

## The influence of the group investigation on students' critical thinking skills in physical education

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### ABSTRACT

*The purpose of this research is to determine the effect of the Group Investigation on students' critical thinking skills in Physical Education. The method used was a true experiment with The Randomized Pretest-Posttest Control Group Design. 8th grade students of Adzkiya Integrated Islamic Junior High School Sukabumi were the population in this study with a sample 56 students. The research instrument used a questionnaire. Data analysis using paired t-tests in the experimental group showed Sig. 0.00<0.05, so there is a significant difference between the pre-test and post-test results. The value of the control group is Sig. 0.065>0.05, no significant effect exists between the pre-test and post-test results. The results of the independent sample t-test showed a Sig. 0.00 <0.05, so Group Investigation is more effective than Direct Instruction. Group Investigation has a significant effect on improving students' critical thinking skills in Physical Education. Direct Instruction does not have a significant effect on improving students' critical thinking skills in Physical Education. Group Investigation improves students' critical thinking skills in Physical Education learning more effectively than Direct Instruction. The results of this study can be used as a reference for Physical Education teachers in implementing learning and a reference for further research.*

**Keywords:** Group Investigation, Critical Thinking Skills, Physical Education

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## INTRODUCTION

21st century skills are skills that are expected to be possessed by every individual in the current era, so that every individual can adapt to all the rapid changes and developments, both in terms of developments in technology and information and science. In this way, individuals have a good place in society and are able to decide things appropriately and become productive individuals to live their lives ([ÇİFTÇİ et al., 2021](#)). Critical thinking is a general skill that is recommended for students to have because it is predicted to be a skill that can contribute to academic success and career success in the 21st century ([Hsu et al., 2022](#); [Shaw et al., 2020](#); [Ulu-Aslan & Baş, 2023](#)), which is also believed to make an important contribution to logical thinking, correct decision making, and also appropriate problem solving ([Liu et al., 2014](#)).

Critical thinking is necessary for making decisions regarding what to believe and do based on the results of reasonable, reflective and relevant thinking ([Verburgh, 2019](#)). Critical

thinking skills are basically related to students' ability to use their cognitive domain, students can make decisions quickly and be able to analyze a problem (Hena, 2019). In physical education, reflective thinking that is applied to rationally and persuasively decide on movement goals and difficulties is referred to as critical thinking abilities (Huang et al., 2017). In physical education, critical thinking skills are an important skill because when students carry out a movement to be said to be proficient it must involve appropriate decision making skills. These skills are the result of critical thinking (Pill & SueSee, 2017).

One of the Competency Standards for graduates in junior high school is to demonstrate the ability to identify relevant information or problems faced, analyze, prioritize the most relevant information or the most appropriate alternative solutions (Permendikbud, 2022). The graduate competency standards are related to critical thinking skills. Therefore, every student must have critical thinking skills, because improving critical thinking skills is one of the goals of education (Akinoglu & Baykin, 2017).

Group Investigation is part of the cooperative learning model. One of the characteristics of the cooperative learning model is that it emphasizes student participation and activity. Students can search for the lesson material, for example, from textbooks or from newspapers or the internet (Metzler & Colquitt, 2021). In Group Investigation, students study in small groups and discuss material assigned by the teacher. The report on the results of the discussion is in the form of a project which is then presented in front of the class. (Slavin, 2015a). The Group Investigation learning model is very suitable for classes containing students with various interests, experiences and knowledge. Because group determination is based on students' interests, experience and knowledge of the available sub-material (Slavin, 2015b). The Group Investigation model divides students into groups of two to six people and each group is free to choose a subtopic from the material to be taught, then each group divides their subtopics into individual assignments and carries out the activities needed to prepare a group report to be presented in class (Sharan, 2014).

Several studies have been conducted related to critical thinking skills and Group Investigation learning models. In English classes, a dialogic instructional learning approach is used to investigate the relationship between teachers' talk and students' critical thinking skills. The results show that a dialogic instructional approach can improve students' critical thinking skills (Cui & Teo, 2023). The next research is about the influence of critical thinking embedded English course design on increasing students' critical thinking skills, The results of this research show that there is an increase in students' critical thinking skills (Bağ & Gürsoy, 2021). Further

research, regarding differences in gender and reading skills on the growth of students' critical thinking skills in science learning ([Alpizar et al., 2022](#)). Other research regarding the Group Investigation to increase learning abilities in groups of students. The results of this research show that student learning outcomes increase because learning is carried out in groups using the Group Investigation learning model ([Sojayapan & Khlaisang, 2018](#))

The above study discusses group investigation and students' critical thinking skills. It is necessary to conduct research on the influence of Group Investigation on students' critical thinking skills in Physical Education learning. Previous studies only measured students' critical thinking skills in science learning. The results of interviews with teachers of Adzkie Integrated Islamic Middle School, that students' critical thinking skills are still low. This is because the learning model used is still traditional. Students only do assignments according to what is demonstrated and instructed by the teacher. So that students do not use their thinking skills to do a movement task. Critical thinking skills must be improved, because critical thinking skills are related to the cognitive domain. Physical education learning is not only related to the psychomotor domain, but the cognitive domain must also be improved through physical education learning. In this study, researchers tried to use Group Investigation to improve critical thinking skills in physical education learning. The question in this study is whether the Group Investigation and Direct Instruction learning models affect students' critical thinking skills. Which learning model is more effective than group investigation and direct instruction in improving students' critical thinking skills? This study aims to determine whether the Group Investigation learning model can improve students' critical thinking skills in physical education learning. The next objective is to find out which learning model is more effective between Group Investigation and Direct Instruction in improving students' critical thinking skills in physical education learning.

## **METHODS**

This research is a quantitative descriptive research with data collection using questionnaires. The method used in this research is quantitative, the data produced is in the form of numbers and then analyzed using statistics ([Hardani, 2020](#); [Sahir, 2022](#)). True-experimental with The Randomized Pretest-Posttest Control Group Design as used as a design of this study. Two groups of subjects were used in this study. Each group was measured and observed twice each at pretest and posttest. This research was carried out in Sukabumi Regency. The population of this study were 8th grade students at Adzkie Integrated Islamic Junior High School Sukabumi and sampling used cluster random sampling. The research

sample was 56 people. The control and experimental groups each consisted of 28 people. There are independent and dependent variables in this research. The independent variable is Group Investigation and the dependent variable is critical thinking skills. The questionnaire adopted from Ennis ([Ennis, 2011](#)) is an instrument used to measure critical thinking skills and has been used in previous research ([Hena, 2019](#)). Indicators for measuring a person's critical thinking skills are The basis for the decision, Elementary clarification, and Inference. The treatment given was Physical Education learning using the Group Investigation learning model for the experimental group and the Direct Instruction learning model for the control group. Treatment was given in 12 meetings and 2 meetings were held every week. The researcher's decision to carry out the treatment in 12 meetings was based on Slavin's opinion which stated that for the Group Investigation learning model to be effective, the duration of the study should be a minimum of 12 meetings. Data analysis in this study used a paired sample t-test to compare the average values of the pre-test and post-test results before and after treatment was given to the research sample. Independent samples t-test was used to compare the mean scores of the control and experimental groups.

## RESULTS AND DISCUSSION

Data analysis in this research used the Statistical Package for the Social Sciences (SPSS) software. Before testing the hypothesis, a normality test and homogeneity test are carried out as prerequisite tests.

### Results

**Table 1.** Normality test

<b>Group</b>	<b>N</b>	<b>Asymp. Sig. (2-tailed)</b>
Direct Instruction	28	.200
Group Investigation	28	.200

The results of the control group and experimental group data normality test are shown in table 1. The results of the control group data normality test show significant value Asymp. Sig. (2-tailed)  $0.200 > 0.05$ . The results of the normality test in the experimental group showed Asymp. Sig. (2-tailed)  $0.200 > 0.05$ . then the data obtained from the experimental group is normally distributed.

The homogeneity test in this study used Levene's Test which is shown in table 3. The homogeneity test results show Sig.  $0.282 > 0.05$ . This means that the data obtained is homogeneous so that hypothesis testing using the independent sample t-test can be carried out.

**Table 2.** Paired sample t-test Statistical Analysis

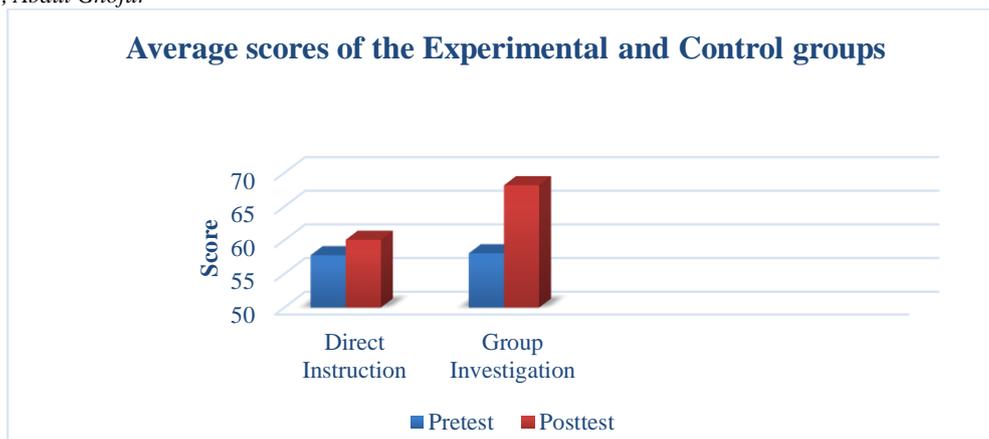
<b>Group</b>	<b>Mean Differences</b>	<b>T</b>	<b>df</b>	<b>Sig. (2-tailed)</b>
Direct Instruction	-2.286	-1.923	27	.065
Group Investigation	-10.107	-7.136	27	.000

The results of the paired t-test in the control group, namely the group that carried out physical education learning using the Direct Instruction learning model showed Sig.  $0.065 > 0.05$ . Based on these results, a decision can be made that there is no influence of the Direct Instruction on students' critical thinking skills. The results of the paired t-test in the experimental group, namely the group that carried out physical education learning using the Group Investigation learning model, showed a Sig.  $0.000 > 0.05$ . Based on the results of the paired sample t-test in the experimental group, it can be decided that there is a significant influence of the Group Investigation learning model on students' critical thinking skills.

**Table 3.** Independent Sample t-test Statistical Analysis

	<b>Levene's Test for Equality of Variances</b>		<b>t-test for Equality of Means</b>		
	F	Sig.	t	df	Sig. (2-tailed)
Equal variances assumed	1.179	.282	-6.173	54	0.000
Equal variances not assumed			-6.173	51.212	0.000

The independent sample t-test was carried out to determine the difference in influence between the control and experimental groups. The independent sample t-test in this research was to determine the difference in the influence of the Group Investigation and Direct Instruction learning models on students' critical thinking skills. Table 10 shows the results of the independent sample t-test. the results show the value Sig. (2-tailed)  $0.000 < 0.005$ . Based on these data, it can be decided that there is a difference in the influence of the Group Investigation and Direct instruction learning models on critical thinking skills. Group Investigation is more effective in improving students' critical thinking skills than Direct Instruction. Figure 1 shows the average scores of the experimental and control pretest and posttest.



**Figure 1.** Average score of experimental and control pretest and posttest

## Discussion

The aim of this research is to determine the effect of Group Investigation on improving students' critical thinking skills in Physical Education learning. The Group Investigation and Direct Instruction learning models were compared to determine the differences in their influence on critical thinking skills, and which one is better and more effective for improving students' critical thinking skills. The results of data processing and data analysis contained in tables 1, 2 and 3 provide answers to this research question. The results of data analysis show that Group Investigation improves students' critical thinking skills in physical education learning. Students' critical thinking skills can increase, one of which is due to the choice of the Group Investigation learning model in the learning process, because the Group Investigation learning model emphasizes students to carry out investigative activities in solving problems through analysis, synthesis and gathering information. Thus, students' critical thinking skills can improve (Slavin, 2015). This research supports previous research by Muhdhar (Muhdhar et al., 2016) which stated that the implementation of the Group Investigation learning model encourages students to improve their critical thinking through planning, argumentation, stating questions and problems, as well as analyzing and providing solutions to environmental problems.

As a result of observations made by the teacher, students carry out physical education learning using Group Investigation, making students more active in discussing with their groups. Each student discusses and expresses his opinion to solve the problems faced by his group. Apart from that, in discussion activities students also learn to accept opinions from other students even though their opinions are different. This research supports previous research which states that Group Investigation increases student participation in discussions to solve

problems, students learn to express their opinions and also accept opinions from other students ([Iswardati, 2016](#)). The Group Investigation learning model encourages students to use their cognitive abilities in searching for information and analyzing any information obtained to solve problems faced in learning ([Bustami et al., 2018](#)). The more often students use their cognitive abilities, the more students' critical thinking skills will improve. This is the advantage of the Group Investigation learning model over traditional learning models, as it improves cognitive abilities and critical thinking ([Boari et al., 2023](#)). The Group Investigation learning model provides students with the opportunity to search for information from various sources such as books, video shows provided by the teacher or search for themselves on the internet. Video shows provided by teachers are one of the interactive learning media that can stimulate students to use their critical thinking skills so they are able to solve problems ([Maulidia & Ridwan, 2021](#)).

Physical education must encourage students to develop their cognitive and psychomotor abilities. The results of this research indicate that the Group Investigation learning model is more effective in improving students' critical thinking skills in physical education learning when compared to the Direct Instruction learning model. This research is in line with previous research which states that the Group Investigation learning model helps students to develop their critical thinking skills so that students can also develop their motor skills effectively, because motor skills always involve developing critical thinking skills when solving a ([Huang et al., 2017](#)). This research provides an illustration that physical education is not only oriented towards movement skills. However, students also need to develop their cognitive abilities. Apart from that, this research also tries to provide answers regarding the opinion of the public who believe that physical education lessons are only complementary lessons and do not have an influence on the development of a child's overall potential ([Irmansyah et al., 2020](#)).

The Group Investigation learning model places students in small groups to work together to achieve learning goals ([Schulze & M, 2022](#)). Meanwhile, the Direct Instruction learning model places the teacher as the leader in the learning process who regulates learning content, class management, and student involvement. Students only follow what the teacher instructs so that students carry out learning and work individually ([Setiawan et al., 2020](#)). The differences between the two learning models influence the results of this research, because students improve their critical thinking skills more effectively by working together in groups compared to working individually using the Direct Instruction learning model ([Ramadhan & Ulinnuha, 2023](#)). The results of this study state that the Group Investigation learning model

improve students' critical thinking skills. However, the Group Investigation learning model has a significant effect on improving students' critical thinking skills in physical education learning.

## CONCLUSION

Based on the results and discussion, it can be concluded that the Group Investigation learning model significantly improves students' critical thinking skills in physical education learning. Meanwhile, the Direct Instruction learning model has no effect on improving students' critical thinking skills in physical education learning. If we compare the Group Investigation and Direct Instruction learning models, the Group Investigation learning model is more effective in improving students' critical thinking skills than the Direct Instruction learning model. This research can be a reference for teachers to improve students' critical thinking skills in physical education using the Group Investigation learning model.

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