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Effect of Group Investigation Learning on Students' Concept Understanding in Economic Growth: A Study at SMA Negeri 1 Padalarang

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ABSTRACT

This research was driven by the low conceptual understanding of students, identified through pre-research in Class XI of SMA Negeri 1 Padalarang. The study aimed to examine the effect of the cooperative learning model using the group investigation technique on students' conceptual understanding. Class XI-12 served as the experimental group, and XI-10 as the control group, using a quasi-experimental method with a non-equivalent control group design. Objective test questions measured conceptual understanding, and data were analyzed using parametric statistics (normality, homogeneity, and hypothesis tests). Results showed: (1) a significant improvement in the experimental class after treatment, and (2) a significant difference between the experimental class (group investigation model) and the control class (lecture method). The experimental class showed greater improvement with an N-Gain of 0.31 (medium), compared to 0.14 (low) in the control class, indicating the effectiveness of the group investigation technique.

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INTRODUCTION

Efforts to realize quality education through curriculum development, teacher competency development, to the development of teaching materials and learning methods continue to be carried out in order to realize better education in Indonesia (Rosser, 2022). If national education is of good quality, it will be followed by an increase in human resources that have the potential to advance the country and be able to compete globally (Chentukov et al., 2021).

The success of the implementation of the learning process is often a benchmark in assessing the quality of education in a country (Prasetiyo & Muhes, 2025). "One of the main objectives of learning is to help students understand concepts, not just memorize materials separately" (Siregar and Motlan, 2016, p. 2). However, in learning, students are often found who can only remember the material and do not understand the concept. Therefore, in order to encourage students to achieve optimal learning outcomes, it is very important for educators to ensure that their students understand the learning concepts first (Marouchou, 2012).

"Understanding the concept is one of the main requirements for students to develop in learning" (Rahayu and Pujiastuti, 2018, p. 96). Student development will be difficult to achieve if the students cannot understand the learning concepts given well. Without understanding the concept, students will always rely on teachers in learning and it is difficult to develop (White, 2023). Therefore, an optimal understanding of the concept is needed so that students will have high-level thinking skills and abilities.

The importance of understanding concepts as one component of learning outcomes is urgent in this study. However, there is a phenomenon obtained based on observations made by researchers at SMA Negeri 1 Padalarang, the following empirical conditions can provide an overview of the low conceptual understanding of students in economics subjects. These empirical conditions can be described through Table 1 below.

Table 1. *Results of the Concept Understanding Test of Economic Subjects for Grade XI Students of SMA Negeri 1 Padalarang Academic Year 2023/2024*

Value	Category	Frequency	Percentage (%)
90-100	Very High	0	0
80-89	High	1	0,93
65-79	Medium	17	15,8
55-64	Low	14	13,08
0-54	Very Low	75	70,09
Total		**107**	**100**

The phenomenon of low conceptual understanding of students is not in accordance with the implementation of the Merdeka curriculum which gives students the freedom to develop learning and obtain information from various sources (Jamilah, J., & Suryani, 2024). However, seen from the results of low conceptual understanding, students' potential to have high learning outcomes is hampered (Lin et al., 2016). The low level of conceptual understanding of students can be caused by learning that is not optimal. An appropriate learning model or method is needed and adjusts to the needs so that learning runs more optimally (Sari, Santyasa, & Gunadi, 2021). One alternative active and student-oriented learning method is in the cooperative learning model. This is supported by the opinion of Hayati, et al. (2023, p. 1151) "The use of a cooperative learning model can stimulate students' knowledge directly so that learning can be centered on students".

One of the learning techniques in the cooperative model is the group investigation technique (GI). "Group investigation is learning that is associated with assignments, analysis, synthesis of information, and efforts to solve problems" (Damayanti, et al. 2019, p. 44). "Learning using the group investigation technique is carried out by grouping students to carry out investigations related to a topic" (Maula and Wulandari, 2018, p. 318). The cooperative learning model using the group investigation technique can be applied to almost all subjects taught in schools, including economics (Nofriansyah, Rahayu, & Wardiman, 2024). In order to improve the learning outcomes and achievements of students in the context of economics, Darmian (2021, p. 6) recommends using active, participatory, effective, innovative, and fun learning methods. The GI technique encourages students to have initiative and think actively and contribute creative ideas during the learning process (Fiorella & Mayer, 2016).

The results of Tlhoaele, Suhre, dan Hofman (2016), that cooperative learning methods, for example the use of group investigation techniques, have been proven to improve students' understanding of the material and concepts that have been given by teachers. The study is also more specific in economics subjects so that it can support that the selection of GI learning techniques is appropriate in economics subjects, especially to improve conceptual understanding. In line with this research, Jo dan Hong (2020) in their research results found that there were differences in the level of conceptual understanding in students who used GI learning techniques and those who did not. In classes that applied the GI learning model, student learning outcomes indicated a higher conceptual understanding when compared to students in classes that did not apply the method such as conventional methods.

Research Objectives

This study aims to:

1. To find out the general description of students' conceptual understanding of grade XI students at SMA Negeri 1 Padalarang.
2. To find out the differences in students' conceptual understanding in the experimental class between before and after being given cooperative learning model using group investigation technique.

3. To find out the differences in students' conceptual understanding between the experimental class using cooperative learning model using group investigation technique and the control class using lecture method after being given treatment.

LITERATURE REVIEW

Learning Outcomes

Learning outcomes are all forms of student achievement that are obtained and/or obtained after going through the learning process (Sloane et al., 2024). Based on the opinion of Zhang et al. (2022) "Learning outcomes are the result of an interaction between learning and teaching activities". Related to this definition, learning outcomes can also be interpreted as the result of teacher actions after teaching and ending with an evaluation of learning outcomes (Bakkenes, Vermunt, & Wubbels, 2010). Evaluation of learning outcomes is often used as a benchmark in identifying the extent to which the learning process achieves its goals (Sainov, 2021).

Learning outcomes can be categorized into several hierarchies called Bloom's taxonomy. "Bloom's taxonomy is a level structure that classifies thinking skills, starting from low to high levels" (Adams, 2015). Bloom's taxonomy also refers to a framework for measuring and developing the thinking skills needed to achieve learning objectives in learning outcomes (Agung et al., 2023). The history of this taxonomy was first discovered by Benjamin Bloom, a psychologist who focused on the field of educational development around 1956 (Arievitch, 2020).

Bloom's Taxonomy System has three important assessment aspects consisting of cognitive abilities, affective skills, and psychomotor abilities (Engin, Gençdoğan, & Engin, 2024). In the cognitive aspect, learning is developed to gain knowledge skills. The affective aspect is reviewed from a moral perspective that can be seen through the motivation, values, feelings, and attitudes of students. While in the psychomotor aspect, students will actualize the contribution of abstract theory to real life (Bahari, 2023). This section outlines the research approach employed in this study, including the research design, data collection methods, data analysis techniques, and the steps taken to ensure the validity and reliability of the findings. The methodology is chosen to support the research objectives and provide a robust foundation for drawing valid conclusions.

Conceptual Understanding

Conceptual understanding is one aspect of learning outcomes. As explained in the description of Bloom's taxonomy in the previous point, conceptual understanding is included in the cognitive domain at level C2. Although the level of conceptual understanding is low compared to the cognitive level above it, conceptual understanding is the basis for students to be able to think higher at the next level.

"Students who have the ability to understand concepts will have an objective attitude and be able to explore the meaning of information" (Sands et al., 2018). This

will help students in processing information in learning. Students do not just understand information at a glance and then easily forget the information, but can also explain it again in the future. Students who can understand knowledge as a whole have strong implementation abilities and potential in applying the knowledge they have. Thus, students can change the information they get into another form that they understand better.

Conceptual understanding means not just knowing and remembering lessons, but understanding and interpreting the material more deeply both abstractly and concretely. Conceptual understanding is a higher level of thinking ability than just remembering, memorizing and reasoning. By having a good understanding of the concept, students will develop and be able to have critical thinking skills at the level in Bloom's taxonomy. According to Djamarah and Zein (2010, p. 109) there are factors that influence student understanding as learning success from an educational aspect, namely goals, teachers, students, evaluation atmosphere, evaluation materials and tools, and teaching activities.

According to Engin, Gençdoğan, & Engin (2024) students' success in having the ability to understand concepts depends on the indicators of understanding concepts. Indicators of understanding concepts are:

1. Interpreting, which is changing information from one form to another.
2. Giving examples (exemplifying), which is exemplifying general concepts and presenting relevant illustrations or cases to clarify a concept or idea.
3. Classifying, which means being able to know or group something in a certain category.
4. Summarizing, which means making statements that can represent all information.
5. Drawing inferences/concluding (inferring), which is finding patterns from facts that occur.
6. Comparing, which is finding similarities and differences in two things.
7. Explaining, which is building a cause-and-effect model of something happening and being able to describe steps or information systematically.

Learning Theory Underlying the Cooperative Learning Model

The cooperative learning model is one of the student-centered learning models. In this learning model, students are directed to build their own meaning. The learning theory that is relevant and suitable for the cooperative model and which is implemented in this study is the constructivism learning theory. The meaning of constructivism is constructive. The meaning of building is the meaning to be understood by oneself. "... a key assumption of constructivism is that people are active learners and develop knowledge for themselves ..." [Individuals as active learners in developing their understanding related to science for their own convenience is a general assumption of constructivism in general] (Simpson, 2002, p. 347). To be able to understand the concept well, learners must find basic principles.

Piaget conveyed his thoughts on cognitive development, namely a cognitive development based on intellectual abilities characterized by increasingly complex cognitive processing. Piaget's theory is related to knowledge, or how people acquire knowledge. In more depth, Piaget divides students' cognitive development into four main factors, namely: biological maturity, experience gained from physical activity, experience gained from the social environment, and balance (Schunk, 2012, p. 320). Balance is the main factor in cognitive development. Balance integrates all actions that form mental and external reality based on these three factors consistently.

Neo-Piagetian theory states that cognitive development depends on brain development (Schunk, 2012, p. 325). Children are cognitively capable of doing what their brain development can do. However, according to Neo-Piagetian theory, brain development will limit children's ability to think and reason. Therefore, Neo-Piagetian proposes the assumption of gradual cognitive development that adds flexibility to the stages of development. This development is not always linear and the same in every child, and can be influenced by external factors.

Jerome Bruner's cognitive growth theory does not associate development with cognitive structures as Piaget did. Instead, Bruner's theory highlights the various ways children represent knowledge. According to Bruner in (Schunk, 2012, p. 327) '...the development of human intellectual functioning from infancy to such perfection as it may reach is shaped by a series of technological advances in the use of mind...' [The development of human intellectual functioning from infancy to adulthood achieved is shaped by a series of technological advances in thinking]. This technological advancement depends on the improvement of language skills. As development progresses, children's actions are no longer limited by direct stimulation.

Vygotsky's theory is a prime example of social constructivist theory. The emphasis that is the focus of discussion of this theory is in the form of environmental conditions that are considered to influence the learning development process. Vygotsky's theory emphasizes the relationship between aspects as the key to human development in the form of complexity involving individuals, cultural-historical aspects, and interpersonal aspects (Schunk, 2012, p. 331). Cognitive development can be formed through the process of individual interaction with the surrounding environment. The way students interact with other people, objects, and institutions in the context of interaction can change their way of thinking. The meaning of the concept changes when the concept is linked to the real world.

Cooperative Learning Model

Cooperative learning is a form of socially mediated learning that is often used in the classroom (Slavin, 1995, p. 4). The goal of cooperative learning is to develop students' ability to work together with others. This peer-assisted learning model is very compatible with constructivism. This is because "Peer-assisted learning refers to an instructional approach in which peers act as active agents in the learning process" (Rohrbeck, et al. 2003, p. 242).

"Cooperative learning can be integrated with insights that contribute to students' ability to think independently (personal constructivism) and in groups (social constructivism), especially in building students' understanding or knowledge" (Hayati, et al. 2023, p. 1145). The thinking skills produced will then train students' ability to work together and discuss in groups, students' ability to argue, ask questions, and solve problems. Quoted from Liu (2023), the cooperative learning model has several techniques including STAD (Student Team Achievement Division), Jigsaw, GI (Group Investigation), TPS (Think Pair Share), and NHT (Numbered Head Together) techniques.

Success in cooperative learning needs to be considered so that learning outcomes are more optimal. Factors that influence the success of cooperative learning are teacher, student, and environmental factors (Nabil, 2024, p. 709). Johnson et al. (in Singh and Agrawal, 2011, p. 4) state that the characteristics of cooperative learning are as follows:

1. Interdependence: Group members are required to support each other in order to achieve group goals.
2. Individual Accountability: Each student has their own responsibilities and tasks.
3. Social Interaction: Group assignments can be built by dividing tasks and group discussions. Tasks are given interactively.
4. Collaborative Skills: Students are motivated to develop and implement trust, leadership, decision-making, communication and conflict management in groups.
5. Group Processing: Group members plan group goals, then assess how well they work as a group, and identify learning to be more effective in the future.
6. Heterogeneous Groups: Students benefit from working with other individuals who are different from themselves.

Group Investigation Technique

Group investigation (GI) technique is one of the techniques in the cooperative learning model developed by Shlomo Sharan and Yael Sharan at Tel Aviv University, Israel (Nasir & Haqqini, 2019). Group Investigation is one of the techniques that focuses on student participation and activeness Liu (2023) are directed to find their own material and information to be studied from various sources. This activity can foster students' ability to think independently.

Group investigation has cognitive and social goals. The cognitive goal of the cooperative learning model of the group investigation technique academically is that students have an understanding of concepts and investigative skills. While the social goal of the cooperative learning model of the group investigation technique is cooperation in groups (Parinduri, et al. 2017, p. 50). With these two goals, not only does it support academically, but this technique also supports students' social abilities.

The advantages of this GI technique are in the personal, social, and academic aspects (Nursanti, et al. 2019, p. 51). With these advantages, group investigation can be said to be one of the more effective learning techniques compared to learning using conventional methods. This is because group investigation will affect three aspects at once for students if applied correctly. Meanwhile, the disadvantages of the group investigation learning technique found in the research of Retno, et al. (2014, p. 481) are the potential role of smarter group members to dominate the group, the GI technique takes longer, and teachers need more thorough preparation.

According to Sharan & Sharan (1990, p. 17) there are steps in learning the group investigation technique, namely:

1. Grouping
2. Planning
3. Investigation
4. Organizing
5. Presentation
6. Evaluation

Research Hypothesis

There is a difference in conceptual understanding in students who study in the experimental class, before and after being given the group investigation technique as part of the cooperative learning model.

After the treatment, there is a difference in conceptual understanding ability between students who receive learning in the experimental class based on the GI technique and those in the control class based on the lecture method.

METHODS

The object of this study is the understanding of the concept (Y) as the dependent variable, and the cooperative learning model of the group investigation technique (X) as the independent variable. The material to be selected is the material on economic growth and development. This research will be conducted at SMA Negeri 1 Padalarang, West Java Province with the unit of analysis in this study being class XI students of SMA Negeri 1 Padalarang as the subject.

The research method used is the quasi-experimental method, the design used is the Non-equivalent Control Group Design research design. In this study, the researcher divided the students into two groups, namely the experimental group and the control group, the experimental group is the group that was given treatment with the cooperative learning model of the group investigation technique. While the control group is a group of students who were given treatment with the lecture method.

The data collected in this study are primary data. The data were obtained from the results of tests conducted twice, namely the initial test (pre-test) and the final test (post-test) Handley et al. (2018). The form of the test is an objective test that is

compiled through the guidelines for indicators of conceptual understanding questions. The research instrument uses an objective test to measure students' conceptual understanding after being given treatment. Instrument testing is carried out to determine the quality of the questions in this study.

Validity Test

A validity test is conducted to measure the validity of the instrument in a study. A research instrument can be said to be valid if it can measure the data that is to be expressed from the research variables accurately. The following formula is used to test the validity of the test items, namely the Pearson Product Moment formula.

$$r_{xy} = \frac{n(\sum xi), (\sum yi)}{\sqrt{\{n\sum x^2 - (\sum x)^2\},\ \{n\sum Y^2 - (\sum Y)^2\}}}$$

(Arikunto, 2013, p. 170)

Validity Test was conducted for 22 objective question items and tested on 35 students. Of the 22 questions tested, there were 20 valid questions and 2 invalid questions. These questions have alternative questions in each sub-material so that even if they are deleted, there are still other question items from each sub-material. Therefore, the questions used in this study amounted to 20 objective questions.

Reliability Test

Reliability in a test is related to the level of trustworthiness of the test. According to Arikunto (2013, p. 178), a reliability test is important in addition to a validity test because a question can be valid but not reliable. The formula used to calculate the reliability coefficient in this study is the Cronbach Alpha formula, namely:

$$r_{11}=\left[\frac{k}{k-1}\right]\left[1-\frac{\sum \sigma b^2}{\sigma^2 t}\right]$$

(Arikunto, 2013, p. 196)

The results of the reliability test of 20 valid questions were 0.734 which can be categorized at a high level. Thus, it can be interpreted that the instrument in this study is reliable.

Table 2. *Reliability Test Results*

Croncbach's Alpha	N of Items
0,734	20

Source: Data processed from SPSS 30

Discriminating Power Test

The Discriminating Power Test is conducted to identify students with high ability and students with low ability in answering questions. The following is the formula used to find the discriminating power.

$$DP = \frac{Mean_A \, Mean_B}{Skor\ Maksimum}$$

(Zulaiha, 2012, p. 28)

The results of the discriminatory power test showed that no questions needed to be eliminated because no questions were categorized as bad. A total of 7 questions were categorized as good, and 13 questions were categorized as sufficient in the instrument's discriminatory power test.

Difficulty Level Test

According to Anaya et al. (2022), the level of difficulty is how many test participants can answer the question points correctly. This test is conducted to determine how difficult the test questions are. The formula applied in this test is as follows.

$$P = B$$

$$JS$$

(Arikunto, 2013, p. 223)

The results of the difficulty level test show that there are 5 questions in the easy category, 10 questions in the medium category, and 5 questions in the difficult category.

Data Analysis Techniques

After obtaining data from the results of the student tests, data analysis is carried out with the following stages.

1. Finding the maximum score and minimum score.
2. Calculating the average (mean), with the formula:

$$\bar{X} = \frac{\Sigma fx}{\Sigma f}$$

Description:

$\bar{X}$ = average

f = frequency

x = pretest/posttest value

3. Calculating the standard deviation, with the formula:

$$S=\sqrt{\frac{\sum f(Xi-X)^2}{\sum fi}}$$

Description:

S = standard deviation

Xi = Middle value

$\overline{X}$ = average

F = frequency

4. The N-Gain normalization between the pretest results and the average obtained from the posttest results can be formulated in the following formula:

$$\text{gain}=\frac{Posttest\ Value-Pretest\ Value}{Maksimum\ Value-Pretest\ Value}\times 100$$

The normalized gain (g) category interprets the calculation results below (Hake, 1999).

a. g ≥ 0.70 = high

b. 0.30 ≤ g < 0.70 = medium

c. g < 0.30 = low

Hypothesis Testing

Hypothesis testing is carried out through normality tests, homogeneity tests, paired sample tests, and independent sample tests.

RESULT

The subjects in this study were students in grade XI at SMA Negeri 1 Padalarang. The subjects were divided into two classes, namely class XI-10 as the control class and class XII-12 as the experimental class. The experimental class is a class that is given the cooperative learning model treatment using the group investigation technique, while the control class is a class that uses the lecture method in its learning.

The data in this study were obtained from the results of the pre-test and post-test given to the experimental class and the control class. This data was then processed using the Microsoft Office Excel and SPSS version 30 applications (Sitinjak, 2024). The results of the data testing in this study will answer the formulation of research problems related to the understanding of the concept and model of cooperative learning using the group investigation technique (Nofriansyah, Rahayu,

& Wardiman, 2024). The following are the results of processing pretest and posttest data in the experimental class and the control class (Christine et al., 2024).

Table 3. *Descriptive Analysis of Concept Understanding in Experimental & Control Classes*

Description	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test Experiment	36	25	70	48,61	12,51
Post-test Experiment	36	40	90	65,28	13,01
Pre-test Control	35	20	60	41	11,58
Post-test Control	35	30	80	51	14,26

Source: Microsoft Excel data processing

Based on table 3, the results of students' conceptual understanding in the experimental class with an average value on the pretest were 48.61 and increased to 65.28 on the average posttest score. The minimum value on the experimental pretest was 25 and the maximum value was 70. While on the experimental posttest, the minimum value was 40 and the maximum value was 90. In the control class, the results of conceptual understanding with an average value on the pretest were 41 and increased to 51 on the average posttest score. The minimum value on the control pretest was 20 and the maximum value was 60. While on the control posttest, the minimum value was 30 and the maximum value was 80.

Results of Normality Test

The normality test in this study was conducted to test the pretest and posttest scores in the experimental and control classes using SPSS 30 with the One-Sample Kolmogorov-Smirnov technique with a significance level of 5%. The results of the normality test in this study can be seen in table 4 below.

Table 4. *Normality Test Results*

Class	Score	Normality	
		Sig	Decision
Experiment	*Pre-test*	0,071	Normally Distributed
	Post-test	0,200	Normally Distributed
Control	*Pre-test*	0,115	Normally Distributed
	Post-test	0, 104	Normally Distributed

Source: SPSS 30 data processing

Based on table 4, the results of the pretest normality test of the experimental class have a significance value of 0.071> 0.05, so the data has been normally distributed. In the posttest of the experimental class, the significance value is 0.200> 0.05, the data has been normally distributed. As for the pretest of the control class, the significance value is 0.115> 0.05, so it can be concluded that the data has been normally distributed. In the posttest of the control class, the significance value is 0.104> 0.05, so it can be concluded that the data has been normally distributed. The conclusion of the normality test in this study is that all data has been normally distributed.

Homogeneity Test Results

The homogeneity test in this study was conducted to check whether the values have homogeneous variance or not. The homogeneity test uses SPSS 30 with the Levene Test technique and a significance level of 5%. The homogeneity test criteria are as follows. The results of the homogeneity test in this study can be seen in table 5 below.

Table 5. *Results of Homogeneity Test*

		Levene Statistic	Sig.	Decision
Concept Understanding Results	Based on Mean	0,683	0,564	Homogeneous

Source: SPSS 30 data processing

Based on the homogeneity test in table 5 above, it can be seen that the significance value based on mean is 0.564> 0.05 which is the level of significance. So it can be concluded that the data in this study has a homogeneous variance value.

Paired sample Test Results

The average difference test conducted with SPSS 30 through the Paired Sample Test technique which has a significance level (sig. 2-tailed) $\alpha = 0.05$. The hypotheses are as follows.

Ho: There is no difference between students' conceptual understanding in the experimental class before and after being given a cooperative learning model with a group investigation technique.

Ha: There is a difference between students' conceptual understanding in the experimental class before and after being given a cooperative learning model with a group investigation technique.

The results of the Paired Sample Test in this study can be seen in table 6 below.

Table 6. *Paired Samples Test Results*

Paired Samples Test									
	Paired Differences					t	df	Significance	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Lower	95% Confidence Upper			One-Sided p	Two-Sided p
PRE TEST POST TEST	-16,7	14,24	2,374	-21,5	-11,8	-7,02	35	0,000	0,000

Source: SPSS 30 data processing

Based on table 6 above, it can be seen that the sig. (2 tailed) = 0.000 <0.05 which means rejecting Ho and accepting Ha. Thus, it can be concluded that there is a difference between students' conceptual understanding in the experimental class before and after being given a cooperative learning model using the group investigation technique on the material of economic growth and development.

Independent Sample Test Results

The results of the normality test and homogeneity test on the research data have shown that the data is normally distributed and has a homogeneous variance value. Next is the average difference test carried out with SPSS 30 through the Independent Sample Test technique which has a significance level (sig. 2-tailed) α = 0.05. The hypotheses are as follows.

Ho: There is no difference in students' conceptual understanding between the experimental class using the cooperative learning model using the group investigation technique and the control class using the lecture method

Ha: There is a difference in students' conceptual understanding between the experimental class using the cooperative learning model using the group investigation technique and the control class using the lecture method. The results of the Independent Sample Test in this study can be seen in the following table 7.

Table 7. *Results of the Independent Samples Test*

Independent Samples Test	**Levene's Test**		**t-test for Equality of Means**			
					Significance	
	F	**Sig.**	**t**	**df**	**One-Sided p**	**Two-Sided p**

Experimental - Control (Posttest)	Equal variances assumed	0,150	0,700	4,259	69	0,000	0,000
	Equal variances not assumed			4,254	68,020	0,000	0,000

Source: SPSS 30 data processing

Based on table 7 above, it can be seen that the sig. value (2 tailed) = 0.000 <0.05 which means rejecting Ho and accepting Ha. Thus, it can be concluded that there is a difference between students' conceptual understanding in the experimental class using the cooperative learning model of the group investigation technique and the control class using the lecture method on the material of economic growth and development.

N-Gain Test Results

The results of this study can be seen in table 8 below.

Table 8. *N-Gain Test Results*

Class	Value	Average Value	N-Gain	Interpretation
Experiment	*Pretest*	48,61	0,31	Medium
	Posttest	65,28		
Control	*Pretest*	41,00	0,14	Low
	Posttest			

Source: Microsoft Excel data processing

Based on table 8 above, it can be seen that the average N-Gain value for the experimental class is 0.31 which is included in the moderate category. This shows that after the implementation of the cooperative learning model of the group investigation technique, students' conceptual understanding has increased, although there is still room for improvement because it is still in the moderate category. The average N-Gain value in the control class is only 0.14 which is included in the low category. This shows that although there is an increase in conceptual understanding, the level of improvement is still lower compared to the experimental class.

DISCUSSION

Based on the results of the paired sample test, it can be seen that there was a difference in conceptual understanding in students who received material delivery in the experimental class between before and after being given treatment. The

treatment applied was a cooperative learning model through the group investigation technique concerning the delivery of economic growth and development material. After implementing this technique, the conceptual understanding value possessed by students increased compared to before receiving treatment.

In the experimental class, students were required to investigate material topics together with their group members. This activity will later encourage students to practice having initiative and thinking actively and creatively so as to train students' thinking abilities. In addition, communication and social interaction skills in expressing opinions and discussing are also obtained by students in GI technique learning.

The group investigation learning technique improves students' conceptual understanding because students will study and interpret the material more deeply. In line with research by Harris (2010), that GI-based teaching techniques can improve students' ability to understand material and concepts in economic subjects.

The results obtained in this discussion are in accordance with the theory of constructivism, the theory states that students will build their knowledge independently through the process of interacting and participating actively in learning (Schunk, 2012, p. 327). With this theory, constructivist learning is suitable to be developed in a cooperative learning model, one of which is in the group investigation technique. The way of thinking of students who experience development in interactions in the learning process will develop their conceptual understanding abilities.

Based on the results of the study on the independent sample test, it shows that there is a difference in the conceptual understanding of students who study in the experimental class that implements the cooperative model based on the group investigation technique (GI) with students who are exposed to conceptual material in the control class that applies the lecture method. The results of this study can prove the second hypothesis.

The difference in conceptual understanding between the two classes is also seen in the N-gain value, which shows that the student's score in the experimental class has a higher and more weighted level so that it is worthy of being classified into the medium category. While in the control class, the N-gain value is included in the low category. This shows that the cooperative learning model with group investigation techniques applied to experimental class learning is more effective than the lecture method applied to control class learning.

The difference in N-gain values that occurred in the experimental class can arise because the learning process focuses on and targets student understanding. This has been proven to result in an increase in conceptual understanding more effectively. Students can interpret the material better because they are used to finding knowledge independently in GI technique learning. The results of this study are in accordance with the theory of constructivism which states that students will build

their own knowledge by interacting and actively participating in learning (Schunk, 2012, p. 327).

Unlike the control class, learning is still centered on the teacher. This will make students less able to understand the material in depth compared to the experimental class. Students listen more so they tend to be more passive. This is in line with the results of research by Juniartina (2015); Wicaksono, et al. (2015); and Suhartono, et al. (2019) who found differences between the student learning process with the application of GI techniques in class with students who did not receive any treatment related to the cooperative teaching model. Classes that apply learning based on group investigation techniques allow students to achieve learning outcomes and the ability to understand concepts that are superior to students in classes with conventional learning methods.

The implementation of learning with group investigation techniques that run effectively will improve conceptual understanding. Especially to bring up an increase in conceptual understanding in each student regarding the topic of economic growth and development. So, this technique is one of the right techniques that can be an option used by teachers in learning to improve students' conceptual understanding.

CONCLUSION

Based on the research results and discussion analysis obtained, the following research conclusions were obtained.

The conceptual understanding of students in the experimental class and control class was still relatively low before being given treatment. In the experimental class by applying the cooperative learning model group investigation technique, overall students' ability to understand concepts experienced a gradual increase, from being in the low category to being moderate. In contrast to the control class which applied the lecture method, students in that class as a whole still had a low conceptual understanding although some students had shown signs of increasing conceptual understanding.

There was a difference in students' conceptual understanding in the experimental class before and after receiving the cooperative learning model group investigation technique treatment, especially on the material of economic growth and development. Overall, the students' scores related to conceptual understanding after being given treatment were higher than before being given treatment.

There was a difference in students' conceptual understanding who studied in the experimental class with a cooperative learning model based on the group investigation technique, with students in the control class who used the lecture method. The conceptual understanding of students in the control class was still relatively low, while the conceptual understanding of students in the experimental class was in the moderate category. The cooperative learning method group investigation technique has been proven to be used as an alternative way of delivering learning materials to achieve learning outcomes in the form of better understanding of student concepts than the lecture method.

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