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The Influence of Group Investigation Learning Model Assisted by Three-Dimensional Media on Mathematics Learning Outcomes

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Abstract: The aim of this study was to determine the effect of cooperative learning model type group investigation assisted by three-dimensional media on the learning outcomes of fifth grade students of SDN 1 Jati Indah South Lampung. This type of research is a qualitative type of pre-experimental design in the form of one group pretest posttest. The population in this study were fifth grade students of SDN 1 Jati Indah South Lampung. The probability sampling technique of simple random sampling type was used as a sampling technique. Tests and documentation were used in data collection methods and equipment. T-test (paired sample t-test) is the method to analyze the data. The results showed the t-count of 10.778 with the level of Sig. (2-tailed) 0.000 < 0.05. Also reinforced by the average results of pretest 63.3 and posttest 73.5. Based on this, that there is an effect of cooperative learning model type group investigation assisted by three-dimensional media on mathematics learning outcomes.

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Introduction

Education is still considered an important means of building the intelligence and character of a nation. Education must continue to be developed in order to deepen its implementation so as to produce graduates who have achievements and quality. According to (Zakaria et al., 2023) in order to develop competent human resources in the future, education is important. Therefore, training students who excel and have quality is where the educational process must also always be evaluated and improved. So it can be said that education is an effort to teach students and improve students' abilities such as talents that have been owned so that they can form better characters and become useful provisions in the future. In addition, education aims to provide the skills needed by students to face the upcoming globalization period. Infrastructure and facilities, the quality of teachers and learners, and curriculum development must continue to be improved in the field of education.

The curriculum is the most important factor that serves as a guide in achieving goals in an education. The Merdeka curriculum is a curriculum model used in Indonesia. In this curriculum, students are required to actively develop their own knowledge and create creative ideas to be useful later in life (Hakiky et al., 2023). In involving students who must be active

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and creative, the selection of learning models and media to be applied during learning must be appropriate and efficient.

Learning models and learning media are one of the supporters of the success process in learning. Therefore, the selection of learning models must be able to foster creativity in the classroom and an active learning environment. Active learning can be developed by directly involving and creating student interaction during the learning process so that students are the center of learning or commonly called student centered (Zulfahnur et al., 2020). In order for the material learned to be better understood, the learning media used must also be adapted to the conditions of the students. Concrete learning media is a medium that can be used in the learning process, because concrete media is real so that it is relevant in the lives of students, for it is hoped that the concept of understanding the material that has been learned will be more embedded in the memory of students.

Mathematics is a relatively difficult subject, while on the other hand in the digital and technological age math lessons are needed (Susanti, 2020). Mathematics is a topic that is basically difficult for elementary school students to understand because it contains abstract and complicated objects, and this is due to their developing cognitive abilities. This can cause students when studying mathematics to easily feel bored and lack enthusiasm due to the uninteresting learning process.

One of the materials studied in metemtika is building space. According to (Suharjana, 2008) built space is part of the space bounded by points and located on the entire surface that surrounds it. Building space is mathematical material that is arguably concrete but not always real, because students are always faced with physical things but not in front of them (Nurhikmayati, 2017). Learners will always be required to imagine and describe every property and component in the building space that does not actually exist. So that students will have difficulty solving problems related to building space.

Based on pre-research observations in class V at SDN 1 Jati Indah, it was found that teachers still use conventional teacher-centered learning models, without using innovative learning models when teaching in class, so that it tends to take place in one direction which makes students inactive, learning becomes more monotonous and causes students to feel bored and quickly feel bored, and lack of utilization of learning media so that students find it difficult to understand the material. The results of interviews with homeroom teacher V, found data on learning outcomes for mathematics subjects, many students have not yet reached KKTP (Criteria for Successful Learning Objectives), namely not reaching a score of 70.

One way to overcome this problem, it is necessary to have a maximum learning process with the use of the right learning model and media in order to maximize student learning outcomes. In order for students to participate more actively in learning so as to achieve maximum learning outcomes, the previous teacher-centered learning model was changed to a student-centered learning model. The use of learning media must also be done appropriately so that students are more interested and not easily bored when learning takes place.

The right learning model in answering these problems is the group investigation type cooperative model. In the cooperative approach, students learn in small groups of 4-6 people who collaborate to solve problems by respecting each other's ideas and developing positive interdependence while improving their socialization, interaction, and communication skills (Anitra, 2021). In cooperative learning, students are required to work together in groups, so that indirectly there is a knowledge transfer activity between other students in the group. The

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group investigation type cooperative learning strategy emphasizes the active participation of students in searching for knowledge independently to learn through the use of available resources such as textbooks and the internet. (Sulistio & Haryanti, 2022). By involving students from the beginning to the end of the learning process, this learning model will encourage active learning and provide opportunities for students to hone their understanding. The group investigation type cooperative model will aim to help students learn the subject systematically, analytically, and train to work together in problem solving, with this students will be equipped with valuable life skills in social life (Pratiwi, 2021).

The use of learning media will be able to support the interest of students when learning takes place, because it can visualize the learning material being taught. Facts, concepts, principles, and processes look more real or concrete when learning media are used. (Moreira et al., 2018). Reality media such as walls and models can be utilized to communicate ideas through three-dimensional learning media (Astono & Wibawa, 2019). Students will more easily understand the material presented using three-dimensional media because they can interact with the media directly because the media is real and concrete.

The application of the group investigation type cooperative learning model can improve learning outcomes significantly, as evidenced by research (Sudarta, 2022) which shows an increase in learning outcomes between cycle I (average score 64, absorption 64%, learning completeness 69%) and cycle II (average score 76, absorption 76%, learning completeness 96%), but in Sudarta's research used science subjects to be studied, while the researchers took math subjects to be studied. Additional research conducted (Buaton et al., 2021) showed a t-test of t_{count} 4.786> t_{table} 1.703, and the results of the correlation test of 0.640 showed that r_{count} (0.640)> r_{table} (0.361) indicating that there is a significant influence between the type of cooperative learning model type group investigation on student learning outcomes. Furthermore, based on research (Wijayaningrum, 2020) the learning outcomes of students with $t_{count}t$> t_{table} (namely 4.963> 2.021 (with α = 0.05) and the ability of math learning outcomes increased to 0.55 with the criteria "Moderate" when using a cooperative learning model type group investigation. In research (Rolita, 2022) also shows that the value of $t_{count}t$ < t_{table} (t_{count} = -7.21 < t_{table} = 2.021), so it can be concluded that learning outcomes can be influenced by the use of three-dimensional media. Based on previous research, students' learning outcomes can be improved by using the three-dimensional learning model.

Research Method

This research uses a type of quantitative experimental method. In this study using a pre-experimental design. Pre-experimental design is used because there is only one group and no control variables. The pre-experimental design used is in the form of one group pretest-posttes.

The population in this study were 117 fifth grade students of SDN 1 Jati Indah. In this study, the probability technique of simple random sampling was used in sampling. The sample used was 30 students of class V C. This research was conducted in the even semester of the 2023/2024 school year in class V of SDN 1 Jati Indah, Jati Indah Village, South Lampung Regency, 2023/2024 School Year.

Data collection techniques using observation and tests, the test instrument used is an objective test with 20 items of multiple choice questions that have previously been validated by experts and then tested for validity, reliability, difficulty level, question differentiation, and analysis of the function of the examiner. The test questions are in the form of multiple choices given at the beginning (pretest) and end (posttest) of learning to determine the

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improvement of students' learning outcomes in mathematics lessons in the material of building space. The data obtained will then be analyzed using SPSS 25 for Windows software. The data analysis techniques used are normality test using shapiro-wilk (because respondents are less than 50), homogeneity test, and hypothesis testing using paired sample t-test with sig level. 0,05.

Result and Discussion

Data collection in this study was carried out by first conducting a pretest to students to determine their mastery of mathematics lessons on the material of building space. Furthermore, three-dimensional media was used to facilitate learning in the classroom through a cooperative learning model of group investigation type. After that, researchers conducted posttests to determine the development of students' learning outcomes.

From the results of the study, in the following table 1, are the scores of students' pretest and posttest results.

Table 1. Data on students' learning outcomes

Data	Statistik	Value
Pretest	Highest value	80
	Lowest value	45
	Average value	63,3
	Standard deviation	9,407
Posttest	Highest value	90
	Lowest value	55
	Average value	73,5
	Standard deviation	9,205

Based on table 1, the highest scores on the pretest and posttest were 80 and 90, while the lowest scores on the pretest and posttest were 45 and 55 and the standard deviations on the pretest and posttest were 9.407 and 9.205. In the pretest score, the average value is 63.3 while the posttest average value is 73.5. For more details, the comparison of the scores of the pretest and posttest results is presented in Picture 1 below.

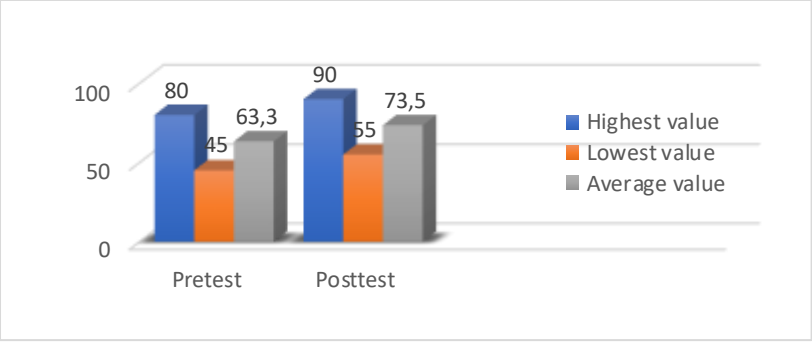

Figure 1. Comparison chart of pretest and posttest results

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Next, the normality test is carried out. The normality test aims to ascertain whether the pretest and posttest data meet the predetermined requirements for normally distributed data. if the sig level. > 0.05, the data is normally distributed and if the sig level. <0.05, the data is not normally distributed. The following are the results of the normality test with shapiro-wilk.

Table 2. Normality test

Shapiro-Wilk		
Data	Sig.	Conclusion
Pretest	0,128	Normal
Posttest	0,269	Normal

It is known that the pretest significance level is 0.128 > 0.05, and the posttest significance level is 0.269> 0.05, according to the results of the normality test that has been carried out. Thus, it can be said that the pretest and posttest instruments of this study have a normal distribution.

The next step is to conduct a homogeneity test on the research data after the normality test. By comparing the significant values obtained from the homogeneity test, it can be seen the level of similarity between the pretest and posttest variances of the two groups. The results of the homogeneity test are presented in table 3 below.

Table 3. Homogeneity test

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Mathematics Learning Outcomes	Based on Mean	0,15	1	58	0.901

Based on table 3, it can be seen that the significant level of pretest and posttest has a value of 0.901> 0.05. Therefore, it can be said that the pretest and posttest data are homogeneous or come from populations that have the same variance.

Next, hypothesis testing was conducted. Hypothesis testing using paired sample t-test. If the Sig value. (2-tailed) in this test <0.05 then Ha is accepted and Ho is rejected, meaning there is an influence. The following is a list of hypothesis test results conducted with SPSS 25 for windows.

Table 4. Hypothesis test

Paired Sample T-Test				
		t	df	Sig. (2-tailed)
Pair 1	*Pretest - Posttest*	10.778	29	.000

Based on the results of the hypothesis test which shows that the value of the Sig level. 0.000 <0.05 (2-tailed) then Ha is accepted and Ho is rejected. Therefore, it can be concluded that the cooperative learning model of group investigation type assisted by three-dimensional media has an effect on math learning outcomes,

Based on the results of research conducted in class V SDN 1 Jati Indah, South Lampung Regency, it is proven that the use of cooperative learning models of group investigation type assisted by three-dimensional media has an impact on math learning

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outcomes. Where based on the t-test (paired sample t-test) that has been carried out, the t-count result is 10,778 with a sig. (2-tailed) value of 0.000 <0.05.

The group investigation cooperative model is used in the classroom to carry out learning so that students must actively collaborate, think creatively, be able to solve problems, and dare to voice their opinions to identify answers to existing problems in learning using the group investigation cooperative model. This is in line with research conducted (Sudarta, 2022), namely, using cooperative learning of group investigation type will make students become active, creative, and involved in learning. The group investigation model is also able to foster students' self-confidence. Three-dimensional learning media also affects the activeness and understanding of students so that it affects learning outcomes. This is in line with research conducted (Rolita, 2022) that the level of understanding, the ability to obtain learning outcomes, and the level of activeness, all show differences in the learning they do before and after using three-dimensional media.

Conclusion

Based on the results of the research described, it can be seen that the use of cooperative learning models of the group investigation type with the help of three-dimensional media can affect the learning outcomes of students in mathematics. With a sig. (2-tailed) value of 0.000 <0.05. It can also be seen from the average posttest score of 73.5 and the average pretest score of 63.3.

Recommendation

After collecting, analyzing, and interpreting the data, the recommendations that researchers provide are:

1) In applying an effective and appropriate learning model on mathematics learning outcomes, the cooperative learning model of group investigation type assisted by three-dimensional media can be used as an appropriate alternative.
2) For other researchers, in order to carry out the stages of research by paying attention to the preparation and implementation time, because preparing learning media requires careful design.

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References

Anitra, R. (2021). Pembelajaran kooperatif tipe jigsaw dalam pembelajaran matematika di sekolah dasar. *JPDI (Jurnal Pendidikan Dasar Indonesia)*, *6*(1), 8.

Astono, W. D. D., & Wibawa, S. C. (2019). Pengembangan Media 3D Pada Pembelajaran Crimping Kabel Utp Menggunakan Platform Android Untuk Meningkatkan

Juli 2024. Vol. 9 No. 3
E-ISSN: 2656-1417
P-ISSN: 2503-0602
pp. 395-401

Kemampuan Psikomotorik Siswa Di SMK Negeri 1 Kemlagi. *IT-Edu: Jurnal Information Technology and Education*, *4*(01).

Buaton, R. A., Sitepu, A., & Tanjung, D. S. (2021). Pengaruh Model Pembelajaran Kooperatif Tipe Group Investigation terhadap Hasil Belajar Siswa pada Pembelajaran Tematik di Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, *3*(6), 4066–4074.

Hakiky, N., Nurjanah, S., & Fauziati, E. (2023). Kurikulum merdeka dalam perspektif filsafat konstruktivisme. *Tsaqofah*, *3*(2), 194–202.

Moreira, I. X., Pereira, S., & Gusmão, H. F. (2018). The Influence of Concrete Instructional Media on Learning Achievement. *ISCE: Journal of Innovative Studies on Character and Education*, *2*(1), 104–114.

Nurhikmayati, I. (2017). Kesulitan berpikir abstrak matematika siswa dalam pembelajaran problem posing berkelompok. *Kalamatika: Jurnal Pendidikan Matematika*, *2*(2), 159–176.

Pratiwi, P. (2021). Kajian Tentang Model Pembelajaran Tipe Group Investigation Terhadap Hasil Belajar (Studi Literatur). *PhD Thesis*. FKIP UNPAS

Rolita, S. (2022). Pengaruh Penggunaan Media Tiga Dimensi Terhadap Hasil Belajar Dan Keaktifan Siswa Pada Mata Pelajaran IPA Kelas V SD Negeri 52 Seluma. *PhD Thesis*. UIN Fatmawati Sukarno Bengkulu

Sudarta, G. K. (2022). Meningkatkan Hasil Belajar IPA melalui Penerapan Model Pembelajaran Kooperatif Tipe Group Investigation pada Siswa Kelas VI. *Journal of Education Action Research*, *6*(2), 221–227.

Suharjana, A. (2008). *Mengenal bangun ruang dan sifat-sifatnya di sekolah dasar*. Direktorat jenderal peningkatan mutu pendidik dan tenaga kependidikan.

Sulistio, A., & Haryanti, N. (2022). *Model Pembelajaran Kooperatif (Cooperative Learning Model)*.

Susanti, Y. (2020). Pembelajaran matematika dengan menggunakan media berhitung di sekolah dasar dalam meningkatkan pemahaman siswa. *Edisi*, *2*(3), 435–448.

Wijayaningrum, D. A. (2020). Pengaruh Model Pembelajaran Kooperatif Tipe Group Investigation Terhadap Hasil Belajar Matematika Peserta Didik Kelas V SD Negeri 11 Metro Pusat.

Zakaria, Z., Sukomardojo, T., Sugiyem, S., Razali, G., & Iskandar, I. (2023). Menyiapkan Siswa untuk Karir Masa Depan Melalui Pendidikan Berbasis Teknologi: Meninjau Peran Penting Kecerdasan Buatan. *Journal on Education*, *5*(4), 14141–14155.

Zulfahnur, R., Winarti, A., & Syahmani, S. (2020). Model Pembelajaran Debat Aktif Berbasis ICT Pada Materi Koloid Dan Keterampilan Berpikir Kritis Siswa. *JCAE (Journal of Chemistry And Education)*, *4*(1), 7–15.

