

The Influence of the Group Investigation Type Cooperative Learning Model on the Critical Thinking Skills of Grade XI Geography Students

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Abstract

This study aims to examine the impact of the Group Investigation (GI) cooperative learning model on the critical thinking skills of eleventh-grade students taking geography at Semen Padang High School. The background to this research is the finding that students often display suboptimal critical thinking skills, particularly when they have difficulty expressing opinions, analysing problems, or drawing logical conclusions in geography class. This study employs a quantitative approach with a quasi-experimental design that enables non-equivalent control groups, in which all eleventh-grade students participated, the experimental group is made up of class XI.1, while class XI.3 serves as the control group, with each group containing 31 students selected through purposive sampling. To measure critical thinking skills, researchers used tests based on Ennis indicators, the research including: (1) providing simple explanations, (2) building basic skills, (3) making inferences, (4) providing more detailed explanations, and (5) developing strategies and tactics. The data analysis involved normality assessments and an independent samples t-test. The results showed that the experimental group recorded a higher average score 0,225 than the control group 0,585, and the t-test produced a significance value of 0,001, **which is below** the threshold of 0,05, signifying that the implementation of the GI model significantly enhances students' critical thinking abilities.

Keywords: Group Investigation, Critical Thinking, Cooperative Learning, Geography.



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Introduction

Education plays a crucial role in developing students' critical thinking skills, which are essential for effective problem-solving and informed decision-making in the 21st century. According to Ennis (2011), critical thinking involves a reflective and rational process, requiring analysis, evaluation, and logical judgement based on available data. Furthermore, Facione (2015) highlights that this ability helps students engage in systematic reasoning and make decisions supported by strong evidence.

The results of the observation at SMA Semen Padang indicate that students' critical thinking skills are still lacking, with many students struggling to explain concepts, assess work, or conduct analysis related to geographical phenomena. One of the main causes is the disadvantage of the traditional lecture-based learning teaching methods, which provide students little opportunity to participate actively and critically in the learning process.

Previous research has shown that cooperative learning models such as Group Investigation (GI) can improve higher-order thinking skills. For example, Fitriani (2021) found that implementing the GI model successfully increased student participation, academic achievement, and critical thinking

skills. Similarly, Disurya and Hamzah (2022) reported significant improvements in critical thinking skills in collage students.

Methods

1. Research Location

This study is being conducted at Semen Padang High School, Padang City, West Sumatra. This school is regarded as the primary location due to its excellent facilities and educational infrastructure, as well as its diverse student body, which contributes to the development of the Group Investigation (GI) cooperative learning model. In addition, this school's collaborative and conducive learning environment allows for the implementation of effective interactive teaching strategies, making it the perfect location for our study.



Picture 1. Semen Padang High School as the Research Location

2. Research Instrument

This instrument used to measure students' critical thinking skills is a descriptive test. The development of this test refers to the critical thinking indicators suggested by Ennis (2011), include: (1) offering straightforward explanations, (2) developing fundamental skills, (3) making inferences, (4) giving additional clarifications, and (5) structuring approaches and tactics. Each question in the test is carefully designed to cover these indicators, so that this instrument can assess students' critical thinking aspects comprehensively and in depth.

Before implementation, this instrument underwent validity testing to ensure its quality as a research tool. Validity testing was conducted using the Pearson Product-Moment correlation technique, which showed that most of the items were valid because the significance value was less than 0,05 and the calculated r value was greater than the table r value. Therefore, this critical thinking test instrument is considered valid for use in this study.

3. Research Procedures

This research procedure was conducted in three main stages: preparation, implementation, and evaluation. In the preparation stage, the researcher prepared learning materials, designed research instruments, and communicated with the school to ensure the process ran smoothly. In the implementation stage, the Group Investigation (GI) cooperative learning model was applied in the experimental class, while the control class used conventional teaching methods. In the experimental class, students were divided into small groups to investigate the assigned topic, discuss it within their groups, and present their findings to the class. In the evaluation stage, students took a learning achievement test to measure the impact of the implemented model on their critical thinking skills and overall learning outcomes.



Picture 2. 11th grade students conducting a group discussion using the Group Investigation model



Picture 3. Presentation of student investigation results in Front of the class

4. Data Analysis Technique

This study employs a quantitative approach using a kuasi-experimental methodology. The design of the study is a non-equivalen control group, involving two classes: an experimental class (XI.1) implementing the group investigation model, and a control class (XI.3) using conventional learning methods. The research population comprised all eleventh-grade students at Semen PadangHigh School for the 2025/2026 academic year. The participants were chosen using purposive sampling. The tool for research was a critical thinking skills assessment created according to the indicators outlined by Ennis (2011): (1) offering straightforward explanations, (2) cultivating fundamental skills, (3) making inferences, (4) supplying additional explanations, and (5) formulating strategies and tactics. These indicators are detailed in Table 1:

Table 1:
Critical Thinking Indicators

No.	Critical Thingking Indicators (Ennis)	Description in Tst Instrument
1.	Provide a Simple Explanations	Identifying facts, reason, and conclusions.
2.	Building Basic Skills	Assess sources and use credible observations.
3.	Concluding	Making inferences and hypotheses.
4.	Provide Further Explanations	Analyzing more complex arguments and evidence.
5.	Arranging Strategy and Tactics	Determine problem solving steps.

Source: According to Ennis (2011), 2025

The data were then analysed using several statistical procedures, including instrument validity, normality testing, and independent-samples t-test to compare mean scores between the two groups. Before hypothesis tesing, prerequisite tests were conducted to ensure the data were suitable for parametric analysis. The Shapiro-Wilk test was used to assess normality, and if the assumptions were met, parametric testing proceeded. The primary hyphothesis was tested using an independent-

sample t-test at the 0,05 level of significance to determine whether there was a statistically significant difference in critical thinking skills between students taught with the group investigation model and those taught using conventional learning methods.

Results and Discussions

1. Results

a. Descriptive Test

Based on the results of the descriptive analysis, the experimental class of 31 students achieved a minimum score of 74 and a maximum score of 98, with an average score of 88,06 and a standard deviation of 6,41. This average shows that most students in this class are above the minimum competency threshold (KKTP), while the relatively low standard deviation indicates that the distribution of scores among students is fairly even and concentrated around the average, reflecting consistency in their performance.

This standard simulation shows some of the data's deviations from the mean. In this context, a higher score and a higher average in the experimental group indicate that the implementation of the Group Investigation (IG) model is beneficial in enhancing and preserving students' critical thinking skills. For a clearer illustration, the data is shown in Tabel 2 below:

Table 2.
Critical Thinking Descriptive Test

Kelas	N	Minimum	Maximun	Mean	Std.Dev
Eksperimen	31	74	98	88,06	6,41
Kontrol	31	57	82	68,52	9,20

Source: Processed Research Data, 2025

Conversely, in the control group, which also consists of 31 students, the minimum score is 57 and the maximum score is 82, with a average of 68.52 and a standard deviation of 9.20. This more detailed report indicates that the learning outcomes of the students in this school are not entirely satisfactory. Furthermore, higher standard deviation indicates a larger score, indicating a greater difference between students who are high and low achievers.

b. Prerequisite Test

The tests required in this study include normality tests and hypothesis tests, with prerequisite tests conducted first to ensure that the data meet the requirements for statistical analysis.

1. Normality Test

The normality test is used to determine whether the data is normally distributed. In this study, the Shapiro-Wilk method is used for the analysis, and IBM SPSS 27's software tool is used for the analysis. The criteria for determining based on significance levels are as follows: a) The data is considered normal distribution if the significance level is greater than 0.05; b) If the significance level is less than 0.05, the data may not be normally distributed.

The Shapiro-Wilk method was selected for this normality test because the data set contained fewer than 100 observations, meeting the requirements for its use. In this case, the data used by the researcher were indeed below 100, making this method appropriate. The test results indicated that the data were considered normal is the significance value was greater than 0,05 and not normal if the significance value was less than 0,05.

Table 3.
Normality Test

Normality Test							
	Kelas	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Hasil	Kelas Eksperimen	.105	31	.200*	.956	31	.225
	Kelas Kontrol	.135	31	.156	.972	31	.585

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Processed Research Data, 2025

Based on the results of the normality test shown in the table, the data in both the experimental and control classes are normally distributed. This is indicated by the significance values of the Shapiro-Wilk test, which are 0,225 for the experimental class and 0,585 for the control class. As both values are greater than 0,05 it can be concluded that the critical thinking data in both classes meet the assumption of normality and are therefore suitable for further analysis.

c. Hypothesis Testing

The hypothesis testing in this study states that the implementation of the group investigation cooperative learning model affects students' critical thinking skills at Semen Padang High School. This test was conducted using a parametric statistical test, specifically the independent samples t-test, via the IBM SPSS 27 application. The aim was to compare the means of two groups that received different treatments: the experimental group and the control group. The data used in this test were obtained from student worksheets (LKPD), which were designed to measure their critical thinking skills.

(H₀): There is no significant effect of the Group Investigation cooperative learning model on the critical thinking skills of 11th-grade students at Semen Padang High School.

(H₁): There is a significant effect of the Group Investigation cooperative learning model on the critical thinking skills of 11th-grade students at Semen Padang High School.

The decision-making criteria are based on a comparison between the calculated t-value and the t-table value:

- If t count > t table, then H₀ is rejected and H₁ is accepted.
- If t count < t table, then H₀ is accepted and H₁ rejected.

Table 4.
T-test of Experimental Class and Control Class

Test of Independent Samples										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Hasil	Equal variances assumed	0,032	0,858	11,474	60	<,001	19,54	1,704	16,14	22,95

Equal variances not assumed	11,474	59,811	<,001	19,54	1,704	16,14	22,95
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Source: Processed Research Data, 2025

Independent sample t-test is carried out to determine whether there are any significant differences in the students' critical thinking skills between the experimental and control groups, using data from 31 students in each class. The statistical results showed a significance (2-tailed) value of < 0.001 , which is less than 0,05 therefore, H_0 was rejected and H_1 was accepted. This indicates a significant difference in the average critical thinking skills of students in the two classes after the implementation of the The cooperative investigative group learning model.

2. Discussions

This study indicates that implementation of the Group Investigation (GI) cooperative learning paradigm can increase students' critical thinking skills. Samin (2023) states that the evaluation is carried out using tes questions that are in accordance with the critical think indicators. These tes include the following primary activities: (1) providing an explanation of the basic's simple (basic discussion), (2) providing an explanation of the dasar's skills (basic support), (3) providing an explanation of the conclusion (infrence), (4) providing a longer explanation of the basic (further discussion)), and (5) plan strategic and tactical.

Data analysis reveals differences between students using the GI model and those using the conventional method that are evident in the test results. The experimental results reached a average score of 88.06, whereas the control results only reached 86.52. This indicates that the GI model significantly increases the critical thinking skills of the students at SMA Semen Padang. This is supported by independent uji-t sampel, with a 2-tailed significance level of 0.001, which is less than 0.05, meaning that H_1 is determined.

These findings align with earliner studies conducted by Disurya an Hamzah (2022) and Chairunnisa (2022), which concluded that the GI model is effective in improving critical thinking skills through collaborative investigation activities and structured learning interactions. Both studies emphasised the role of active participation in inquiry-based group work in encouraging analytical and reflective thinking.

A closer examination of the critical thinking tetst indicators shows that all categories received either "very good" or "good" scores. The indicator "providing a simple explanations" (question 1 and 5) achieved 87,81%, while "drawing conclusions" (question 3) achieved 81,72%. The indicator "developing strategies and tactics" (question 6 and 7) achieved the highest score of 89,53%, demonstrating students' strong analytical undersatnding.

On the other hand, the indicators "developing basic skills" (question 2) and "providing further explanations" (question 4) scored slightly lower, at 75,3% respectively, although they were still categoriised as "good". This indicates that some students still experience difficulties in designing problem-solving startegies and impelementing effective approaches in complex contexts.

Conclusion

Based on data analysis and analysis, it can be concluded that the implementation of the Group Investigation (GI) cooperative learning model has a significant positive impact on the critical thinking skills of 11th grade geography students at SMA Semen Padang. The results of the study indicate that students in experimental classes using the GI model had higher average scores than students in control classes using the conventional method. The results of the independent sample t-test (with a significance level slightly below 0.05) support this finding by demonstrating statistically significant differences in the work performance of the two groups.

The learning stages in the GI model offer students meaningful opportunities to investigate problems, analyse information, evaluate evidence, and draw logical conclusions based on their findings. This process aligns with Ennis's (2011) critical thinking indicators, which include providing explanations, developing basic skills, drawing inferences, offering further clarification, and implementing strategies and tactics.

Therefore, the Group Investigation model has proven to be an effective teaching approach for enhancing critical thinking skills in geography education. Beyond honing cognitive skills, this model also encourages independent learning, communication, and collaboration, which are essential competencies for success in 21st-century education. The implementation of the GI model is therefore highly recommended as an alternative strategy for fostering active, analytical, and reflective thinking among high school students.

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