THE ROLE OF USING REAL OBJECT MEDIA IN EXPLAINING ELECTRICAL CIRCUITS TO PHYSICS STUDENTS OF JABAL GHAFUR UNIVERSITY

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Article Info	ABSTRACT
	One of the media that can be used in learning physics in the Physics Study Program is the tools available in the laboratory. This research was carried out at the Physics Study Program at Jabal Ghafur University entitled ""The Role of Using Real Material Media in Explaining Electrical Circuits to Physics Students at Jabal Ghafur University. The use of media in the physics learning process is a demand in the curriculum. Media in the learning process can be used in the form of original objects or in the form of pictures. Formulation of the problem: "Is there a role for the use of real-life media in explaining electrical circuits to Physics Students in Even Semester Academic Year 2022/2023?" : "There is a role for the use of real-life media on student achievement in electrical circuits in the Physics Study Program." The population in this study were all Physics Study Program students. While the samples in this study were taken by random sampling (drawn or random) each 30 people, the number of both classes = 60 people. The method for collecting data is the "experimentation method". The research instrument is: is the "Test", Data processing method: use "Z-score". Conclusion, "There is a role for the use of real-life media on student learning achievement in electrical circuit material for the 2022/2023 Academic Year Semester*"*

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1. INTRODUCTION

The subject of physics in junior high schools (SMP), public high schools up to tertiary institutions is one of the fields of study in Natural Sciences (IPA), which consists of physics and biology subjects. In accordance with the demands of the times and technological developments, the teaching system has undergone various changes. Changes in the teaching and learning process, emphasis on deepening the material and the use of teaching methods.

The use of teaching methods emphasizes the development of abilities or experiences based on the independent campus learning curriculum. Lecturers must be able to choose alternative teaching methods in an effort to achieve instructional goals, both general (TIU) and specific (TPK) in accordance with the subject matter or sub-topic they teach. Lecturers are expected to be creative in choosing several process skills, so that students feel familiar and generate motivation in dealing with problems in the teaching and learning process.

The government's efforts to improve the quality of education, especially student achievement, are provided with various facilities such as libraries, laboratories and various other teaching aids. Lecturers only have to choose alternative facilities that can be used in the teaching and learning process. Science laboratories have a lot of equipment that can be used in the teaching and learning process. In principle, it is not only used to carry out experiments in the laboratory, but can also be used in classrooms, both for demonstration and demonstration.

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If the teacher uses teaching aids or teaching aids that come from laboratory equipment, it means that the teacher has used the actual or original teaching aids. This has a tendency to be easier for students to understand compared to non-actual or original teaching aids such as pictures, both in chart form and those that can be projected through the OHP.

The learning process at the Faculty of Social Sciences, Jabal Ghafur University, currently has various teaching media available, with the aim of enhancing the quality of its graduates. This agrees with what was stated by S. Hamidjoyo (1988:14), namely:

Teaching Media is the media used that is integrated with the objectives and content of teaching (usually already stated in the outlines of teaching plans), which are intended to enhance the quality of teaching and learning activities.

Teaching media helps teachers in teaching and learning activities, so that student learning outcomes can be effective, Gene L. Wilkinson (1984:15) suggests: "Instructional programs using various media (multi-media) based on a systems approach, often make it easier for students to learn more effectively than traditional teaching".

In accordance with what was said by Oemar Hamalik (1982: 20), said namely: 1. Teaching media reviewed
   according to the level of student experience is divided into three groups:
   2. Media is the actual object or the original media.
   3. Media is an imitation object or substitute object in the form of pictures. 4. Media
   communication with language.

Based on the quotation above, it means that there are two media that can be used in the learning process in an effort to make learning activities effective, as well as to enhance the quality of learning activities. In the process of learning physics subjects in the Physics Study Program, both the media is in the form of real objects (actually) and imitation objects in the form of images

pictures are easy to find. Simple real object media for certain subjects, easily obtained from the tools available in the laboratory. The use of real object media is not all physics material can be used, for example explaining atoms, of course the original object cannot be obtained, so what can be used is real object media in the physics learning process such as: Harmonious vibrations, fluids and electric circuits. If there should be real object media to explain a physics material, it would be nice for the teacher to be able to use it. Because by using real object media, students can understand more deeply, generate interest in learning, passion, discipline, so it can be expected that there will be an increase in student learning outcomes compared to teaching without using media or using picture media on the blackboard. Based on the statement above, the author wants to examine through a research the use of real object media in explaining electrical circuit material, namely to Physics Students in the even semester of the 2022/2023 Academic Year at Jabal Ghafur University.

Research purposes

In accordance with the problems formulated, the purpose of this study is, "To observe the role of the use of real object media on student electrical circuit learning achievement in the even semester of the 2022/2023 Academic Year

hypothesis

The hypothesis is a temporary guess whose decision is taken after conducting research. J. Supranto (1981:23) says: A hypothesis is a condition that is temporarily considered true and perhaps without conviction, so that a logical consequence can be drawn and in this way a test of its truth is carried out using research data. The hypothesis of this study is that: "There is a role for the use of real object media on the learning achievement of electrical circuits for Even Semester Students T.A. 2022/2023

2. RESEARCH METHODS

The object and research subject are in accordance with the problem, so the object of this research is, "The Role of Using Real Material Media in Explaining Electrical Circuits to Students of Physics Study Program, Jabal Ghafur University. The place of this research is, "At Jabal Ghafur University Faculty of Education. The population is the whole research object and the sample is a part of the object that can represent the population. In accordance with the research subjects as mentioned above, the population of this study were: "All students in the Physics Study Program at Jabal Ghfur University. While the samples in this study were taken by random sampling (drawn or random). In this case, to equalize the sample, 30 students were taken from a total of 39 students. So the number of samples = 60 people.

Method of collecting data

Based on the problems and objectives as well as the subject of this research, the method for collecting data is the "Experimentation Method" with steps like those in the research instrument below.

Research Instruments

The research instrument is the equipment needed in conducting research. This data collection technique is

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to use experimentation, so the instrument of this research is "Test", it can be reached with the following steps:

1. Class I is designated as an experimental class, namely a class taught with real object media
2. Class II is designated as the control class, namely the class that is taught not using the media, only by drawing on the blackboard.
3. The two classes are each taught with the same subject, namely electrical circuits. The difference is class I1 real object media is used, while class II does not use it, only by drawing on the blackboard.
4. After the learning process has taken place as mentioned above, the two classes are evaluated using the same form of test and at the same time.

Data Processing Methods

Based on the problems and objectives as well as the type of data collected, the "Z-score" was used to process the data in this study

Where:

$$\bar{X}_1 = TM_1 + \frac{\sum (fd_1)}{N_1} \cdot i_1$$

$\bar{X}_1$ = Nilai rata – arata kelas eksperimen

$\bar{X}_1$ = Nilai rata – rata kelas kontrol

MT_1 = Mean terkaan kelas eksperimen

MT_1 = Mean terkaan kelas kontrol

fd_1 = Frekuensi kelas eksperimen diikalikan dengan defiasi kelas eksperimen

fd_1 = Frekuensi kelas kontrol dikalikan dengan defiasi kelas kontrol

i_1 = Interval kelas eksperimen

i_1 = interval kelas kontrol

N_1, N_1 = Sampel kelas eksperimen dan sampel kelas kontrol

Standard deviation calculation:

$$SD_1 = i_1 \sqrt{\frac{\sum f d_1^2}{N_1} - \left(\frac{\sum f d_1}{N_1}\right)^2} \quad SD_2 = i_2 \sqrt{\frac{\sum f d_2^2}{N_2} - \left(\frac{\sum f d_2}{N_2}\right)^2}$$

Where:
SD1 = Standard experimental class deviation
SD2 = Standard deviation of control class
fd1 = Frequency multiplied by the experimental class deviation
fd2 = Frequency multiplied by the control class deviation
N1 = Experimental class sample,
N2 = Control class sample.

3. RESULT AND DISCUSSION

As already mentioned in chapter I (introductory chapter), that the data collection technique in this study was carried out by the experimental method. After the experimentation was held, namely by presenting electrical circuit material to the experimental class and control class, the following data were obtained:

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A. Kelas Eksperimen, yaitu yang diajarkan dengan menggunakan media benda asli :

90	85	70	60	65	80	75	95	90	70	70	75
60	65	60	65	55	60	55	90	60	60	40	55
50	50	25	25	80	75

B. Kelas Kontrol, yaitu yang diajarkan dengan menggunakan media gambar :

80	85	65	75	80	60	65	75	55	80	65	55
40	70	70	50	45	55	50	40	40	75	45	45
50	20	35	30	60	45

Data Processing and Analysis

After the data is collected, it is continued with processing, namely by using the Z score. For this purpose, the average value and standard deviation must first be determined each group, according to Sutrisno Hadi (1980:12) can be taken the following steps

1. Determine the maximum (highest) and minimum (lowest) scores.
2. Determine the area of the toas (wide spread of scores) which is called the Range, namely the maximum score minus the minimum score.
3. Determine the interval class on the basis of conditions around 10 to 20 classes (preferably the interval class is not less than 10 and not more than 20).
4. The number of interval and interval classes.
5. The interval (i) is adjusted according to the class, bearing in mind that (i) must be an odd number, then arrange the frequency table so that all scores are included, from the maximum to the minimum.

Based on the steps as mentioned above, the value (i) of each group (class) is found to be 10 class intervals

$$K = \frac{R}{i} + 1 = \frac{90-25}{7} + 1 = \frac{65}{7} + 1 = 10.$$

(K).

1. Class interval (K) prices for the experimental class (class II1), :

2. The class interval price for the control class (class II3), :

$$K = \frac{R}{i} + 1 = \frac{85-20}{7} + 1 = \frac{65}{7} + 1 = 10.$$

Furthermore, after the interval (i) and class interval (K) values are obtained, the data that is still scattered is entered into a table, called the frequency distribution table, in order to calculate the average value price and the standard deviation in the two classes mentioned above. The tables in question can be seen as in the following section.

Table 1 Frequency Distribution of Student Values Taught Using Real Material Media

No	Kelas Interval	X	f	d	d²	fd	fd²
1	88 – 94	91	3	+ 4	16	12	48
2	81 – 87	84	2	+ 3	9	6	18
3	74 – 80	77	5	+ 2	4	10	20
4	67 – 73	70	3	+ 1	1	3	3
5	60 – 66	63	9	0	0	0	0
6	53 – 59	56	2	- 1	1	-2	2
7	46 – 52	49	2	- 2	4	-4	8
8	39 – 45	42	1	- 3	9	-3	9
9	32 – 38	35	1	- 4	16	-4	16
10	25 – 30	28	2	- 5	25	-10	50
	Jumlah		30			8	174

From the table above, it means:

MT1 = 63
$\sum fd1 = 8$
N = 30
I = 7

Calculation of the average value:

$$\bar{X}_1 = TM_1 + \frac{\sum (fd_1)}{N_1} \cdot i_1$$

$$= 63 + \frac{8}{30} \cdot 7$$

$$= 63 + 1{,}87$$

$$\bar{X}_1 = 64{,}87$$

Standard deviation calculation:

$$SD_1 = i_1 \sqrt{\frac{\sum fd_1^2}{N_1} - \left(\frac{\sum fd_1}{N_1}\right)^2}$$

$$= 7 \cdot \sqrt{\frac{(174)}{30} - \frac{(8)^2}{30}}$$

$$= 7 \sqrt{(5{,}8) - \left(\frac{68}{30}\right)}$$

$$SD_1 = 13{,}3$$

Table 2. Frequency Distribution of Students' Values Taught Using Picture Media

No	Kelas Interval	X	F	D	d²	fd	fd²
1	83 – 89	86	1	+4	16	4	16
2	76 – 82	79	3	+3	9	9	27
3	69 – 75	72	5	+2	4	10	20
4	62 – 68	65	3	+1	1	3	3
5	55 – 61	58	5	0	0	0	0
6	48 – 54	51	3	-1	1	-3	3
7	41 – 47	44	4	-2	4	-8	16
8	34 – 40	37	4	-3	9	-12	36
9	27 – 33	30	1	-4	16	-4	16
10	20 – 26	23	1	-5	25	-5	25
			30			-6	162

From the table above, it means:

MT2 = 58
$\sum fd2 = -6$
N = 30
I = 7

Calculation of the average value:

$$\bar{X}_2 = TM_2 + \frac{\sum (fd_2)}{N_2} \cdot i_2$$

$$= 58 + \frac{(-6)}{30} \cdot 7$$

$$= 58 - 1{,}4$$

$$\bar{X}_2 = 56{,}6$$

Standard deviation calculation:

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$$SD_2 = i_2 \sqrt{\frac{\sum fd_2^2}{N_2} - \left(\frac{\sum fd_2}{N_2}\right)^2}$$

$$= 7 \sqrt{\frac{162}{30} - \frac{(-6)^2}{30}}$$

$$= 7 . \sqrt{6,4 - 1,2}$$

$$SD_2 = 14,4$$

Furthermore, determining the value position of students in groups (in class), respectively. The goal is to see student achievement in each class. In this case it can be reached through the position of the average value, mode and median in the frequency distribution of student scores.

According to Sutrisno Hadi (1980:13), "The mode can be defined as the value of the variable that has the highest frequency in the distribution". The median is a value in the distribution that limits the 50 % of the frequencies above and the 50 % of the frequencies below it.

Review of Hypotheses

The purpose of the hypothesis review is to see whether the results of the research and data processing accept or reject the hypothesis that was previously formulated in chapter 1. The hypothesis testing in this study is a "two-way" test, because the hypothesis does not emphasize assumptions. This means that the hypothesis states only, "there is a difference", or there is no emphasis that "class I student achievement is better or class II student achievement is better. So the hypothesis in this study is not in favor of one of the activities, whether the activity uses real object media or uses pictures.

Explanation of the terms null hypothesis (Ho) and alternative hypothesis (Ha), namely:

1. The null hypothesis (Ho) is the opposite hypothesis of the alternative hypothesis. If for example the alternative hypothesis states: there is a difference, then the formulation of the null hypothesis (ho) states,: there is no difference.

2. The alternative hypothesis is the working hypothesis (ha), whose formulation is based on initiative or work, or in this case based on the background of the problem. What is meant by work here are: Results of discussion, design or observation. To be clearer, below is formulated the null hypothesis (Ho) and the alternative hypothesis (Ha), namely:

Hypothesis nothing (Ho) :"There is no role for the use of real-life media on the learning achievement of electrical circuits for students of the Physics Study Program.

Alternative Hypothesis (Ha): "There is a role for the use of real-life media on the learning achievement of electrical circuits for students of the Physics Study Program. So based on the z value in the 'z list' table, the z value obtained at a significance level of 5% or = 0.05 is = 1.65. So it is clear that: 1.65 is smaller than the price or calculated z value, namely = 2.3.

Based on the decision in testing the hypothesis, it can be stated that: "The results of this study accept the alternative hypothesis which states, "There is a role for the use of real object media on the learning achievement of electrical circuits for students of the Physics Study Program.

4. CONCLUSION

After conducting research and data processing, researchers can draw conclusions from the results of this study as follows: Based on zhit. > ztable (0.05), that ; "There is a role for the use of real-life media on student electrical circuit learning achievement in the Even Semester Academic Year 2022/2023. The use of media in the physics learning process can be in the form of real objects or artificial/substitute objects such as pictures.

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