



The Effect of Interactive Multimedia Based on Articulate Storyline 3 on Student Learning Outcomes in Elementary Schools

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ABSTRACT

This study aims to determine the effect of interactive multimedia base on articulate storyline 3 on student learning outcomes in elementary schools. This study uses quantitative research with a quasi-experimental method of the non-equivalent control group type. The samples used were class IV A and class IV B, each consisting of 15 students. Data collection techniques used were validation, observation and cognitive learning outcome tests. While the collected data were analyzed in two ways, namely prerequisite test were used to ensure the feasibility of the data including normality tests and homogeneity test. Hypothesis testing was used to determine the effect of independent variables on dependent variables using independent sample t-tests. Thus, the results show that the average value of the experimental class is higher than the control class in all three domains of learning outcomes. The t-test produces a Sig. (2-tailed) value of 0.000 (<0.05), which indicates a significant change in the use of interactive multimedia based on articulate storyline 3 on student learning outcomes.

Keywords: multimedia interactive based on articulate storyline 3, student learning outcomes

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1. Introduction

The development of technology in the digital era has had a significant impact in various fields, including in the world of education. The utilization of technology in learning activities has changed the way material is delivered and the learning experience, both in terms of teachers and students. One of the main changes that occur is the process of digitizing learning, which is the integration of digital technology in various aspects of the educational environment, such as teaching, implementation of the teaching-learning process, and school administration. This transformation makes education more accessible, efficient and flexible and allows students to learn independently anywhere and anytime (Ifenthaler, 2021). However, the implementation of technology in learning still faces various challenges. Teachers are required to understand the curriculum deeply before integrating technology in the learning process. In addition, the availability of facilities and infrastructure as well as teachers' skills in using technology are important factors for successful implementation (Muhazir & Retnawati, 2020). On the other hand, teachers also have a big responsibility in creating an interesting, active and appropriate learning environment for students, especially in the era of the Merdeka curriculum which emphasizes the concept of fun and student-centered learning (Sherly, 2021; Dhomir et al., 2023). Although, the integration of technology in education has developed, one of the issues that still often arises in the context of education in Indonesia is the low quality of learning, which is reflected in suboptimal student learning outcomes. In addition, the teacher-centered learning approach also causes students to be less active and not fully involved in the learning process (Handri, Muhammad et al., 2025).

The development of science and technology encourages the improvement of the quality of education and strengthens the demands for improving the quality of learning (Maritsa et al., 2021). One of the positive impacts of technological developments in education is the utilization of learning media by teachers. The use of technology-based learning media, including computers, is an effective alternative in supporting the learning process (Heryahya, 2022). According to Wulandari et al. (2024) Learning media plays an important role in improving the quality of student learning, so they do not feel bored during the process of teaching and learning activities. The use of learning media can increase students' interest in learning and learning outcomes.

In the era of technological advances, information and communication, teachers are required to adapt learning methods to the times, one of which is through the use of the articulate storyline 3 application as an interactive learning media (Saputro et al., 2020). Interactive multimedia is a computer-based learning method that combines various elements such as text, images, graphics, sound, animation and video and allows students to interact directly with the media to get a response according to the actions taken (M Z & Azzahhira, 2024). Articulate storyline 3 is a form of interactive multimedia that helps students understand material through visual and audio presentations, such as images, animations and videos. This media encourages active student involvement because it allows direct interaction such as answering questions or operating features related to learning material (Septian, 2020). Interactive multimedia based on articulate storyline 3 encourages active student participation through direct interaction with learning media. Students are involved in operating the media and answering questions related to the material, so the use of this media can have a positive influence on their learning outcomes (Budiarto & Jazulia, 2022).

According to Irmaningrum & Linaria (2021) learning outcomes reflect the success of students in undergoing the learning process as a whole. Assessment is not only based on the final results, but also pays attention to the learning process from start to finish, in order to identify obstacles that affect the achievement of optimal learning outcomes. Student learning outcomes are a measure of the extent to which students understand the material taught and are an indicator of the achievement of learning objectives. Students' understanding of the material can be measured through the grades obtained, so learning outcomes serve as a reference in assessing the success of the learning process (Mayasar & Yudha 2024). From the Merdeka curriculum, learning outcomes assessment includes three main domains, namely cognitive, affective and psychomotor. The cognitive domain focuses on intellectual abilities, affective includes students' attitudes and emotions, and psychomotor assesses motor skills and physical abilities (Sylvia et al., 2019; Suaradipa & Priyana, 2020).

The reality in the field shows that student learning outcomes are still low. Based on initial observations at SDN 3 Sendangrejo, Ngimbang sub-district, it was found that fourth grade students in IPAS subjects were still relatively low. Problems were found in all three domains: cognitive, students had difficulty understanding the material because of the dominant lecture method without supporting media; affective, students lacked independence and confidence; and psychomotor, students seemed passive and unenthusiastic because there was no interesting media in learning. Of the 15 students observed, only 5 students scored above the Minimum Requirements Criteria (KKM) of 75, while the other 10 students scored below the KKM. In addition, the affective and psychomotor aspects also showed symptoms of students' inactivity in the learning process.

Some studies that are relevant to this research are Research conducted by (Rahma et al., 2024) shows that there is a significant effect on the use of interactive multimedia using wps office on student learning motivation. There is a significant effect of the application of interactive learning media based on articulate storyline 3 on the achievement and learning motivation of elementary school students (Sabani & Karman, 2024). Interactive multimedia based on articulate storyline 3 is suitable for use to improve student learning outcomes and help increase student motivation, learning achievement, understanding and communication skills (Saputro, 2020). This research has novelty because it is specifically applied to IPAS class IV SD subjects with local wisdom and cultural diversity material at SDN 3 Sendangrejo. In contrast to previous studies that only discuss interactive multimedia in general, this study specifically applies articulate storyline 3 as an interactive learning media that contains animations, video material questions, quizzes and other interactive features. In addition, this study also discusses learning outcomes as a whole including cognitive, affective and psychomotor domains. This study aims to determine how the effect of interactive multimedia based on articulate storyline 3 on student learning outcomes in elementary school.

2. Methods

This study uses quantitative research, quasi-experimental method, experimental research is an effective method for revealing cause-and-effect relationships, by comparing the results between groups that are treated and groups that do not receive treatment (Akbar et al., 2023). This study used a Non-equivalent control group design, which involved two groups: an experimental class and a control class. Both groups were given a pretest and posttest to measure changes in learning outcomes (Zyra et al., 2022).

Table 1. Non-Equivalent Control Group Research Design

Class	<i>Pretest</i>	<i>Treatment</i>	<i>Posttest</i>
Experiment (E)	O1	X1	O2
Control (K)	O3	X2	O4

Description:

O1: pretest for experimental class

O2: posttest for experimental class

O3: pretest for control class

O4: posttest for control class

X1: treatment using interactive multimedia based on articulate storyline 3

X2: treatment using lecture and question-and-answer methods. Source: (Sugiyono, 2019)

The population in this study were all students of class IV A and class IV B of SDN 3 Sendangrejo with a total of 30 students. The sample used in this study is the simple random side technique. Simple random sampling is a random sampling technique, where each member of the population has the same opportunity to be selected, without considering differences or strata in the population (Raharjo & Santi, 2020). This study involved two classes as samples, namely class IV A as the experimental class and class IV B as the control class, each consisting of 15 students. The experimental class used interactive multimedia based on articulate storyline 3, while the control class used the lecture and question and answer method. The implementation time was in semester II in May with 2 meetings.

The data collection techniques used in this study were validation, observation and cognitive learning outcomes test. Validation is used to assess the feasibility of learning devices and learning media. Observation is used as a data collection technique to identify problems in student learning outcomes in the affective and psychomotor domains using a 1-4 Likert scale as a research instrument. Cognitive learning outcomes test is used to measure the level of mastery of the material by students using multiple choice questions totaling 20 items. The data analysis technique in this study used quantitative data analysis with an inferential statistical approach through the T-test. Before the T-test is carried out, a prerequisite test is first carried out in the form of normality test and homogeneity test. The T-test was used to test the hypothesis regarding the effect of using interactive multimedia based on articulate storyline 3 on student learning outcomes in elementary school. The entire analysis process was carried out using the help of SPSS software.

3. Result and Discussion

Result

This research was conducted at SDN 3 Sendangrejo involving students in class IV A as the experimental class and IV B as the control class, each totaling 15 students. To measure student learning outcomes in three domains, namely cognitive, affective and psychomotor, pretests were conducted before treatment and posttests after treatment in both classes. To determine the difference in learning outcomes between the experimental and control classes, the posttest scores in the three domains: cognitive, affective and psychomotor were analyzed. The experimental class used interactive multimedia based on articulate storyline 3, while the control class used conventional methods. The results of the measurement of the three aspects are presented in the following table.

Table 2. List of Posttest Results for Experimental Class and Control Class

	Criteria	Experiment	Control
Cognitif	Highest Score	100	85
	Lowest Score	75	50
	Total	1320	1065
	Average	88	71
Affective	Highest Score	38	33
	Lowest Score	29	24
	Total	500	432
	Average	33	28
Psychomotor	Highest Score	38	30
	Lowest Score	33	26
	Total	540	417
	Average	36	27

The data in Table 2 shows the difference in average learning outcomes between the experimental and control classes. These results identify that the use of interactive multimedia based on articulate storyline 3 has a positive impact on improving student learning outcomes compared to lecture and question and answer methods. Furthermore, prerequisite tests and hypothesis tests were conducted, as follows:

1. Prerequisite Test

Before conducting hypothesis testing, prerequisite tests were carried out to ensure the feasibility of the data. The prerequisite tests used include normality and homogeneity tests, as follows:

Table 3. Results of Cognitive, Affective and Psychomotor Normality Tests

Result Test	Group	Cognitive	α	Information
		Sig		
Pretest	Experiment	0.366	0.05	Normal
	Control	0.292	0.05	Normal
Posttest	Experiment	0.156	0.05	Normal
	Control	0.145	0.05	Normal
Result Test	Group	Affective	α	Information
		Sig		
Pretest	Eksperimen	0.179	0.05	Normal
	Control	0.531	0.05	Normal
Posttest	Experiment	0.909	0.05	Normal
	Control	0.69	0.05	Normal
Result Test	Group	Psychomotor	α	Information
		Sig		
Pretest	Experiment	0.14	0.05	Normal
	Control	0.218	0.05	Normal
Posttest	Experiment	0.292	0.05	Normal
	Control	0.155	0.05	Normal

Based on the normality test results presented in table 3, the Sig. value of the Shapiro-wilk test shows a number > 0.05 for all groups of data both pretest and posttest in the experimental and control classes. Therefore, it can be concluded that the data in all three domains, namely cognitive, affective and psychomotor, are normally distributed.

Table 4. Results of Cognitive, Affective and Psychomotor Homogeneity Tests

Cognitive				
	Levene Statistic	df1	df2	Sig.
Based on Mean	1.223	1	28	0.278
Based on Median	0.708	1	28	0.407
Based on Mean and With Adjusted	0.708	1	22.299	0.409
Based on Trimmed Mean	1.182	1	28	0.286
Affective				
	Levene Statistic	Df1	Df2	Sig.
Based On Mean	0.081	1	28	0.778
Based On Median	0.57	1	28	0.813
Based On Mean And With Adjusted	0.57	1	27.998	0.813
Based On Trimmed Mean	0.57	1	28	0.786
Psychomotor				
	Levene Statistic	Df1	Df2	Sig.
Based On Mean	0.377	1	28	0.544
Based On Median	0.412	1	28	0.526
Based On Mean And With Adjusted	0.412	1	26.755	0.527
Based On Trimmed Mean	0.426	1	28	0.519

Based on the results of the homogeneity test presented in table 4, the Sig. value is greater than the predetermined limit, namely 0.05 (Sig > 0.05). thus it can be concluded that the data in the three domains, namely cognitive affective and psychomotor, are homogeneous.

2. Hypothesis Testing

To find out whether the difference is significant or not, an independent sample t-test was conducted using SPSS software. This test aims to test the effect of the independent variable on the dependent variable based on the difference in posttest scores between the experimental and control classes. The following are the results of the independent sample t-test test:

Table 5. Cognitive, Affective and Psychomotor Independent Sample T-Test

	t	df	Sig. (2-tailed)	Mean Difference	95% CI Lower	95% Upper
Cognitive	4.498	28	0.000	-17.000	24.742	-9.258
Affective	-5.264	28	0.000	-5.133	-7.131	-3.136
Psychomotor	-15.823	28	0.000	-8.200	-9.262	-7.138

Based on the results of the analysis using the T-test in Table 5, it is known that the significance value (Sig. 2-tailed) for all aspects of learning outcomes, namely cognitive, affective, and psychomotor, based on a significance level of 0.05. In the cognitive aspect, a value of $t = 4.498$ and Sig. = 0.000 was obtained, indicating a significant difference between the experimental class and the control class. Similar results were observed in the affective aspect ($t = -15.823$; Sig. 0.000) and psychomotor aspect ($t = -15.823$; Sig. = 0.000), both of which showed significant differences between the two groups.

These differences indicate that the use of interactive multimedia based on Articulate Storyline 3 has a significant impact on improving student learning outcomes. The application of this media in the learning process has proven to be more effective than the lecture and question-and-answer methods used in the control class.

Discussion

Interactive multimedia based on articulate storyline 3 is applied to grade IV students at SDN 3 Sendangrejo to find out whether the learning media has an effect on the learning process. This study was conducted in class IV A as an experimental class using interactive multimedia based on articulate storyline 3 and class IV B using lecture and question and answer methods without the help of learning media. Sampling was done randomly class IV A consists of 15 students and class IV B consists of 15 students. In

the early stages, the research gave a pretest in the form of 20 cognitive questions and made affective and psychomotor observations of students. Furthermore, after being given treatment, the researcher gave a cognitive posttest and made affective and psychomotor observations.

Data analysis was carried out through three stages: normality test, homogeneity test and T test on the three domains, namely cognitive affective and psychomotor. The results of the normality test showed that all pretest and posttest data in both classes had a value of Sig. > 0.05, which means that the data is normally distributed in all three domains, namely cognitive, affective and psychomotor. The homogeneity test, from the three domains, shows that all data are homogeneous with a value of Sig. > 0.05, which means the sample comes from a homogeneous population. The T test results show that the Sig. (2-tailed) in all three domains is 0.000 (<0.05), which means that there is a significant influence between student learning outcomes in experimental and control classes. This difference indicates that the use of interactive multimedia based on articulate storyline 3 has a positive influence on the achievement of learning outcomes, both in terms of cognitive affective and psychomotor.

These results are supported by several relevant studies, which state that articulate storyline 3 helps students understand the material through visuals and audio (Septian, 2020). Also mentioned that this media can create an interesting and dynamic learning experience (Sindu, 2020). According to Budiarto & Jazulia (2022), students become more active through direct interactive with the media. In addition, according to Sabani & Karman (2024) concluded that web-based interactive media with articulate storyline 3 can improve the achievement and learning motivation of elementary school students. So it can be concluded that learning by using interactive multimedia based on articulate storyline 3 is more significant in improving the learning outcomes of grade IV students at SDN 3 Sendangrejo.

4. Conclusion

Based on the results of the study, it shows that the use of interactive multimedia based on articulate storyline 3 has a significant effect on the learning outcomes of elementary school students. The process of applying this media is carried out through the stages of observation of needs, planning of learning devices, implementation of media using articulate storyline 3 software, and evaluation through pretests and posttests in all three domains, namely cognitive, affective and psychomotor. This is proven through a series of tests, namely learning device validation, learning media validation, question validity test, reliability test, difficulty test, differentiator test, normality test, homogeneity test and T test. The T-test results show that there are significant differences in learning outcomes between the experimental class and the control class in all three domains, namely cognitive, affective, and psychomotor.

Interactive multimedia based on articulate storyline 3 is able to improve student learning outcomes in three domains (cognitive, affective and psychomotor) in elementary schools. The implication of this finding is that interactive multimedia based on articulate storyline 3 can be used as an alternative learning media that is innovative and fun. Teachers and prospective teachers are expected to consider using articulate storyline 3-based interactive multimedia in teaching and learning activities to create a more interesting, interactive learning atmosphere and in accordance with the developmental needs of elementary school students. Researchers' suggestions for further research, it is recommended that learning media can be applied at different levels of education and in other subjects. The goal is to find out whether the learning media remains effective and gives consistent results, and further researchers can also examine other factors that might affect student learning outcomes.

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