SMA Negeri 2 Sintang, totaling 34 students.

**HASIL DAN PEMBAHASAN**

1. **Implementation of the Group Investigation (GI) Type Cooperative Learning Model**

Implementing the cooperative group investigation learning model in class XA was good. Based on the observations, the implementation percentage of the group investigation cooperative learning model by teachers was 84.62%, and students was 88.89%. From the observation results, it meant the implementation was successfully implemented.

Teachers and students successfully implemented all aspects of the observation sheet. The results of observations on the implementation of the group investigation learning model are presented in Table 4.2.

The teaching and learning process using the group investigation cooperative learning model in class XA at the second and third meetings was successful. Research started from the first meeting by conducting a pre-test, then treatment, and the last taking post-test scores.

1. Teacher's Observation Result

The observation was carried out at the second meeting. The result is used as an instrument to record the learning implementation process using the group investigation cooperative learning model.

Table 4.1 Learning Implementation

|  |  |  |  |
| --- | --- | --- | --- |
| No | Activities | Percentage | Category |
| 1. | Preliminary | 84,62 % | High and Excellent |
| 2. | Core |
| 3. | Closing |

Based on Table 4.1, learning activities using the group investigation cooperative learning model in the second meeting learning implementation plan with the observed aspects includes the preliminary, core, and closing activities. It resulted 84.62% and is categorized as high and very good. Giving assignments was the only item in the observation sheet that the teacher did not implement. He/she claimed that forgot to give assignments back to students before the end of the lesson.

1. Students' Observation Result

The observation result is not only from teacher activities, but the students are also observed during the implementation of the learning model. Observations of students are carried out at the second and third meetings. The results can be seen in Table 4.2.

Table 4.2 Learning Implementation

|  |  |  |  |
| --- | --- | --- | --- |
| No | Activity | Percentage | Category |
| 1. | Preliminary | 88,89 % | High and Excellent |
| 2. | Core |
| 3. | Closing |

Based on Table 4.2, the implementation of learning showed 88.89% and is categorized as high and very good.

1. **Learning Outcome**

The researcher gets the complete data from all the students on the first meeting because no students were absent. The average score obtained is 48.24, with a standard deviation of 13.34. The result means that many students' learning outcomes do not reach the minimum standard criteria or KKM determined by the school, that is 65. Moreover, from 34 students, only six students, or 17.65% of students, can pass the minimum criteria. The rest, 28 students or 82.35%, are not complete. It happens because the learning system still uses the conventional lecture learning model and does not vary. It makes students feel bored and lazy to learn.

Meanwhile, data from the post-test from 34 students shows 70.15 for the average student score with a standard deviation 7.64. It means that student learning outcomes are higher, and many students have achieved the minimum criteria. Of the 34 students, 30, or 88.23%, pass the minimum criteria, and only four, or 22.77%, do not complete the test. It means there are differences in results for pre-test and post-test.

Table 4.3 Pre-test and Post-test Results

|  |  |  |
| --- | --- | --- |
| Criteria | Pre-test | Post-test |
| Highest | 75 | 80 |
| Lowest | 30 | 50 |
| Total of Learning Outcomes | 1640 | 2385 |
| Score Average | 48,24 | 70,15 |
| < Standard Criteria | 28 | 4 |
| Under Standard Criteria | 82,35% | 11,77% |
| > Standard Criteria | 6 | 30 |
| Passing Standard Criteria | 17,65% | 88,23% |
| KKM | 65 | 65 |

Based on Table 4.3, students' pre-test achievement shows that the highest pre-test score is 75 and the lowest is 30. Students who pass KKM are six or 17.65%, while those below KKM are 28 or 82.35%. The low learning outcomes are because some students still talk to their classmates, and using the conventional lecture learning model, which affects the teaching and learning process, is ineffective.

The result from the post-test shows that the highest score is 80 and the lowest score is 50. Students who pass the KKM are 30 students or 88.23%, while those who do not pass the KKM are four students or 11.77%. It concludes that learning outcomes are higher after implementing the group investigation cooperative learning model.

The average pre-test result is 48.24; it increases on the post-test with a point of 70.15. The students' average scores increased significantly compared to the conventional lecture learning model, and many students discussed the material in the group discussions. Learning outcomes increase because the group investigation cooperative learning model has the advantage of increasing student activity in class. In this learning activity, there is a group that can provide direct feedback, allowing a more effective learning process, students become happier, creating enthusiasm and interest in learning so that students can follow learning. Based on research conducted by Hanafi, M. A. 2013 with the title "*Metode Pembelajaran Kooperatif Tipe Group Investigation Untuk Meningkatkan Kemampuan Membaca (Mahārah al-qirā’ah) Siswa Kelas VIII MTsN Prambanan Klaten Tahun Ajaran 2012/2013.*" The results prove that Group Investigation Type Cooperative Learning to Improve Reading Ability as a learning resource influences student learning outcomes.

1. **The Effect of Implementing the Group Investigation (GI) Learning Model on Student Learning Outcomes**

The researcher calculated the normality test to the pre-test and post-test results to know the influence of the group investigation cooperative learning model on student learning outcomes. After the data is normally distributed, it is then continued with a homogeneity test. After the data is homogeneous, continue with hypothesis testing using the t-test.

1. Normality Test Result
2. Pre-test Normality Test Results

The Normality Test was carried out using the Chi-Square formula. It is used to determine the normality of data distributed. The data is normally distributed if the criteria of calculated X2 count < X2 table is measured at a certain significant level. The results of normality test can be seen in Table 4.4.

Table 4.4 Pre-test Normality Test Results

|  |  |
| --- | --- |
| Symbol | Pre-test |
| N | 34 |
| X2 count | 6,93 |
| X2 Table | 11,070 |
| Description | Normal |

Based on Table 4.4, the normality test results are obtained at a significance level of 5% (α = 0.05) using the Chi-Square value table. Pre-test value X2 count and X2 table for α = 0.05 and degrees of freedom (dk) =5, then in the Chi-Square table is got X2 table = 11.070. It turns out that X2 count < X2 table or 6.93 < 11.070, so the pre-test data is normally distributed. So, it can be continued with the homogeneity test.

1. Post-test Normality Test Results

The post-test normality test was carried out using the Chi-Square formula. The results of the research post-test normality test can be seen in Table 4.5.

Table 4.5 Post-test Normality Test Results

|  |  |
| --- | --- |
| Symbol | Pre-test |
| N | 34 |
| X2 count | 2,99 |
| X2 Table | 11,070 |
| Description | Normal |

Based on Table 4.5 above, the normality test results for post-test data are measured at a significance level of 5% (α = 0.05) using the Chi-Square value table. Post-test value X2 count and X2 table for α = 0.05 and degrees of freedom (dk) = 5, then from the Chi-Square table is counted for X2 table = 11.070. It turns out that X2 count < X2 table or 2.99 < 11.070, which means the post-test data is normally distributed. So, it can be continued with the homogeneity test.

1. Homogeneity Test Results
2. Pre-test Homogeneity Test Results

The homogeneity value is counted after the research data are declared normally distributed. The test criteria used are that both data are declared homogeneous if the F2 count < F2 table is measured at a significant level of 5%. The results of the pre-test homogeneity test are in Table 4.6

Table 4.6 Pre-test Homogeneity Test Results

|  |  |  |
| --- | --- | --- |
| Symbol | Pre-test | Post-test |
| S1 and S2 | 75 | 30 |
| Fcount | 2,5 | |
| Ftable | 2,34 | |
| Description | Homogenous | |

Based on Table 4.6 above, it is known that the homogeneity test data for the Pre-test data obtained Fcount is 2.5 with the formula dbnumerator = n-1 = 34 =33 (for the largest variant), dbnominatir = n-1 =34-1 = 33 (for variance). The significant level (α) = 0.05, so the FTable is 2.34 or 2.5 < 2.34, so the variances are homogeneous. It can be continued with hypothesis testing.

1. Post-test Homogeneity Test Results*.*

The results of the post-test homogeneity test of the research data can be seen in Table 4.7

Table 4.7 Post-test Homogeneity Test Results

|  |  |  |
| --- | --- | --- |
| Symbol | Pre-test | Post-test |
| S1 and S2 | 80 | 50 |
| Fcount | 1,6 | |
| Ftable | 2,34 | |
| Description | Homogenous | |

Based on Table 4.7 above, it is known that the homogeneity test data for the post-test obtained Fcount is 1.6 with the formula dbnumerator= n-1 = 34-1 =33 (for the largest variant), dbnominatir = n-1 =34-1 = 33 ( for variance). The significant level (α) = 0.05, so the Ftable is 2.34 or 1.6 < 2.34, so the variances are homogeneous.

1. Hypothesis Test Results

After testing the data, the result is known to be a normal and homogeneous distribution. Thus, it is continued with testing the hypothesis using the t-test. The results of the research hypothesis testing table for pre-test and post-test data can be seen in Table 4.8.

Table 4.8 Pre-test and Post-test t-test results.

|  |  |  |
| --- | --- | --- |
| Symbol | Pre-test | Post-test |
| N | 34 | 34 |
| Mean | 47,94 | 70,85 |
| tcount | 14,59 | |
| tTable | 2,34 | |
| Description | Tcount > tTable = Ho rejected | |

From Table 4.8 above, the average pre-test score is 47.94, and the post-test score is 70.85, hypothesis testing with α = 0.05 while the degree of freedom of testing is db = n-1 db = 34-1 = 33. To see the influence of applying the Group Investigation (GI) type cooperative learning model on student learning outcomes in the ecosystem material by looking at the tTable with db 33, it gets tTable 2.34. The conclusion is Tcount > tTable, and it is 9.35 > 2.34. H0 is rejected, and H1 is accepted, which means that there is a significant influence on the Group Investigation (GI) type cooperative learning model on student learning outcomes. Then, it is continued with the effect size test.

1. Effect Size testing result

The influence of the Group Investigation (GI) type cooperative learning model on student learning outcomes can be determined using Effect Size. The decision-making criteria are ES < 0.2 low, 0.2 < ES < 0.8 medium, and ES > 0.8 high. The results of calculations using Effect Size can be seen in Table 4.9.

Table 4.9 Results of the Effect Size Test

|  |  |  |
| --- | --- | --- |
| Post-test average score (xe) | 70,15 | ES |
| Pre-test average score (xc) | 48,24 | 1,64 |
| Standard deviation of the comparison group (Sc) | 13,34 |  |

Based on Table 4.9, the calculation shows ES > 0.8 or 1.64 > 0.8. So, the influence of the Group Investigation Type cooperative learning model on student learning outcomes is categorized as significant because it is close to 2.0. After testing the data requirements, it is discovered that the learning outcome data in this study is normally distributed and homogeneous. The result for hypothesis test data using the t-test also shows an influence of the Group Investigation (GI) type cooperative learning model.

Student learning outcomes on ecosystem material using the Group Investigation (GI) type cooperative learning model look better. It aligns with research conducted by Nurhidayat, A. (2011) titled "Pengaruh penerapan model pembelajaran Kooperatif Tipe Group Investigation Terhadap Aktivitas dan Penguasaan Konsep Biologi Siswa Kelas X SMA N 3 Bantul." The results of his research prove that applying the Group Investigation Type Cooperative learning model can develop Activities and Mastery of Biology Concepts in the teaching and learning process.

**KESIMPULAN**

1. Implementing the Group Investigation (GI) Model Cooperative Learning Type on ecosystem material shows excellent results. From the observation sheets, the teachers' score is 84.62%, and students is 88.89%. It is the "excellent" category.
2. The pre-test score is 82.35%. After implementing learning using the group investigation cooperative learning model, the post-test increased to 88.23%.
3. The influence of the cooperative group investigation learning model on student learning outcomes in Ecosystem material at SMA Negeri 2 Sintang is:
4. Normality test results for pre-test data value X2 count and X2 table for α = 0.05, and degrees of freedom (dk) = k-1 = 6-1 =5, then in the Chi-Square table is X2 table = 11.070. It turns out that X2 count < X2 table or 6.93 < 11.070. Post-test value X2 count and X2 table for α = 0.05 and degrees of freedom (dk) = k-1 = 6-1 =5, then in the Chi-Square table is X2 table = 11.070. It turns out that X2 count < X2 table or 2.99 < 11.070. Thus, the post-test data is normally distributed.
5. The pre-test Homogeneity test obtained Fcount data of 2.5 ≤ Ftable 2.34, and the post-test homogeneity test obtained Fcount data of 1.6 ≤ Ftable 2.34. Thus, the variances are homogeneous.
6. Hypothesis testing obtained data Tcount 9.35 > Ftable 2.34; then H0 is rejected. It means that there is an influence of the group investigation cooperative learning model on student learning outcomes.
7. The Effect Size of implementing the Group Investigation (GI) type cooperative learning model on ecosystem material affects students' understanding and learning outcomes, that is (d) 1.64 (significant criteria).

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