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Cooperative Learning Process in the 21st Century Era: Does It Still Have an Impact on Students' Understanding of Concepts?

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Abstrak

Penelitian ini dilakukan untuk mengetahui pengaruh model pembelajaran Cooperative Learning terhadap pemahaman konsep pada materi usaha dan energy. Jenis penelitian ini adalah penelitian kuantitatif. Populasi dalam penelitian ini adalah seluruh siswakelas X semester ganjil SMK N 3 Tanjung Jabung Barat tahun ajaran 2022/2023 yang terdiri dari tiga kelas yaitu X TKRO 1, X TKRO 2, dan X TEI. Teknik pengambilan sampel dilakukan dengan menggunakan teknik purposive sampling dikarenakan data yang didapat sebelumnya dari tiga kelas tersebut normal dan homogen. Desain dalam penelitian ini adalah post-test only dikarenakan sampel yang digunakan memiliki kemampuan awal yang bisa dikatakan sama. Berdasarkan analisis data yang diperoleh nilai rata-rata kelas eksperimen sebesar 52,3 dan nilai rata-rata kelas kontrol adalah 47,6. Selain diperoleh nilai rata-rata, dalam penelitian ini juga didapat dari hasil uji t bahwa pembelajaran Cooperative Learning tidak memiliki pengaruh yang signifikan dengan kelas yang tidak menggunakan model pembelajaran Cooperative Learning.

Kata Kunci: *Cooperative Learning, Era Abad 21, pemahamna konsep*

Abstract

This research was conducted to determine the effect of the Cooperative Learning learning model on understanding concepts in business and energy material. This type of research is quantitative research. The population in this study were all students of class The sampling technique was carried out using a purposive sampling technique because the data previously obtained from the three classes was normal and homogeneous. The design in this research is post-test only because the samples used have initial abilities that can be said to be the same. Based on data analysis, the average score for the experimental class was 52.3 and the average score for the control class was 47.6. Apart from obtaining the average value, in this study it was also found from the results of the t test that Cooperative Learning learning did not have a significant influence on classes that did not use the Cooperative Learning learning model.

Keywords: *Cooperative Learning*, 21st century era, understanding concepts

Introduction

Learning is a word that is no longer foreign to hearing in human life. Learning is a process of changing behavior and a way to gain knowledge (Masalesi, 2022; Misbah et al., 2022; Nehru et al., 2022). Learning is a process of gaining knowledge, can improve skills, attitudes, and strengthen personality (Harefa et al., 2020). Learning is also marked by significant changes experienced by a person (Yusuf et al., 2022; Zakwandi et al., 2022). The learning process consists of several parts, namely: teacher, students, learning objectives, learning materials, learning media, learning methods, and evaluation. Therefore, in the learning process teachers and students must work together in order to foster an effective and efficient learning process, one of which is in physics learning (Adha et al., 2023; Maya et al., 2023; Sofna et al., 2023).

In the 2013 curriculum, for high school level there are two subject groups, namely the compulsory subject group and the specialization subject group. There are three specialization subject groups, namely the mathematics and science specialization group, the social group, and the language specialization group. One of the subjects studied in the mathematics and science specialization group is physics. Apart from being included in the mathematics and science specialization group, Physics is also included in cross-interest subjects. So, students who do not take the mathematics and science specialization group can also take part in the physics learning process.

Physics learning is learning that discusses the symptoms of natural phenomena systematically. Physics is one of the aspects contained in science. Science has a very important role in creating quality students in class (Pramita & Putri, 2023; Purnomo et al., 2023; Roshita et al., 2023; Sapitri & Indriyati, 2023). Physics is an activity in the form of knowledge, opinions and concepts obtained from experience through a scientific process (Rozal et al., 2021; Sulman, 2012, 2019). Physics lessons cannot only study theory but emphasize how the theory applies in real life (Ellis, 2006). Physics is closely related to product aspects, scientific processes and attitudes. Physics concepts and theories are products obtained from scientific processes such as conducting experiments, measurements and discussions (Mei-chuen Lin & Lin, 1999). In physics, students do not just know (knowing) and memorize (memorizing) about physics concepts, but must make students understand and comprehend (to understand) these concepts and be able to relate the relationship between one concept and other concepts. However, in reality physics learning in schools focuses more on theory (Meiliani et al., 2021; Putra et al., 2021; Reyza et al., 2022, 2023; Sulman, Sutopo, et al., 2021). Some concepts in physics are abstract, which often creates obstacles for teachers in providing material to students (Podolefsky & Finkelstein, 2007). This is what reduces students' interest in learning physics and makes it very difficult for students to accept physics concepts. There are many things that teachers must pay attention to to overcome this problem, one of which is using the right learning model (Sulman et al., 2020; Sulman, Sutopo, et al., 2021; Sulman, Tanti, et al., 2021). Teachers can create learning models that are used to adjust students' conditions to make it easier for students to understand concepts, especially physics concepts (Mari & Gumel, 2015).

Determining the learning model used by the teacher can determine how students' understanding of physics concepts is observed (Gordon et al., 2021; Maurer & Bogner, 2020; Sulman, Yuliati, Kusairi, et al., 2022; Zb et al., 2022) and observed if the learning model used is appropriate and good (Sulman et al., 2023; Sulman, Yuliati, Kusairi, et al., 2022; Sulman, Yuliati, Purnama, et al., 2022).

Understanding physics concepts is the ability a person has to understand material in the physics learning process (Wu, 1999). In order for students to more easily understand physics concepts, learning must start from the simple to the complex (Zakwandi et al., 2022; Zeidler & Nichols, 2009; Zhao et al., 2021; Zheng et al., 2021) and from the concrete to the abstract (Krathwohl et al., 1964). With this, the learning model used must be appropriate and appropriate (Ananda & Fadhilaturrahmi, 2018; Bao & Fritchman, 2021; Kim et al., 2018; Kusairi, 2013). An appropriate learning model is a learning model that attracts students' interest in learning, students become more active in learning (Rahim & Nadira, 2022; Ramadhani & Nurita, 2022; Sinaga et al., 2022; Wahyuni & Taqwa, 2022). One learning model that can be used in this case is the cooperative learning model.

The cooperative learning model is a learning model that can be used in the learning process (Alimah et al., 2021; Sulman, 2012; Wijayanti, 2016). The cooperative learning model is a learning model by creating groups so that students can work together (Agustina et al., 2020; Handayani & Panjaitan, 2015; Mustamin, 2021; Ulpiana et al., 2021) to help each other in understanding concepts and solving problems. Cooperative learning is very in line with the nature of humans as social creatures who cannot live alone, are interdependent with other people (Johnson & Johnson, 1998). According to Hamid Hasan, cooperative learning means doing work together to achieve a common goal. In a cooperative class, students learn together in small groups consisting of 4-6 students of equal but heterogeneous abilities, gender, ethnicity, race and helping each other. The aim of creating groups is so that students get the opportunity to be able to take an active part in the process of learning activities (Kagan & Stenlev, 2009).

Not all learning that uses groups is considered a cooperative learning model. To get the expected results from using the cooperative learning model, it is recommended that several elements must be implemented in learning activities, namely interdependence, face-to-face interaction, individual responsibility, social skills, group process evaluation. The advantages of the model are that it can improve student achievement, deepen students' understanding, and can have a pleasant impact, especially on students (Adha et al., 2023; Ningrym et al., 2015; Starzinski & Starzinski, 2017; Tanti et al., 2018), then be able to develop leadership attitudes, develop positive attitudes of students, develop attitudes of self-respect, learn inclusively, foster a sense of mutual belonging, and grow skills. Apart from the advantages of the cooperative learning model, there are also disadvantages, namely the long time required for students and teachers in this learning model (Ekawan et al., 2015; Mardatila et al., 2021; Ningrym et al., 2015; Ramli, 2017; Wijayanti, 2016), teachers must have special abilities so that not all teachers can carry out this model, students are required to have certain characteristics (Ali, 2021). The best learning model must be chosen by a teacher so that learning can run optimally and better. The role of the teacher is very

important so that the learning adaptation process can take place well. It must still be understood that students have diverse characters, both teaching styles, discipline in how to organize themselves and all of this can of course have an impact on a better learning process and more effective continuity of learning (Ananta & Kurniawan, 2023; Aulya et al., 2023 ; Fiqri et al., 2023). Based on the background described above, it is necessary to carry out research entitled The Influence of the Cooperative Learning Model on Understanding Concepts. The aim of this research is to draw conclusions regarding the influence of cooperative learning models in increasing understanding of concepts.

Method

The population in this study were all students of class The sampling technique was carried out using a purposive sampling technique because the data previously obtained from the three classes was normal and homogeneous. Purposive sampling technique is a sampling technique based on criteria. In this research, the criteria used were the number of students in one class. Because classes X TKRO1 and X TKRO 2 have the same number of students, namely 26 students, the sample in this study was class X TKRO 2 functions as a control class. This research has two variables, namely the cooperative learning model as the independent variable, and conceptual understanding as the control variable. The instrument used to collect data in this research is a posttest in the form of essay questions totaling 5 questions to measure understanding of concepts.

The design in this research is post-test only because the samples used have initial abilities that can be said to be the same, so that the accuracy of the tests given can be trusted. The data taken in this research is the data in this research is quantitative data in the form of test scores after learning. What can be observed and seen is as in table 1.

Table 1. Research Design

Group	Treatment (X)	*Posttest*
R_1	X	Q_1
R_2		Q_2

Information:
R1 : Experimental class
R2 : Control class
X : Treatment uses Cooperative Learning
Q1 : Experimental class posttest results
Q2 : Control class posttest results

Analysis of research data includes normalized gain test, normality test, homogeneity test and hypothesis test. The normality test uses the Shapirowilk statistic, the homogeneity test uses the Test of Homogeneity of Variances and the hypothesis test uses the Independent-samples T Test. All hypothesis testing was carried out with a significance level of 95% ($\alpha = 0.05$) and analysis with the help of the SPSS program

Results and Discussion

In this research, conceptual understanding was measured using a post-test in the form of essay questions consisting of 5 essay questions. Making essay questions is used so that students better understand the learning process from the start, where essay questions do not contain new data that students can remember to be able to answer the questions given, in other words the information used in answering questions is knowledge that they actually already have. by these students so that it can easily be used as an ability to analyze the answers to the essay questions. The results of this research after

processing the post-test results in the control and experimental classes obtained the results presented in table 2 below.

Table 2 Recapitulation of Post-test Results for Students' Understanding of Physics Concepts

Class	Highest Score	Lowest Score	Average
Experiment	90	20	52,3
Control	80	20	47,6

From table 2, it can be seen from the average post-test value that has been obtained that the average value of the experimental class is 52.3, which is higher than the average value of the control class, which is 47.6. From the results of data analysis regarding the influence of the Cooperative Learning learning model, it was obtained that students understood the concept of learning in class X physics at SMK N 3 Tanjung Jabung Barat class 2022/2023.

Table 3 Normality Test of Post-test Values for Experimental Class and Control Class

Kelas		Shapiro-Wilk		
		Statistic	df	Sig.
nilai siswa	X TKRO 1	0,960	26	0,388
	X TKRO 2	0,948	26	0,211

The normality test results are based on Shapiro-Wilk at a significance or probability level of 95% ($\alpha = 0.05$). Based on table 3 above, it can be seen that class X TKRO 1 as an experimental class has a sig value. 0.388 > 0.05 and the control box has a sig value. 0.211 means that both the experimental class and the control class are normally distributed.

After carrying out the normality test, the next step is to carry out the homogeneity test. The homogeneity test aims to test whether the variances of the two groups are the same. The importance of looking for homogeneity in this research is to see whether students are truly capable or have the same abilities before the test is carried out, so that the student learning process after the treatment is carried out will truly reflect the influence of the cooperative learning model that has been implemented by the teacher, so that the learning provided by the teacher with the learning outcomes obtained truly reflecting the students' ability to achieve maximum and better learning outcomes and are indeed influenced by the learning model applied by the teacher, without being influenced by other influences. In a study, of course, the researcher's hope is how to assess learning outcomes according to the treatment given. The treatment given is expected to truly be an accurate picture where the research process is influenced by the learning model and not other factors. In measuring the homogeneity of student learning in this research, the method used by researchers to test the homogeneity of the data is by using the SPSS application, provided that the sig value is > 0.05, then the data is homogeneously distributed. The student homogeneity data can be seen in table 4.

Table 4 Results of Homogeneity Test of Post-test Values for Experiment Class and Control Class

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.

nilai siswa	Based on Mean	0,055	1	50	0,816
	Based on Median	0,083	1	50	0,774
	Based on Median and with adjusted df	0,083	1	49,982	0,774
	Based on trimmed mean	0,059	1	50	0,810
	Based on trimmed mean	0,059	1	50	0,810

Based on table 4 above, it can be seen that the sig. 0.810 > 0.05 so the data has a homogeneous variance. After carrying out normality and homogeneity tests, the data obtained were normally and homogeneously distributed. Therefore, a hypothesis test (t-test) can be carried out. The purpose of the t-test was carried out to see whether after being given treatment there was a significant influence from the learning model applied. If the value is sig ttable then it can be concluded that there is an influence (H1 is accepted).

Table 5 Calculation Results of the t-test Student Learning Results (Post-test)

Group Statistics				
class	N	Mean	Std. Deviation	Std. Error Mean
Value	X TKRO 1	26	52,31	16,324	3,201
	X TKRO 2	26	47,69	16,807	3,296

Based on table 5, it can be seen that the tcount is 1.004 with a sig.(2-tailed) of 0.320. At the significance level of 0.05, it is obtained from ttable = 1.6759. So after knowing tcount and ttable, it was found that tcount < ttable = 1.004 < 1.6759, there was no difference between the experimental class and the control class. This is also proven by the sig value (2-tailed) = 0.320 > 0.05, so H1 is rejected. So it can be concluded that there is no significant difference in students' conceptual understanding between the experimental class and the control class.

After the statistics were carried out and obtained, it did not show a significant difference, but the average conceptual understanding of students in the experimental class was 52.3. This shows that the use of cooperative learning models in experimental classes may have made a positive contribution to increasing students' conceptual understanding. Although this increase cannot be considered statistically significant, it is still a meaningful finding in a learning context.

Based on the results of data analysis and hypothesis testing, it shows that there is no significant difference in understanding the concepts of the experimental class with the control class. This may be due to the influence of the cooperative learning model on the understanding of concepts in physics subjects in class From the average value of concept understanding of students from the experimental class it is higher than the average value of understanding the concept of students from the control class, 3) from the

maximum value obtained by students from the experimental class and control class seen from table 2, the maximum value obtained by students in the experimental class it was 90 and the maximum score in the control class was 80. This shows that there is no significant difference between the maximum scores of the classes that received the Cooperative Learning model treatment and those that did not receive the treatment. Likewise for the minimum value, both the experimental class and the control class obtained the same minimum value, namely 20.

Conclusion

Overall, based on the results of the statistical analysis that has been carried out, we can conclude that there is no significant difference in students' conceptual understanding between the experimental class and the control class. However, it is important to acknowledge that there are indications of an increase in the average understanding of concepts in the experimental class, which may be due to the use of cooperative learning models. Although this improvement did not reach the expected level of statistical significance, these results provide important insight into the effectiveness of this learning model in improving students' conceptual understanding.

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