JoSSEd
Journal of Science and Science Education
ISSN: 2774-1869 eISSN: 2774-2105

The Effect of Advance Organizer Model on Physics Learning Outcomes in Terms Prior Knowledge

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Received: October 4, 2023
Revised: Fabruary 27, 2024
Accepted: April 25, 2024
Published: April 30, 2024

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DOI: 10.29303/jossed.v5i1.5563

Abstract: This research is experimental research which aims to determine the effect of the advance organizer model on physics learning outcomes in terms of prior knowledge. This research uses a one group pretest-posttest design type . The sample in this research was class X MIA 1 SMAN 8 Mataram which consisted of 24 students. The data collection technique uses test sheets in the form of pre-test and post-test given before and after treatment. The pre-test data results were obtained with an average of 35.6 and 81.5 for the post-test average . The results of the prerequisite test with the Shapiro Wilk test showed that the pre-test and post-test data were normally distributed. Then, a t-test was carried out using a paired sample t-test showing a significant value (sig. 2 tailed) of 0.000, which means (sig. 2 tailed) < 0.005 so it can be concluded that there is an influence of the advance organizer learning model on physics learning outcomes in terms of priors knowledge.

Keywords: Advance Organizer; Learning Outcomes; Prior Knowlege.

Introduction

Education in the 21st century era further develops skills in learning, as a result students are expected to have the skills to develop quickly and dynamically. The demands of the times require teachers to be more creative in creating learning. Creative learning certainly attracts students' interest in learning so that learning goals can be achieved. Learning is the process of seeking new knowledge to increase knowledge insight and explore skills on a scale. Increasing a person's knowledge is based on learning (Faturrohman, 2017).

Learning is an important key in the world of education because the learning process can encourage students to increase their knowledge and skills so as to realize educational goals. According to Busyairi, (2021) learning objectives can be achieved depending on the learning process that students go through. Therefore, the learning process is an important factor that must be considered in order to create quality learning. The learning process that is still focused on educators using conventional learning models creates problems that hinder educational goals.

Conventional learning models can hinder the development of students' potential, thereby causing students' physics learning outcomes to be low. Low physics learning outcomes are a serious problem that requires teachers to update the learning models they apply. The selection of the appropriate model to improve students' physics learning outcomes is the Advance Organizer (AO) model. The AO model is an alternative model that encourages students to be more active, skilled and helpful in obtaining answers to the questions given (Parenta, 2020). Apart from that, according to Payung et al., (2016), the prior knowledge that students have also influences their learning outcomes. Prior Knowledge is an important thing to consider, but teachers rarely measure students' prior knowledge (Fiser et al., 2013).

Prior Knowledge (PK) is the initial knowledge possessed by each student. The differences in prior knowledge that they possess make students have different characteristics (Muanmar et al., 2015). Prior knowledge is classified into three, namely high, medium and low. This classification can differentiate students when learning. Students who have high prior knowledge will be more active, easier to understand and learn the material provided than students with low prior knowledge . High or low students' prior knowledge can be seen from how well students obtain information from previous learning which provides perspective and context for new, interconnected concepts. Thus, prior

How to Cite:
Harjono, A., Hikmawati, H., & Putra, I. K. E. (2024). The Effect of Advance Organizer Model on Physics Learning Outcomes in Terms Prior Knowledge. *Journal of Science and Science Education*, 5(1), 61–65. https://doi.org/10.29303/jossed.v5i1.5563

knowledge has a very positive impact on students to increase learning activity and motivation, thereby causing a significant increase in physics learning outcomes. Based on the results of a preliminary study of the research results of Hikmawati et al., (2017), Susilo (2016), Hikmah (2018), Septian (2018), Astusi (2015), and Adodo (2013), it shows that students' prior knowledge can help and together have an influence on improving learning outcomes.

Based on the problems described above, the researcher attempts to provide a solution through research entitled the effect of the advance organizer model to improve physics learning outcomes in terms of prior knowledge . The use of the advance organizer model replaces the conventional model used by teachers when teaching and pays attention to students' prior knowledge on students' physics learning outcomes. Therefore, this research aims to determine the effect of the advance organizer model on physics learning outcomes in terms of prior knowledge.

Method

This type of research is a quasi experimental design with a one group pre-test - post-test design type . This research was conducted in class X MIA 1 at SMAN 8 Mataram consisting of 24 students. This research was carried out starting from giving a pre-test, followed by giving an advance organizer model as treatment, finally giving a post-test to determine improvement. According to Setyosari (2020), the research design used can be seen in Table 1.

Table 1. One group pretest-posttest design type

	Pre-test	Treatment	Post-test
One Group	0_1	x	0_2

The data collection technique in this research uses test instruments, namely pre-test and post-test . The pre-test is given to determine students' prior knowledge regarding the material to be studied and how far students understand the material. Then, the post-test results were used to see differences in students' physics learning outcomes after being treated with the advance organizer learning model . The pre-test and post-test results obtained were then subjected to a normality test (Shapiro Wilk) and hypothesis testing using the paired sample t-test with a significance level of 0.05. The Shapiro Wilk normality test is a test that is suitable for sample sizes of less than 50 so that the normality test method is effective and valid to use. Hypothesis testing is used to determine whether or not there is an influence of the advance organizer model on physics learning outcomes in terms of prior knowledge so that it can be concluded that $H_a$there is an influence of the advance organizer model on physics learning outcomes in terms of prior knowledge and H_0there is no influence of the advance organizer model and prior knowledge on learning outcomes. physics students.

Result and Discussion

The results obtained through this research are data describing students' physics learning outcomes. Learning outcome data was obtained through pre-tests and post-tests given to students before and after being given treatment in learning with the advance organizer model . Physics learning outcomes are measured in the cognitive domain from C1 to C6 with multiple choice questions consisting of 20 questions. The results of the students' pre-test and post-test data can be seen in Table 2.

Table. 2 Pre-test and Post-test results

Component	Pre-test	Post-test
Number of Students	24	24
The highest score	65	95
Lowest Value	15	70
Average	35.6	81.5

The pre-test and post-test data can be seen in Table 2 above. These results are then subjected to a normality analysis test as a prerequisite for hypothesis testing which requires the data to be normally distributed before carrying out hypothesis testing. The normality test uses the Shapiro Wilk test with the help of SPSS Statistics version 25. According to Sinambela (2014), the normality test aims to see whether the data to be analyzed is normal or not. If the data is normally distributed then we will continue to carry out hypothesis testing . The normality test results can be seen in Table 3.

Table 3. Normality Test Results

Shapiro Wilk			
	Statistics	df	Sig.
Pre-test	.925	24	.076
Post-test	.935	23	.124

Based on Table 3 above, the normality test of the pre-test data is obtained , namely 0.076 > 0.05, which means that the data is normally distributed. Post-test data obtained 0.124 > 0.05 so the data is said to be normally distributed. Based on the normality test, it can be concluded that the overall research data is normally distributed, both pre-test data and post-test data . Next, a hypothesis test is carried out which is a mandatory test in quantitative research to find out whether the hypothesis is accepted or rejected (Yusuf, 2017). If the sig value. > 0.05 then $H_a$it is rejected and H_0accepted, but if

the value is sig. < 0.05 then $H_a$it is accepted and H_0rejected. Hypothesis testing is carried out with the help of the SPSS Statistics application version 25 by comparing the pre-test and post-test results that have been obtained, this aims to determine the effect of the learning model provided. Hypothesis testing uses the paired sample t-test. The analysis results from the paired sample t-test can be seen in Table 4.

Table 4. Paired Sample t-test

		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-Tailed)
Pair 1	Pre-test – Post-test	-45.83333	8.42701	1.72016	-49.39175	-42.27492	-26.645	23	.000

Based on Table 4 above, a significant value (sig. 2 tailed) of 0.000 is obtained. It can be concluded that the significant value (sig. 2 tailed) is <0.005 so that there is a difference in the average learning outcomes of students' pre-test and post-test . This is due to the influence of the model applied in learning which is able to improve students' physics learning outcomes. To see the interaction of prior knowledge and the advance organizer model on students' physics learning outcomes, it is presented in Figure 1.

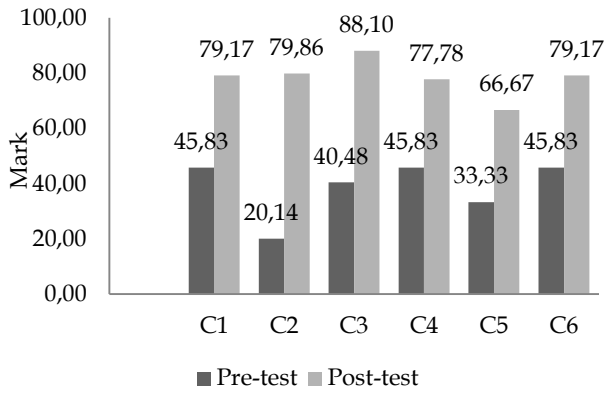

Figure 1. Average pre-test and post-test scores

It can be seen in Figure 1 above that there is an influence of the advance organizer model on physics learning outcomes. It can be seen that each indicator has experienced a significant increase, starting from C1 (remembering) to C6 (creating). This is in line with research by Wahyuni et al., (2021), the advance organizer model helps students improve their mastery of concepts, which of course causes their learning outcomes to increase as well. Furthermore, Bely et al., (2019) explained that the advance organizer model is able to help students increase their cognitive abilities. Other research such as, Hamdanillah et al., (2017), Hasbiyalloh et al., (2017), Amanah et al., (2017) and Putra et al., (2023) shows that the advance organizer model plays an important role in improving learning outcomes physics students. Apart from the advance organizer model, prior knowledge also influences it. According to Payung et al., (2016) the prior knowledge possessed by students encourages improving learning outcomes.

Students with high prior knowledge will find it easier to understand the material being studied. Apart from that, judging from the activeness in the learning process, students with high prior knowledge will be more active and brave enough to ask or answer when asked questions compared to students who have low prior knowledge . This is in line with Muanmmar et al., (2015) that the prior knowledge possessed by high school students will help positively in facilitating learning because in physics learning there are levels that require students to recall the phenomena they have experienced to solve problems in the future. . Physics learning in the learning process focuses students more on mastering concepts by providing phenomena that students often experience in explaining the material, so that students will more easily understand physics concepts that are related to everyday phenomena or problems. In line with Fatwa et al., (2018) prior knowledge can help explore phenomena observed in demonstration and experimental activities.

The results of the hypothesis test can be seen in Table 4 showing that there is an influence of the advance organizer model on students' physics learning outcomes in terms of prior knowledge . This is supported by the increase in learning outcomes seen in Figure 1 showing that there is an increase in each indicator. Therefore, the selection of the learning model used is in accordance with students' prior knowledge . In class X MIA 1, which initially had low physics learning outcomes, when the advance organizer model was implemented, it turned out that students' physics learning outcomes increased significantly. Therefore, the advance organizer model is a learning model that helps students improve their physics learning outcomes. Not only that, the prior knowledge factor also helps in improving physics learning outcomes. This is what causes students' physics learning outcomes to increase due to the influence of students' advanced and prior knowledge models.

Conclusion

Based on the results of the research and discussion, a conclusion can be drawn from this research, namely that there is an influence of the advance organizer model on students' physics learning outcomes in terms of prior knowledge.

Acknowledgements
Thank you to the principal of SMAN 8 Mataram, physics teachers and class X MIA 1 students who have been given the opportunity to conduct research and assist researchers in successfully obtaining research data. Hopefully this article can be useful for readers and can be used as a reference to increase insight.

Author Contributions
All authors had significant contributions in completing this manuscript.

Funding
This research received no external funding.

Conflicts of Interest
The authors declare no conflict of interest

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