



The Effect of Multimedia Utilization on Increasing Students Learning Outcomes

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Received: June 8, 2023

Revised: July 8, 2023

Accepted: August 25, 2023

Published: August 31, 2023

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DOI: [10.29303/jppipa.v9i8.4181](https://doi.org/10.29303/jppipa.v9i8.4181)

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Abstract: This study aims to determine the effect of using multimedia on improving student learning outcomes on excretory system material in class XI SMA YPK Pematangsiantar. The total population of 64 people consisting of 2 classes and samples were taken by random assignment so that 2 classes were obtained, namely the control class (XI-3) 32 people and the experimental class (XI-1) 32 people. The control class was treated without using multimedia power point and the experimental class was treated using multimedia power point. Data analysis was carried out by finding the average (\bar{X}), standard deviation (S) and hypothesis testing (t test) at the significance level = 0.05. From the results of the study, the average *post-test* for the control class was 88 and the experimental class was 90.13 with a difference in learning outcomes of 2.13. From the results of hypothesis testing (t test) obtained $t_{count} (2.790) > t_{table} (1.99)$ at a significance level of 0.05 and degrees of freedom (dk) = 62, then H_0 rejected and H_a is accepted, meaning that there is an effect of using multimedia power point to improve student learning outcomes on the material of the human excretory system in class XI SMA YPK Pematangsiantar. It was concluded that there was an effect of using multimedia on improving student learning outcomes in the material of the human excretory system of class XI SMA YPK Pematangsiantar.

Keywords: Learning Outcomes; Multimedia; Power point; Utilization

Introduction

Improving the quality of education requires the hard work of various parties, starting from education staff, parents, students, the community and the government to achieve the ultimate goal, namely quality human resources, so that students need to be prepared early on (Septiani et al., 2020; Suchyadi & Suharyati, 2021). The passive attitude of students in the learning process and the monotonous learning system has an impact on student achievement (Kiat et al., 2020; Nasution et al., 2022; Zulkifli et al., 2021). The fact that happens is that the teacher is considered the most correct source of learning, while students are only listeners to teacher lectures and in general students are less interested in learning and tend to be passive. This results

in the teaching and learning process tends to be boring and makes students learn forcedly.

From the results of observations at SMA YPK Pematangsiantar, in general, teachers only use conventional methods (lectures and giving assignments), even the media used is predominantly books, which results in students being lazy to take part in learning. The lack of interest in students' learning in biology lessons because during the learning process the teacher tends to make students only passive listeners and does not use varied media so that students find biology lessons make students boring.

Efforts to achieve educational success through the teaching and learning process require teachers not only to have theoretical abilities but must have practical experience (Almasseri & AlHojailan, 2019). The role of

How to Cite:

Rajagukguk, S., Sinaga, A. H., Piliang, F. M., Tanjung, A., & Asmayani. (2023). The Effect of Multimedia Utilization on Increasing Students Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, 9(8), 5845-5851. <https://doi.org/10.29303/jppipa.v9i8.4181>

educators, among others, as a facilitator, motivator, driver and inspiration for students. Therefore, to address this problem, teachers are more required to apply learning that is more interesting, namely by changing the learning model or method by using the right media during the teaching and learning process so that students are motivated to study subject matter, especially biology. One alternative that can be used is to use media that can attract students' interest in learning biology. The media is multimedia in the form of PowerPoint.

Learning media includes tools that are physically used to convey the contents of teaching material, which include books, tape recorders, cassettes, video cameras, video recorders, films, slides, photos, pictures, graphics, television, and computers (Arsyad, 2014; Kartikawati & Nita, 2019). Multimedia learning is an application that is used or used in the teaching and learning process which is useful for channeling messages (knowledge, skills and attitudes) not only that it is useful for stimulating thoughts, feelings, attention and willingness to learn so that the teaching and learning process occurs deliberately, aims to be controlled and meaningful (Ardiana & Ananda, 2022; Donna et al., 2021). The use of multimedia used is in the form of PowerPoint which provides picture and sound features which are expected to improve student learning outcomes.

Microsoft Power point is an application program for designing presentation slide (Amadi et al., 2017; Frey & Birnbaum, 2002)s. Microsoft power point is a software that will help you create an effective, professional and easy presentation (Novriandami et al., 2023; Setiaji & Narmaditya, 2020). The advantages of PowerPoint media in learning include that the material to be conveyed in learning is more interesting, can create effective and efficient learning and learning material is delivered in its entirety through material pointers (LeFebvre et al., 2022; Siregar et al., 2023). Media power point is one way that can be done to explain something abstract. In this case a computer with multimedia support can present a display in the form of text that is not monotonous and is more interesting and more interactive. This display will make users more free to choose, filter, and understand the knowledge they want to know (Agbevivi, 2018; Osman et al., 2022).

Learning outcomes are abilities that children acquire after going through learning activities. The success or failure of learning can be seen in the learning outcomes. Learning outcomes are related to achievement in obtaining abilities in accordance with the specific goals planned. In programmed and controlled learning activities called learning activities, learning objectives have been predetermined by the teacher. Successful children can achieve the learning goals that

have been set. Learning outcomes are very important, because with learning outcomes an evaluation of the teaching and learning process can be carried out.

Media that can be applied by teachers to improve student learning outcomes and can improve students' memory in learning biology can be in the form of Microsoft Power Point media. In the teaching and learning process there are two very important elements owned by a teacher, namely teaching methods and teaching media (Rofiah et al., 2020). The use of teaching media in the teaching and learning process can generate motivation and learning stimulation for students so that in the end their learning outcomes will increase. Previous research has shown that the use of multimedia can improve student learning outcomes (Saputra, 2018). Likewise Lestari & Wirasty (2019) concluded their research results that the use of multimedia in learning can increase student interest in learning.

Method

This research was conducted in class XI SMA YPK Pematangsiantar from April to June 2022 with a total population of 96 people (3 classes) and a total sample of 64 people (2 classes) taken using cluster random sampling technique. The method used in this research is an experimental method with a research design using a randomized control group pretest-posttest design (Mudasih & Subroto, 2019; Sugiyono, 2018) using two classes as research samples, namely one class (32 people) as an experimental class which is taught using Power point presentation media and one class (32 people) as a control class which is taught without Power point media. Before learning was carried out, both classes were given a pre-test, then the experimental class was taught using Power point presentation media and the control class was taught without using power point media. After learning ended, both classes were given a posttest. The research design can be seen in Table 1.

To obtain data about student learning outcomes, learning outcomes test instruments have been tested for validity and reliability (Rahmelina et al., 2019; Susanti et al., 2020). The data obtained were analyzed using a quantitative descriptive method, then the results of the analysis were described and compared between the learning outcomes of the experimental class and the control class. Data testing is done by normality test, homogeneity test and hypothesis testing. The hypothesis tested: $H_0 : \mu_1 = \mu_2$; $H_a : \mu_1 \neq \mu_2$. Information : H_0 = Null hypothesis; H_a = alternative hypothesis; μ_1 = average value of experimental class student learning outcomes; and μ_2 = average value of control class student learning outcomes.

Table 1. Pretest Posttest Control Group Design.

Class	Pretest	Treatment	Posttest
Control	Y ₁	Y	Y ₂
Experiment	X ₁	X	X ₂

Information:

Y = Learning without using multimedia

X = Learning to use multimedia

Y₁ = Control Class Pre-test

Y₂ = Control Class Post-test

X₁ = Experiment Class Pre-test

X₂ = Experiment Class Post-test

The criteria for testing the hypothesis

Accept Ho if $t_{count} < t_{table}$ at significance level $\alpha = 0.5$ degrees of freedom $n_1 + n_2 - 2$, which means that there is no significant effect of using PowerPoint multimedia to improve student learning outcomes on the material of the human excretory system in class XI SMA YPK Pematangsiantar. Accept Ha if $t_{count} > t_{table}$ at a significance level $\alpha = 0.5$ degrees of freedom $n_1 + n_2 - 2$ which means that there is a significant effect of using multimedia power point to improve student learning outcomes on the subject of the human excretory system in class XI SMA YPK Pematangsiantar. Data analysis in this study used the SPSS version 21 data processing program.

Result and Discussion

The data analyzed in this study were data on student learning outcomes without using PowerPoint multimedia (control class) and student learning outcomes using PowerPoint multimedia (experimental class) on the subject of the human excretory system in class XI SMA YPK Pematangsiantar.

Control Class Learning Outcomes (Without Multimedia)

The learning outcomes of control class students have a score range of 80-96, where the lowest score is 80 and the highest is 96 with an average score of 88.

Based on table 2. it can be explained that the number of students who got a score of 80 was 1 person (3.1%), students who got a score of 84 were 8 people (19.5%), students who got a score of 88 were 15 people (36.6 %), students who got a score of 92 were 6 people (14.6%), students who got a score of 96 were 2 people (4.9%). Students who achieved value standard minimum scores (75) were 32 people (100%) meaning that all control class students in the posttest had achieved value standard minimum.

Table 2. Frequency Distribution of Control Class Post-Test Data

	Frequency	Percent	Valid Percent	Cumulative Percent
80	1	2.4	3.1	3.1
84	8	19.5	25.0	28.1
88	15	36.6	46.9	75.0
92	6	14.6	18.8	93.8
96	2	4.9	6.3	100.0
Total	32	78.0	100.0	

Table 3. Calculation of the Average (X) and Standard Deviation (S) of Control Class Post-Test Data

N	Valid	32
	Missing	9
Mean		88.00
Median		88.00
Std. Deviation		3.663
Variance		13.419
Minimum		80
Maximum		96

Based on table 4, the average value of the control class post-test was 88.00 and the standard deviation was 3.663. The lowest post-test score is 80 and the highest is 96.

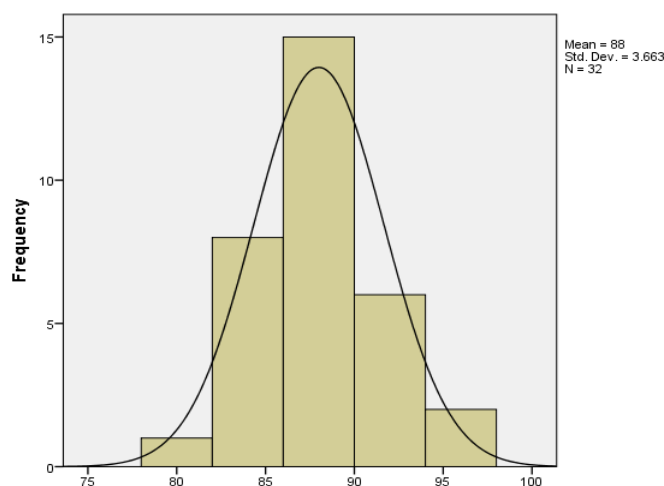


Figure 1. Histogram of Control Class Post-Test Data

Based on Figure 1. the average value of the control class posttest was 88.00 and the standard deviation was 3.663 with a total sample of 32 people. This study uses a significance level $\alpha = 0.05$. If the KSZ value is > 0.05 , it means that the data is normally distributed (Karuniakhalida et al., 2019), and vice versa, if the KSZ value is < 0.05 , it means that the data is not normally distributed. From table 4, it is obtained that the KSZ posttest value for the control class is greater than 0.05, which is 1.414, which means that the posttest data for the control class is normally distributed.

Table 4. Post-Test Control Class Data Normality Test

		posttest control
N		32
Normal Parameters ^{a,b}	Mean	88.00
	Std. Deviation	3.663
	Absolute	0.250
Most Extreme Differences	Positive	0.250
	Negative	-0.219
Kolmogorov-Smirnov Z		1.414
Asymp. Sig. (2-tailed)		0.037

a. Test distribution is Normal.

b. Calculated from data.

In determining the variance of several populations the same or cannot be seen from the significance value.

Table 6. Post-Test Class Experiment Frequency Distribution Data

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	80	1	2.4	3.1	3.1
	84	6	14.6	18.8	21.9
	88	6	14.6	18.8	40.6
	92	13	31.7	40.6	81.3
	96	6	14.6	18.8	100.0
	Total	32	78.0	100.0	
Missing	System	9	22.0		
Total		41	100.0		

Based on Table 6 it can be explained that of the 32 experimental class students the number of students who scored 80 was 1 person (2.4%), students who obtained a score of 84 were 6 people (14.6%), who obtained a score of 88 were 6 people (14.6%), students who got a score of 92 were 13 people (31.7%), students who got a score of 96 were 6 people (14.6%). Thus, there were 32 students who achieved value standard minimum (75) (100%) meaning that all experimental class students in the posttest had achieved value standard minimum.

Table 7. Calculation of the Average (\bar{X}) and Standard Deviation (S) of the Post-Test Class Experiment

N	Valid	32
	Missing	9
Mean		90.13
Median		92.00
Std. Deviation		4.427
Variance		19.597
Minimum		80
Maximum		96
Sum		2884

In this study, the decision-making criterion is if sig > 0.05 then it can be said that the variance is the same and if sig < 0.05 then it can be said that the variances are not the same. From table 5, it is obtained that sig 1,000 means sig > 0.05, meaning that the posttest data for the control class is stated to have the same variance.

Table 5. Data Homogeneity Test Post-test control class

Levene Statistic	df1	df2	Sig.
0.005	3	27	1.000

Experiment Class Learning Outcomes (Using Multimedia)

The experimental class student learning outcomes have a range of 80-96, where the lowest score is 80 and the highest is 96 with an average value of 90.13.

Based on Table 7, the overall posttest score of the students was 2884 with an average score of 90.13 and a standard deviation of 4.427. The lowest score obtained by students is 80 and the highest score is 96. Based on Figure 2, the average value of the students' posttest was 90.13 and the standard deviation was 4.427 with a total sample of 32 students.

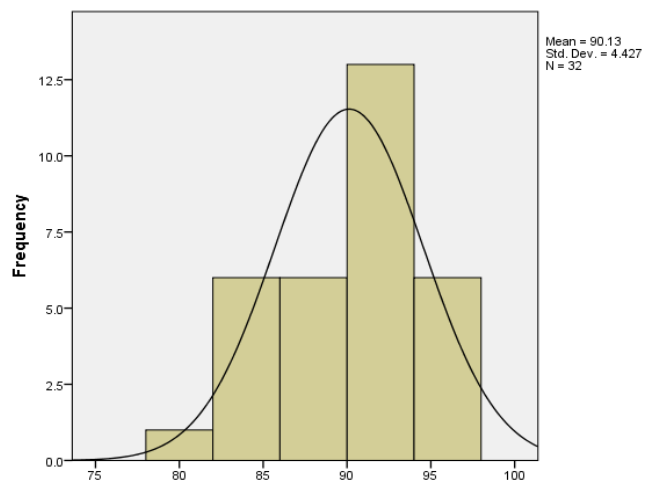


Figure 2. Histogram of Experiment Class Post-Test Data

This study uses a significance level of $\alpha = 0.05$. If the KSZ value is > 0.05 , it means that the data is normally distributed, and vice versa, if the KSZ value is < 0.05 , it means that the data is not normally distributed (Abidin & Hartono, 2021). From table 8, the posttest KSZ value for the experimental class is greater than 0.05, which is 1.458, which means that the posttest data for the experimental class is normally distributed.

Table 8. Post-Test Data Normality Test Class Experiment

N		32
Normal Parameters ^{a,b}	Mean	90.13
	Std. Deviation	4.427
Most Extreme Differences	Absolute	0.258
	Positive	0.148
	Negative	-0.258
Kolmogorov-Smirnov Z		1.458
Asymp. Sig. (2-tailed)		0.028

a. Test distribution is Normal.

b. Calculated from data.

Table 9. Post-Test Data Homogeneity Test Class Experiment

Levene Statistic	df1	df2	Sig.
1.304	3	27	0.293

In determining the variance of several populations the same or cannot be seen from the significance value. In this study, the decision-making criterion is if $\text{sig} >$

0.05, it can be said that the variance data is the same and if $\text{sig} < 0.05$, it can be said that the variance data is not the same. From table 9, it is obtained that $\text{sig} 0.293$ means that $\text{sig} > 0.05$ in the posttest data for the experimental class is stated to have the same variance (Ishartono et al., 2022).

The lowest score for the control class (without multimedia) is 80 and the highest score is 96 with an average score of 88. Meanwhile, the lowest score for the experimental class (using multimedia) is 80 and the highest score is 96 with an average score of 90.13. From these results it can be seen that the posttest average score for the experimental class (using multimedia) is higher than the posttest average score for the control class (without using multimedia), the difference in value is 2.13. This can be explained that in learning by using multimedia students are more interested and more enthusiastic in learning so that their learning outcomes are higher. In accordance with value standard minimum 75 in the Biology subject at YPK Pematangsiantar High School, all students in both the control class (32 people) and the experimental class (32 people) have achieved the value standard minimum score (100%).

To find out the effect of using multimedia Power point to improve student learning outcomes on the Human Excretory System material in Class XI SMA YPK Pematangsiantar, the authors tested the hypothesis using the t-test (Rahmawati et al., 2019), the results of hypothesis testing can be seen in Table 10.

Table 10. Hypothesis Test of Control Class and Experiment Class Data

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	posttest Control - posttest experiment	2.125	4.309	0.762	0.572	3.678	2.790	31	.009

Based on Table 10 it is obtained t-count (2.79) $>$ t-table (2.00) at a significance level of $\alpha = 0.05$ and $dk = 62$, then H_0 is rejected H_a is accepted (Aprilia, 2021) meaning that there is a significant effect of using multimedia power point to improve results student learning on the material of the human excretory system in class XI SMA YPK Pematangsiantar.

Conclusion

From the results of the research and data analysis it can be concluded that there is a significant influence on the use of multimedia on student learning outcomes in the subject of the human excretory system in class XI SMA YPK Pematangsiantar. Student learning outcomes

using multimedia (90.13) are higher than student learning outcomes without multimedia (88). This shows that the use of multimedia in Biology learning on human excretory system material can improve student learning outcomes in class XI SMA YPK Pematangsiantar.

Acknowledgments

Place acknowledgments, including information on grants received, before the references, in a separate section, and not as a footnote on the title page.

Author Contributions

There are five authors of this article. All author members worked together at every stage to complete this paper.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

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