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The Effect of Science Learning Assisted by TikTok Media on Learning Outcomes of Junior High School Students

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Abstract

Many educators still carry out science learning by using books as the main learning material without using learning media. This affects student learning outcomes. Judging from the results of the acquisition of daily test scores of 8th-grade students at Muhammadiyah 5 Tulangan Junior High School with a percentage of 69% as many as 80 out of 115 students scored below the minimum completeness criteria of 75. Therefore, there is a need for media in science learning. This study aims to determine the effect of TikTok-assisted science learning on the learning outcomes of Junior High School students. The material used is the human digestive system in the 8th grade of Muhammadiyah 5 Tulangan Junior High School. The study used two classes selected by random sampling technique, namely the experimental class using the TikTok application and the control class using PPT. Data collection used pre-test and post-test tests with 25 items covering cognitive aspects C1-C6. The acquisition of the T-test (Independent sample T-Test) sig value of 0.000 indicates a significant effect on learning outcomes. The N-Gain value of both classes is in the medium category, but the experimental class is higher than the control class. The experimental class obtained a value of 0.62 while the control class obtained a value of 0.36. It is concluded that learning science using the TikTok application has a positive effect on the learning outcomes of Junior High School students. However, educators must continue to monitor students.

1. INTRODUCTION

Entering the 21st century where the development of education and technology goes hand in hand, educators in Indonesia play a vital role in educating the nation's life by creating good quality education. The existence of technological developments also affects the learning process. Educators must know about the technologies that can be used as teaching materials for students (Arwudarachman et al., 2020). Educators must be able to create interesting learning to create interesting learning, to provide good student learning outcomes (Ulum et al., 2022). Educators still do not utilize technology as a learning medium. Educators should have used media such as learning videos in every learning activity, but there are still many educators who have not used learning

media, which also affects student learning outcomes. Educators still use conventional methods such as in science subjects. This cannot be supported in the learning process using conventional methods (Ichsan et al., 2018).

Natural Science Education is one of the subjects that can be taken at the Junior High School education unit. Science learning has goals, one of which is the ability to build knowledge and understanding. Understanding science learning is a student process experienced through events in life. Understanding science learning through the learning process. The learning process that has been carried out affects student learning outcomes (Pamungkas et al., 2017). Learning outcomes are an achievement that students get after carrying out efforts in learning. Success in learning outcomes can be seen in positive behavior in students (Wahjudi, 2015). Changes in behavior are obtained after the learning process (Achyanadia, 2013) Science learning has an assessment in determining the success of the learning process that has been carried out. Science learning requires authentic assessment to analyze the learning process and produce skills, attitudes, and knowledge that have been obtained. Authentic assessment is obtained from solving problems that can be analyzed through knowledge assessment (Cognitive)(I. K. W. Sari & Wulandari, 2020). Learning outcomes in the cognitive domain are related to learning outcomes or knowledge in terms of understanding, knowing, memorizing, distinguishing, analyzing, and evaluating. (Riwahyudin, 2015). Cognitive learning outcomes are a learning process that requires mental development thinking skills, both in the form of ideas, responses, and values. Therefore, cognitive domain learning outcomes play an important role in the success of the learning process, because every learning requires thinking and remembering activities. (I. K. W. Sari & Wulandari, 2020). Student learning outcomes can vary, differences in learning outcomes obtained by students are influenced by the learning model applied by educators. (Hamin et al., 2019).

The process of direct learning activities carried out by educators can affect student learning outcomes. Educators must prepare the material provided and use the appropriate science learning style so that it leads to good student learning outcomes (Sarumaha et al., 2022). Limitations in delivering material become an obstacle to the achievement of student learning outcomes. Many students have the assumption that science learning is a lesson that is difficult to understand and boring because it deals with formulas in the suitability of the material (R. I. Sari, 2020). Moreover, in the current learning process, there are still many teachers using the old method, namely the lecture method, and relying on textbooks and PPT displays. Delivering material normally and not utilizing technology-based learning, so that students will feel bored bored (Hutamy et al., 2021). The lecture method learning and only relying on student textbooks in learning is less effective due to a lack of interest in reading and only listening to the material conveyed by the teacher using the lecture method (Wahyuni et al., 2022). Science learning is not appropriate when using such learning methods, where students as listeners and educators as spokespersons. However, in science learning there needs to be creation or creativity in learning activities to create interesting and enjoyable learning and get maximum value. The results of observations made by Murnihati (Panggabean et al., 2021) In Negeri 1 Toma Junior High School, student learning outcomes have not reached the minimum completion criteria, which is 60.00. Learning activities carried out by science teachers still refer to conventional learning models, namely only explaining material using student textbooks so that students' interest in learning decreases and learning outcomes are affected.

This also happened at Muhammadiyah Tulangan Junior High School in class 8 which has a total of 115 students. The results of students' daily tests are still relatively low because there are still many students who get scores below the minimum completion criteria. The daily test results obtained by class 8 students in the science learning area with a percentage of 69% as many as 80 students get results below the minimum completion criteria and those who get results above the minimum completion criteria with of 31% as many as 35 students. The acquisition of student scores below the minimum completion criteria is more than students who get scores above the minimum completion criteria. The science teacher said students had difficulty in capturing the material that had been delivered by the teacher, in the learning process the teacher used student textbooks and sometimes used PPT as the main material. The teacher also said that it was rare for science learning activities to use teaching aids in delivering material. At Muhammadiyah 5 Tulangan Junior High School students are allowed to bring smartphones and use smartphones in learning, but use smartphones only when needed. Science teachers at Muhammadiyah 5 Tulangan Junior High School still do not utilize

smartphones in learning. This can affect student learning outcomes which are less than optimal (Fatmawati et al., 2018). The problem arises because educators are still lacking in managing the learning process so that students cannot understand the material properly. According to Surachmad, the learning process requires appropriate methods and tools in learning activities. Learning outcomes by using tools can increase. The increase in student learning outcomes requires learning tools or media (Fatmawati et al., 2018).

The existence of these problems requires learning media to be developed and able to improve student learning outcomes. Researchers found a learning solution using videos in the learning process of science subjects (Ribawati, 2015). Video performances can be accessed by students through social media in the form of TikTok (R. I. Sari, 2020). The TikTok application has many features that support that TikTok can be used as learning media in the learning process. (Mufidah & Mufidah, 2021). TikTok is an interactive learning media because it provides animated videos that contain text, images, and sounds that create fun and interesting learning (Hutamy et al., 2021). Showing science lessons on TikTok can turn abstract concepts into real information so that students easily understand the material that has been displayed (Agustina et al., 2022). The concept of delivering science material in TikTok can be made per sub-chapter so that it is organized and interesting. An interesting learning process can produce learning that is expected (Wahyuni et al., 2022). Learning using the TikTok application in the form of videos has become a solution for improving student learning outcomes where TikTok is an attractive and close media to students (SUPRIHATIN, 2022). Science subjects cannot use learning with methods that are only focused on printed media, but science learning must use video performances that provide moving and real explanations so that students can understand science material clearly (Agustina et al., 2022). TikTok application has become an active and interesting learning media (Mufidah & Mufidah, 2021).

Learning using the TikTok application can produce an imaginative learning process so that learning outcomes are improved. Research conducted by Ericha (Hutamy et al., 2021) resulted in a significant effect in implementing learning using the TikTok application. The application of TikTok application in the learning process of Retail Business material for class XI students of online business and marketing at SMK Negeri 1 Makassar produces fairly good criteria. The results of the study resulted in respondents' responses to the utilization of TikTok as a learning medium of 55.36% and included in the criteria quite well. The effect of using TikTok social media for learning media results in an increase in student learning outcomes (R. I. Sari, 2020). Learning using the TikTok application can increase student interest so that it can generate creative and innovative ideas (Ellya et al., 2021). TikTok is used as a learning medium by researchers. The material on the food digestive system in humans in science subjects in class 8 will use the TikTok application as a learning medium which is a differentiator from previous research.

Based on the above background, researchers use the TikTok application as a learning medium with the material of the human food digestive system in class 8. Learning activities use their respective smartphones and listen to material from the content provided by the researcher. Learning using the TikTok application on the material of the human food digestive system can explain the material more clearly and realistically (Agustina et al., 2022). This study aims to determine the effect of science learning assisted by the TikTok application on the learning outcomes of 8th-grade students at Muhammadiyah 5 Tulangan Junior High School.

2. METHOD

This type of quantitative research uses an experimental approach method. The form of research used in the experimental method is a Quasi-Experimental Design with Nonequivalent Control Group Design (Nurhayati et al., 2014). The material used in the application of TikTok media-assisted learning uses the material of the food digestive system in humans. The experimental method is used to determine the relationship between the cause and effect of a treatment (Fatmawati et al., 2018). Researchers took the population of class 8 students of Muhammadiyah 5 Tulangan Junior High School. The random sampling technique is used for sampling, which is the selection of 2 classes from 4 classes randomly. The number of 8th-grade students is 128 students, each class has 32 students, so a sample of 64 students is obtained (Pebriani, 2017). Researchers use the independent variable on learning using TikTok media and the dependent variable, namely student learning outcomes.

Data collection techniques using tests. This test uses pre-test and post-test tests in two classes, namely experimental and control classes. The pre-test test was given before the learning treatment, while the post-test test was given after the learning treatment. The treatment given to the experimental class was the TikTok application and the control class used PPT as a learning medium (Sarumaha et al., 2022). The material used in this study is the food digestion system in humans.

The instruments used in this study are cognitive questions at the C1-C6 level that have been valid and reliable. The validity test was used to state that the instrument was valid by being tested by 2 experts. The two experts are biology lecturers and science teachers. Instruments that have been declared valid can be used as research material. (Janna & Herianto, 2021). The validation results are taken into account and their validity level is determined (Hulinggi & Mohamad, 2022). The validity results obtained by researchers, namely on learning media assisted by the TikTok application, get a score of 90.45%, cognitive questions get a score of 92.8%, student worksheets (LKPD) get a score of 95.2% and teaching modules get a score of 94.55%. From these results, it can be said that the learning media in the form of TikTok and instruments are declared very valid and can be used as research material. After the validity test, there is a reliability test. The reliability test is used to ascertain how much effectiveness and stability of the Pre-Test and Post-Test cognitive questions in getting the right and appropriate results. The reliability test is calculated by Cronbach's Alpha statistical test with the criteria if the alpha value> 0.60 then the instrument can be said to be reliable and vice versa, it is said to be unreliable if the alpha value <0.60 (Dewi & Sudaryanto, 2020). The reliability test results obtained by researchers are 0.739, which means that the instrument can be said to be reliable.

Data processing techniques were performed using the T-test (Independent Sample T-Test) to determine the effect of treatment on student learning outcomes by fulfilling the prerequisites of the homogeneity test and normality test. The results that have been obtained after conducting research are calculating the results of students' pre-test and post-test scores using the SPSS 26 application. The first test carried out is the N-Gain Score test used to determine the increase in student learning outcomes by calculating using the following formula.

The N-Gain Score test criteria are if the score $g \leq 0.3$ then included in the low category, if you get a score of $0.3 < g \leq 0.7$ then included in the medium category and if you get a score of $g > 0.7$ then included in the high category (Santoso, 2021). The homogeneity test is carried out to see whether the amount in the distribution of data is homogeneous or not. If there are two groups and they get the same result, then it is homogeneous. A homogeneity test can be done before conducting a test comparing two or more groups. The provisions of the homogeneity test research results, if the significance value> 0.05, then the variation of two or more groups is categorized as homogeneous, and vice versa. If the significance value <0.05, then it is included in the inhomogeneous category (Usmadi, 2020). Furthermore, the normality test is used to determine whether the results that have been obtained through the pre-test and post-test tests are normal or not. Researchers used Kolmogorov Smirnov for the normality test. The criteria for Kolmogorov Smirnov are if the sig value is > 0.05, it is said that the researcher's data acquisition has a normal distribution. If the sig value < 0.05 then the data that has been obtained does not have a normal distribution (Wahyuni et al., 2022). Researchers also conducted a T-test to see the effect on learning outcomes of experimental classes using the TikTok application and control classes using PPT media. The T-test model used by researchers is the independent sample T-test by testing the post-test results of the control class and experimental class. The criteria for the T-test are determined according to the results of the significance value, if the sig value > 0.05 then Ho is rejected and H1 is accepted so that it is stated that there is no effect of TikTok media on student learning outcomes, and if the sig value < 0.05 then it is stated that Ho is accepted and H1 is rejected so that there is an influence on TikTok media on learning outcomes (Hamin et al., 2019).

3. RESULTS AND DISCUSSION

The research was conducted on students of classes 8 A and 8 B Muhammadiyah 5 Tulangan Junior High School. The number of students in class 8 was 128 students, each class amounted to 32 students, so a sample of 64 students was obtained. The material used is the food digestion system in humans. Class 8 A is the experimental class and class 8 B is the control class. The experimental class was given treatment in the form of TikTok application during learning and the control class was

given treatment in the form of PPT as learning media. The data analysis used by researchers is the N-Gain Score test and the T-test (Independent Sample T Test) with the prerequisites of normality test, and homogeneity test fulfilled. N-Gain Score test to determine the improvement in student learning outcomes. These gains were observed using the pre-test and post-test results of both the experimental and control classes. The calculation data by researchers is presented in the table below.

Table 1. N-Gain Score Test Results

Class	$\bar{x}$ **Pre-Test**	$\bar{x}$ **Post Test**	**<g>**	**Category**
Experiment	39.63	77.13	0.62	Medium
Control	42.94	63.66	0.36	Medium

Based on the results of the table above, it can be seen that the two classes are in the same category, namely moderate. The experimental class obtained a score of 0.62 and the control class obtained a score of 0.36. Although the experimental class and control class are included in the moderate category, the improvement in the learning outcomes of the experimental class is higher than the control class.

The data must be tested for normality first to determine whether the data results obtained are normally distributed or not. Researchers used Kolmogorov Smirnov analysis on SPSS version 26. The calculation data obtained by researchers is presented in the form of the following table.

Table 2. Normality Test Results

Tests of Normality

Class		**Kolmogorov-Smirnov[a]**		
		Statistic	df	Sig.
Learning Outcomes	Pre-Test Experiment	.145	32	.084
	Post-Test Experiment	.130	32	.187
	Pre-Test Control	.150	32	.065
	Post-Test Control	.146	32	.081

The normality test results obtained by researchers are seen in the significant value of the experimental class pre-test results getting 0.084 and the experimental class post-test results getting 0.187. The results of the experimental class pre-test and post-test are more than the probability price α 0.05, so it can be said to be normally distributed. The control class pre-test result is 0.065, and the control class post-test result is 0.081. The control class pre-test and post-test results are more than the probability price α 0.05, so it can be said that the control class results are normally distributed.

After the data is normally distributed, it is continued with the homogeneity test. This test is conducted to determine whether the sample data comes from a population with the same variance. (Achyanadia, 2013). The following are the results of homogeneity testing as follows.

Table 3. Homogeneity Test Results

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	.000	1	62	1.000

Based on the table above, the significance value Based on Mean> 0.05 is 1.000. The results in the table above can be said that the experimental post-test and control post-test data have homogeneous variants. Then, it is strengthened by the independent sample t-test test to see whether there is an influence on learning outcomes, in both experimental and control classes. The following calculation results are presented in the table below.

Table 4. T Test Results

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.(2-tailed	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Hasil Belajar	Equal variances assumed	10.836	.002	4.431	62	.000	13.496	3.040	7.393	19.545
	Equal variances are not assumed.			4.431	50.052	.000	13.496	3.040	7.364	19.574

Based on the results of the data table above, it can be seen that the sig value (2-failed) <0.05, namely 0.000, it is stated that Ho is accepted and H1 is rejected so that there is an influence on TikTok media on learning outcomes. The existence of an influence on learning using the TikTok application which can be seen from student learning outcomes has increased. To determine the level of student understanding in the cognitive aspect, an analysis of the achievement of indicators of cognitive learning outcomes is carried out. Cognitive aspects consist of C1-C6 where C1 is the ability to remember, C2 is aspects of understanding, C3 is aspects of applying, C4 is the ability to analyze, C5 is the ability to evaluate, and C6 is the to create. (Lubis et al., 2018). The total number of questions is 25 questions. The achievement of indicators of students' cognitive learning outcomes is presented in the table below.

Table 5. Cognitive Aspect Test Results

Cognitive Aspect	Skor N-Gain	Category
C1	0,60	Medium
C2	0,72	High
C3	0,64	Medium
C4	0,65	Medium
C5	0,54	Medium
C6	0,55	Medium

Based on the results of the calculation in the table above, the cognitive aspect of C1 gets a score of 0.60. C2 cognitive aspects with a score of 0.72. C3 cognitive aspects get a score of 0.64. Cognitive aspects C4 get a score of 0.65. Cognitive aspects C5 get a score of 0.54 and cognitive aspects C6 get a score of 0.55. N-Gain Score category if the score is $g \leq 0.3$ then include in the low category, if you get a score of $0.3 < g \leq 0.7$ then include in the medium category, and if you get a score of $g > 0.7$ then include in the high category. (Santoso, 2021). The results that have been obtained for cognitive aspects C1, C3, C4, C5, and C6 are included in the medium category, so it can be said that the explanation of the material of the food digestion system in humans through the TikTok application in the aspects of remembering, applying, analyzing, evaluating and creating is quite good. At the same time, the C2 aspect is included in the high category, so it can be said that the explanation of the material on TikTok in the aspect of understanding is good. The cognitive aspect of understanding (C2) obtained higher learning outcomes compared to other cognitive aspects. Learning outcomes in the C2 cognitive aspect are the highest due to the explanation of the material on TikTok which is more real and packed densely and clearly so that it can provide good student understanding (Ramdani et al., 2021). By the opinion of Mayer & Moreno, animated videos can provide better student understanding when by cognitive theory in learning (Fajar et al., 2017). Based on this opinion, it can be said that using TikTok in learning by providing illustrative videos can facilitate students' ability to understand (C2).

By the results that have been obtained, the material of the human food digestive system using the TikTok application in aspects C1-C6 has been fulfilled and can provide explanations to Junior High School students quite well. The delivery of material on the human food digestive system using the TikTok application can provide understanding to students and the delivery of material can be accepted by 8th grade students of Muhammadiyah 5 Tulangan Junior High School well. The explanation of the material in the TikTok application is by the needs of students. The analysis used by the researcher above is based on the aim to determine the effect of the TikTok application on student learning outcomes in science lessons. Tests that have been carried out by researchers have resulted in a positive effect of learning using the TikTok application on the learning outcomes of 8th-grade students at Muhammadiyah 5 Tulangan Junior High School.

Judging from the N-gain test in Table 1, the experimental class treated with learning using TikTok was higher than the control class learning using the PPT application. The experimental class got a score of 0.62 while the control class got a score of 0.36. Both classes are included in the medium category, but the experimental class is higher than the control class. The difference in learning outcomes is influenced by the learning activities used. Learning using the TikTok application provides results that are in line with good science learning outcomes. Learning using the TikTok application can provide an explanation of material that is abstract in life to be real so that it can have a positive influence on student learning outcomes (Wahyuni et al., 2022).

This study conducted a normality test and homogeneity test to determine whether the data obtained were normal and homogeneous. Normality testing and homogeneity test above using test results, namely pre-test and post-test scores through the stages of normality test and homogeneity test. The normality test that has been obtained can be seen in Table 2 and seen in the sig value section. The experimental class value on the pre-test results is 0.084 and the post-test results are 0.187. In the control class, the pre-test sig value is 0.065 and the post-test result is 0.081. Knowing the acquisition of the normality test carried out the sig value> 0.05 everything, so it can be said that both classes are normally distributed. After the normality test is carried out, then the homogeneity test is carried out. (Wahyuni et al., 2022). The results of the homogeneity test can be seen in Table 3 by getting a sig value of 1.000 where the sig value> 0.05 so that it can be stated that the research comes from two homogeneous classes with the meaning of having the same variance distribution.

After the normality test and homogeneity test are carried out, the T-test (independent sample T-test) is carried out to determine whether there is an effect of learning using the TikTok application on learning outcomes. The independent sample T-test is used to determine whether or not there is an influence on the learning media used, which can be seen in Table 4. The results of the independent sample T-test obtained a significance value of 0.000 <0.05, so it is stated that Ho is accepted and H1 is rejected so that there is an influence on TikTok media on learning outcomes. These results can be concluded that there is a significant influence in the sense that the experimental class learning using the TikTok application and the control class learning using PPT is a significant influence. However, from the results obtained, the N-Gain score of the experimental class is higher than the control class.

Research conducted by Mawardi (Hulinggi & Mohamad, 2022) explains that TikTok media can be used in schools during learning activities. Learning using the TikTok application that has been done by Mawardi gets the percentage of value with an average of 88.7%. Supported by research conducted by Ericha (Hutamy et al., 2021) says that learning outcomes using the TikTok application have increased. The acquisition of learning outcomes average score of 79.06 with a median and mode of 80.

The TikTok application can be used as a learning medium to make it easier for students to understand digestive system material and can create an interactive and fun learning atmosphere. The TikTok application provides features that support teaching and learning activities. Students can also make positive use of the TikTok application by listening to the subject matter on TikTok. TikTok can be used as a learning medium, but educators must still adjust the teaching materials and characteristics of students to create interactive learning (Ramdani et al., 2021)

4. CONCLUSION

Based on the results and discussion above, it can be concluded that the application of the TikTok application is used as a learning media that can affect better learning outcomes. TikTok media has a significant effect on the learning outcomes of 8th-grade students of Muhammadiyah 5 Tulangan Junior High School on the material of the human food digestive system. The results of the experimental class learning scores using the TikTok application were superior to the control class learning using PPT. Learning activities are more interesting and fun and students can easily understand the material presented through the TikTok application. The material uploaded in the TikTok application can be viewed repeatedly, not just once. Learning using the TikTok application indirectly educates students that the TikTok application can be used to find out other knowledge, especially science.

The shortcomings in this study are that there are some students during learning activities that are still less orderly so they do not listen to the explanation of the material properly. The suggestion submitted by the researcher is that there needs to be more supervision to discipline students when learning using TikTok takes place to obtain satisfactory learning outcomes.

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