



The Impact and Difference of Laboratory Use on Student Learning Outcomes

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ABSTRACT

Laboratories are an important part of physics learning activities in schools. However, learning activities in MAN 3 Banda Aceh still rarely use laboratory facilities. It is important to do research related to the use of laboratories in physics lessons. This study aims to determine the impact of laboratory use in achieving physics learning outcomes in MAN 3 Banda Aceh. This study uses a quantitative approach with the method used, namely the experimental method by comparing between experimental classes taught using laboratories and control classes that are not taught to use laboratories after being treated. The population in this study were all students of class X MIA in MAN 3 Banda Aceh. The research sample was selected by purposive sampling, which consisted of class X MIA 1 as the experimental class and class X MIA 2 as the control class. The research data consisted of pre-test and post-test. Then the data of this study were analyzed using t-test statistics. Results The study found that the pre-test value was normally distributed and homogeneous. Then based on the t-test obtained, $(4.118) \geq (2.009)$. It can be concluded that the results of physics learning using laboratories are better than those that do not use laboratories in students of MAN 3 Banda Aceh.

Keywords: effectiveness, learning, laboratory, learning outcomes

INTRODUCTION

Learning is an activity carried out by the teacher with students in the class to discuss or study a subject matter. In this activity the teacher provides material or topics to be discussed in order to instill an understanding of the concepts of knowledge, skills and scientific attitudes in students. From this learning activity students are expected to be able to understand scientific products in the form of concepts, laws, principles or theories, based on scientific processes that are observing, conducting experiments, and so on. Sundoro (2013: 2) said that, in order for students to understand scientific products, learning physics in schools must emphasize scientific thinking, namely observing / observing the surroundings, then thinking of causal relationships, continuing with modeling and finally being able to do engineering in works to produce new things. Ahmad (2011: 5) further states, so that students are not passive in studying physics, should be given training based on scientific processes with the aim of finding some results from the research. From the statement above that the laboratory holds a very important role in the process of learning physics.

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In essence physics learning is closely related to experimental activities in the laboratory, this is because the laboratory is a place to explore science. As Elseria (2016: 109) said that laboratories are a place to get scientific knowledge so that systematic knowledge can be found in depth. This is confirmed by Ridwan (2012: 1) statement that physics is a science that requires observations made through experiments. It is supposed to study Physics to use the Physics Laboratory as a place to conduct experiments. However, if we look at the scope of the Physics laboratory as an aspect of supporting the quality of education, it is hoped that the Physics laboratory can improve the quality of education and the success of students in understanding science. As stated by Rahmiyati (2008: 90) that, "Physics practicum activities carried out in the laboratory will have an influence on the success of students in learning science. It means that practicum done in a Physics laboratory can increase students' enthusiasm in learning science.

Problem of Research

The findings of student learning outcomes in MAN 3 Banda Aceh are still in the low category. In the School Level National Examination Results (UN) based on the Kemendikbud portal, it can be concluded that the average score of UN results for physics subjects in 2017 is 21.41 including the second lowest compared to other science subjects. If seen in the span of the last three years, it appears that the score of National Examination in Physics subjects in MAN 3 Banda Aceh has decreased from an average of 75.99 in 2015 down to 55.22 in 2016 and has decreased back to 21.41 in the year 2017 (Kemendikbud portal). In addition to being based on a relatively low UN score, there are around 60% of students who have a grade below the KKM in a class. Based on interviews, one of the Physics teaching teachers said that it was rarely used by laboratories for learning because the time of the lesson was very limited and feared not to be overtaken by teaching materials. There are allegations of low student learning outcomes due to physics learning rarely using laboratories.

Research Focus

Laboratories play an important role in supporting the learning process of physics to be more optimal. This is because by studying physics subject matter accompanied by practicum can increase motivation and foster students' curiosity about a natural phenomenon. In physics learning, laboratories are included in the category of materials and learning resources, so that the learning process can run well and produce quality products that are students who have the ability in accordance with expectations and good grades. At present the student learning outcomes are still in a less satisfactory category. From the results of the Sundoro (2013) study that, "the physics learning outcomes of public high school students in Jembrana Regency with an average are still in poor qualifications". This is due to the lack of use of laboratories, the lack of laboratory staff in the laboratory, and the size of laboratory equipment and materials so that teachers rarely use the laboratory in learning. This has an impact on student learning outcomes that are not high. Several studies have been carried out relating to the effectiveness of laboratory use in an effort to improve student learning outcomes in physics subjects in schools, among them carried out by Yuliana at Palakka 3 Junior High School in

Bone Regency and by Meillani at SMK 1 Cepu. In this study, the results obtained that the use of laboratories can increase student motivation and learning outcomes. But until now there have been no studies related to the use of laboratories in physics learning at the MAN 3 school in Banda Aceh. Therefore it is interesting to do research on laboratory use in physics learning at the school. Is the use of laboratories in learning effective in improving physics learning outcomes in MAN 3 Banda Aceh.

METHODOLOGY OF RESEARCH

General Background of Research

This research approach is a quantitative approach. According to Sugiyono (2010: 13) quantitative is a research method whose data is in the form of numbers and analysis using statistics. The type of research that will be conducted is an experiment with the experimental design of Nonequivalent Control Group Design. According to Amat Jaedun (2011: 5) states that experimental research is research carried out on variables whose data do not yet exist so there needs to be manipulation through giving certain treatments to the subject of the study that will be observed or measured the impact.

Sample of Research

The population of this study was all students of class X MIA MAN 3 Banda Aceh. Class samples were selected for class I MIA 1 totaling 26 and I MIA 2 totaling 26 based on recommendations by classroom teachers on the grounds that the two classes had the same ability (purposive sampling). However, to meet the requirements for variance homogeneity between the two classes, pre-tests were conducted in both classes. According to Sujana (2016: 149), it is necessary to test the similarity of two variances.

Instrument and Procedures

The instrument used in this study was a multiple choice question. The data in this study were in the form of learning outcomes test scores from each experimental class and control class. Then the data in the form of a Pre-test (initial test) is done to both classes before learning. The next stage provides treatment, the experimental class is given learning using laboratory tools, while the learning control class does not use a laboratory. After the end of learning in both classes a post-test was given to measure the learning outcomes of the two classes.

Data Analysis

The data that has been collected is then tested using the t-test on the pre-test results to be able to conclude whether the examined sample is equal or not. Then after it was found that the two samples were homogeneous, then processed the post-test data with the t-test to see the difference in the average of the two classes after being treated.

RESULTS AND DISCUSSION

Learning outcomes are then given a question so that the average value of the experimental class is 71.73 and the control class is 60, 23. Comparison of the learning outcomes of the experimental class and the control class can be seen in the following diagram .

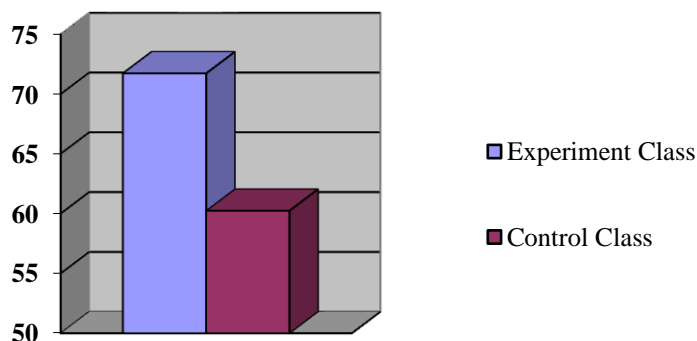


Figure 1. Comparison of learning outcomes of the experimental class and the control

Based on the picture above, it was concluded that the results of physics learning using a laboratory were better than the results of learning that did not use laboratories in students of MAN 3 Banda Aceh. So that the laboratory can be said to have a good impact in improving the learning outcomes of physics. This is reinforced by Agustina (2018: 4) that the laboratory is the right learning tool for all science claimants including students, because the laboratory is a place of practice to find material concepts or principles. When students conduct experimental experiments. students more quickly understand the material being taught, even some among students who like practicum. Agustina in Muna (2018: 3) explains, learning using a laboratory can improve students' understanding, so that expectations can improve learning outcomes. Because of the increase in students' understanding of the material being taught, the learning outcomes that have been obtained from this study also increase.

In addition, based on the experience found when the researcher gave treatment to the experimental class students, it was seen that students were very enthusiastic about doing the practicum, by discussing, solving problems when testing tools, being active / skilled, and so on. as stated by Agustina 2018: 5) that practical activities foster scientific attitudes, one of which is skilled in finding. It is different compared to the control class students who do not do lab work which lack enthusiasm to run learning, so the learning outcomes of the control class are low compared to the experimental class.

CONCLUSIONS

Based on the results of data analysis using the t-test, it can be concluded that the results of physics learning using a laboratory are better than the results of learning that do not use laboratories in students of MAN 3 Banda Aceh. Based on the results of the above research, the suggestion that the writer can convey is, the learning outcomes using the laboratory are greater, so that the hopes for each teacher, especially the physics teacher, try to teach using a laboratory during the learning process. In addition, for further research, it is expected to continue this research to all schools in the Aceh region.

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