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PROJECT-BASED LEARNING WITH DIGITAL STORYTELLING TO IMPROVE SCIENCE LITERACY OF 10TH-GRADE STUDENTS IN MA AL MANSHURIYAH SCHOOL

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Abstract: Science literacy is highly important for students as it enables them to comprehend the issues present in the community's environment. Students' science literacy skills can be enhanced through science learning that prioritizes the development of attitudes, ideas, and process skills. The learning process should be designed in such a way that students can explain scientific phenomena, evaluate scientific research, and interpret data and scientific evidence. This research aims to describe the effectiveness of the project-based learning (PBL) model with digital storytelling in improving 10th-grade students' science literacy on the topic of ecosystems. The research adopts a quasi-experimental design with a non-equivalent pretest-posttest control group. It was conducted at Al Manshuriyah Islamic High School, involving 57 students from two science classes, IPA1 and IPA2. The experimental group, IPA1, was taught using the project-based learning model with digital storytelling, while the control group, IPA2, was taught using conventional teaching methods. The research instruments underwent validation and evaluation by experts to ensure their suitability. The study's results showed that the learning process made students more actively engage in creative problem-solving. There was an improvement in students' science literacy skills on the topic of ecosystems, with an N-gain score of 65% in the experimental group and 56% in the control group. The percentage of students achieving a good category in science literacy was 85% in the experimental group and 78% in the control group. Students' caring attitude towards the environment reached an excellent percentage of 79%. In conclusion, the researcher found that project-based learning with digital storytelling effectively enhances students' science literacy skills and promotes environmental awareness.

Keywords: *Project Based Learning, Digital Storytelling, Science Literacy*

INTRODUCTION

The advancement of science and technology has driven efforts towards renewal in the application of technological innovations in the process of teaching and learning. Teaching methods and learning media are two important components in the process of teaching and learning, and they are interrelated. The appropriate type of learning media will be influenced by the chosen teaching method. Good collaboration between teaching methods and learning media will help to achieve learning objectives. Through the process of discovery and problem-solving, learning biology enables students to have good skills and knowledge in science and technology, and it allows them to think rationally, critically, creatively, and communicate properly. Based on the results of the 2012 Program for International Student Assessment (PISA), Indonesia ranked 64 out of 65 countries in terms of reading, mathematics, and science literacy (with a reading score of 57, a mathematics score of 61, and a science score of 60). Indonesia still lags behind in the ability to understand scientific concepts, including identifying scientific problems, using scientific facts, understanding the system of life, and understanding the use of scientific tools. Based on science achievement data in the Trends in International Mathematics and Science Study (TIMSS) in 2003, Indonesia was ranked 35 out of 46 countries, and in 2007, it was ranked 36 out of 49 countries.

Maximum learning outcomes require the implementation of a suitable learning model that corresponds with the subject matter. The 2013 curriculum, which places more emphasis on student-centered learning, requires a learning model that provides opportunities for students to be more active and develop themselves. One of the models used in biology teaching is project-based learning (PJBL). Project-based learning, as defined by Kemendikbud (2014), is a learning model that uses problems as the initial step in collecting and integrating new knowledge based on the student's experiences in real-life activities. According to Thomas in Made Wena (2014), project-based learning is a learning model that allows teachers to direct classroom learning by incorporating project work. Simply put, project-based learning is an instruction that aims to connect technology with real-world problems that are typically used by students or for school projects (Warsono & Hariyanto, 2012).

Interactive learning media that can be used in biology-based technology-based learning is digital storytelling. Digital storytelling is an activity that combines narrative stories with digital content, including images, sound, music, or videos, resulting in an attractive short film. Djamarah Heriyana & Maureen (2014) stated that the methods and media used in learning should meet several criteria, namely: 1) able to attract students' interest and learning motivation; 2) in line with learning objectives; 3) able to improve various skills possessed by students; 4) able to increase student activity in learning in the classroom. According to Muhyadi Asri (2018), in the context of teaching and learning activities, digital storytelling is one of the learning methods that tries to combine several skills such as listening, speaking, writing, and operating programs that utilize computer and technology developments.

Based on the description, the method used in this research is quasi-experimental with a pretest-posttest control group design. The use of this research design involves two classes as research samples: one experimental class and one control class. The learning process combines a project-based learning model with digital storytelling and observes its influence on improving students' science literacy, aiming to develop students who possess science literacy skills to respond to 21st-century challenges.

METHOD

The method used in this study is quasi-experimental with a pretest-posttest control group design, referring to Sugiyono (2014). Through this method, the researcher deliberately creates an event or condition, then investigates its effects (Arikunto, 2013). The use of this research design involves two classes as research samples, one experimental class, and one control class. The selection of these two classes was not based on strata, random, or region but on a specific purpose. The research subjects were divided into two groups, namely the experimental group and the control group. The experimental group received project-based learning with digital storytelling, while the control group received conventional learning models.

The population in this study is all students of class X in Al Manshuriyah Islamic Senior High School, and 2 (two) were taken as samples. The first step is to determine the students of class X who will be used as samples by selecting two classes in Al Manshuriyah Islamic Senior High School assuming that all classes have equal abilities and do not have different characteristics. The selected samples are class X IPA 1 and class X IPA 2.

The data collection technique used in this research is the measurement, specifically through tests. The tests referred to in this study are the pretest and posttest. A test is a series of questions, exercises, and other tools used to measure the skills, knowledge, intelligence, abilities, or talents possessed by an individual or group (Arikunto, 2013:193). The instrument provided during the pretest and posttest consists of multiple-choice questions. This assessment is used to evaluate students' science literacy. The measurement is conducted at the beginning (pretest) and end of the learning process (posttest). This measurement is conducted in the classroom using project-based learning with digital storytelling, and in another classroom using conventional learning models. Furthermore, to determine the improvement of students' science literacy before and after the implementation of project-based learning with digital storytelling, the following Table 1 presents the value categories."

Table 1. Value Categories

Score Range	Category
90-100	Excellent
80-89	Good
70-79	Enough
60-69	Less
0-59	Very Less

RESULTS

The results and discussion are presented with a length of 60-70% of the length of the article. The results are the main part of scientific articles that contain: the results of data analysis, the results of hypothesis testing, can be equipped with tables or graphs, to clarify the results verbally.

The research on improving science literacy on the topic of ecosystems has a very positive impact on students, as seen in the significant cognitive changes among them. The research data obtained from

the pretest and posttest show that the highest learning score achieved by the experimental group using the PJBL model with digital storytelling was 45, while the lowest was 24. The mean was 37.72, the median was 40.00, and the mode was 44. Meanwhile, the highest learning score obtained from the pretest in the control group using conventional learning models was 45, while the lowest was 18. The mean was 35.36, the median was 36.00, and the mode was 32. In the posttest conducted after using the PJBL model with digital storytelling, the highest learning score achieved by the experimental group was 93, while the lowest was 76. The mean was 84.03, the median was 84.00, and the mode was 84. Similarly, the highest learning score obtained from the posttest in the control group using conventional learning models was 88, while the lowest was 68. The mean was 79.61, the median was 79.00, and the mode was 76. The research data are shown in the following Table 2.

Table. 2 Pretest and posttest value data

Kriteria	Kelas Eksperimen		Kelas Kontrol	
	Pretest	Posttest	Pretes	Posttest
Average	37,72	84,03	35,36	79,61
Middle Value	40	84.00	36,00	79,00
Lowest Value	24	76	18	68
Top Rated	45	93	45	88
Standard Deviation	6,745	4,508	7,922	4,917

The normality test used in the data analysis of this research was Kolmogorov-Smirnov - Shapiro Wilk test, conducted using the SPSS application. The data from the experimental and control groups were normally distributed with values of 0.76 and 0.21 > 0.05, respectively. Based on the results of the Independent Sample T-Test conducted, the value of Sig. (2-tailed) equal variances assumed was 0.001 < 0.05, indicating that there was a significant difference between the learning outcomes of the PJBL model with digital storytelling and the conventional model. The Independent Sample T-Test for cognitive learning outcomes of the students can be seen in Table 4.2.

Table 3. Table of Normality test results, Homogeneity Test and Hypothesis Test

Class	Number of students	Normality Test		Homogeneity Test		Hypothesis Test	
		Value	Inf	Value	Inf	Value	Inf
Experimental	29	0,76	Normal	0.453	Homogen	0,000	Signifikan
Control	28	0,21	Normal	-		0,000	

The N-Gain calculation results show that cognitive learning outcomes using the PJBL model with digital storytelling are better compared to direct learning. The differences can be seen in Table 4.

Class	N-Gain Category (%)			Average	Category
	Low	Medium	High		

Experimental	-	65%	85%	73%	Tinggi
Control	-	56%	78%	68%	Sedang

From the data in Table 4. it can be concluded that there is a difference in the N-Gain values between the experimental and control groups. The experimental group obtained an average of 73% in the high category, while the control group obtained an average of 68% in the medium category.

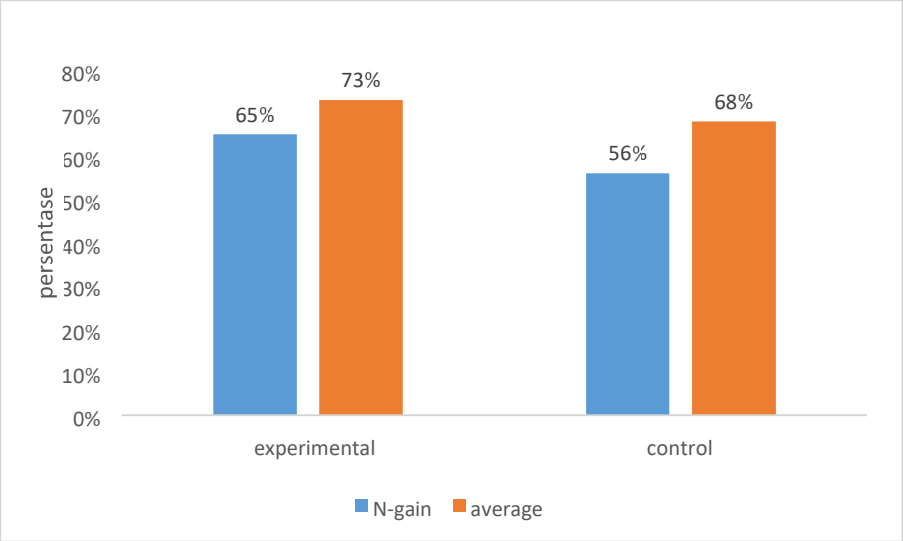

Figure 1. average result of N-gain gain value

The acquisition of N-gain scores for students shows a difference in quantity for each scientific work indicator. The N-gain value obtained for formulating problems and describing problems in each class is in the medium category. In formulating problems, the experimental class obtained a value of 65% and the control class obtained a value of 56% N-gain, while for describing problems, the experimental class obtained a value of 85% N-gain and the control class obtained a value of 78% N-gain. This is because some students in both the experimental and control classes have not been able to formulate problems correctly, as they did not make questioning sentences to inquire about the relationship between influencing factors. Furthermore, students have not been able to describe the problem in detail according to the concept and theory, as evidenced by their answers that have not been fully detailed. The students have not understood how to apply the appropriate concept. Pratiwi (2014) states that although learning focuses on students, they still need more adequate interaction, that is, students need guidance to better understand a problem to maintain its quality.

Discussion is the most important part of the overall content of scientific articles. The objectives of the discussion are: answer research problems, interpret findings, integrate findings from research into existing knowledge sets, develop new theories or modify existing theories.

CONCLUSION

The student learning outcomes in the experimental class, which used the PJBL learning model with digital storytelling, were obtained from pretest and posttest results, with an average pretest score of 37% and a posttest score of 84%. Meanwhile, the student learning outcomes in the control class, which did not use the PJBL learning model with digital storytelling, obtained an average pretest score of 35% and a posttest score of 79%.

There was an influence of the PJBL learning model with digital storytelling on students' science literacy on ecosystem materials conducted in the experimental class with a value of -33.409 and 0.572.

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