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Effectiveness of Event-Based Augmented Reality Media in Social Studies Learning

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ABSTRACT

This study aims to determine the effectiveness of using augmented reality media based on actual events in social studies learning. Sampling was conducted using a simple random sampling method. This study was conducted in 2025. The population of this study consisted of 30 seventh-grade students at SMPN 137 Jakarta in the 2025/2026 academic year in East Jakarta, Indonesia. The sampling technique used the Slovin formula to obtain a sample size of 30 seventh-grade junior high school students. This study used an experimental research method with a single group pretest-posttest design. In addition, the researcher used a paired sample t-test to test the hypothesis and a Shapiro-Wilk t-test to test normality in this study. The results of the independent sample test showed that the significance value with two tails was 0.000 < 0.05; then, as a basis for decision making in the paired sample t-test, it can be concluded that H0 is rejected, and Ha is accepted. The results show that augmented reality media based on actual events in social studies learning has a positive effect on junior high school students' learning outcomes. Augmented reality media based on actual events in social studies learning, in addition to improving learning outcomes, can also increase student motivation and engagement in learning, because it is able to provide an interactive, contextual, and immersive learning experience so that students are more interested and active in the learning process.

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1. INTRODUCTION

The development of digital technology has brought significant changes to the world of education, particularly in the teaching of Social Studies (IPS), which requires an understanding of abstract, contextual, and dynamic concepts. IPS is not only oriented towards mastery of material, but also towards the ability of students to understand social realities, analyze current events, and relate them to everyday life. However, the practice of teaching social studies in schools is still often dominated by conventional methods and the use of media that is not contextual, resulting in low engagement, motivation, and deep understanding of students towards ever-evolving social phenomena. This condition calls for innovation in learning media that can provide a more concrete, interactive, and relevant learning experience to the current social reality. One innovation that has the potential to

address this challenge is the use of augmented reality media based on current events in social studies learning. This augmented reality media allows the integration of virtual objects with the real world in real time, so that students can observe, explore, and analyze social events in a more visual and immersive way. The integration of actual events into augmented reality media makes social studies learning more contextual, meaningful, and encourages critical thinking skills and comprehensive understanding of social issues. Therefore, it is important to assess the effectiveness of augmented reality media based on actual events in social studies learning, particularly in improving student learning outcomes.

Although various studies have shown the potential of augmented reality as an innovative learning medium, empirical studies that specifically integrate augmented reality based on actual events into social studies learning are still relatively limited, especially those that comprehensively examine its impact on student learning outcomes. Most previous studies tend to focus on the use of augmented reality as a medium for visualizing general concepts, without directly linking it to actual social phenomena relevant to students' lives. This gap indicates the need for research that emphasizes not only technological aspects, but also the dynamic and contextual nature of social studies material. Therefore, this study aims to examine the effectiveness of augmented reality media based on actual events in social studies learning in improving student learning outcomes. The results of this study are expected to provide theoretical contributions to enrich the study of contextual digital technology-based social studies learning, as well as practical contributions for teachers in developing innovative learning media that can meaningfully increase student engagement, understanding, and learning outcomes.

Social Studies (IPS) learning plays a strategic role in equipping students with an understanding of the dynamics of social life, civic values, and the ability to analyze various events that occur in society. IPS not only requires mastery of concepts, but also the ability to relate learning materials to real contexts and actual events that are relevant to students' lives. However, social science education learning in schools is often faced with limited media that can represent social events in a concrete and interesting way, so that the learning process tends to be abstract, lacking in context, and does not fully encourage active involvement and deep understanding on the part of students. Augmented reality (AR) media is an innovative alternative that allows the real world to be combined with virtual objects in an interactive and immersive way. The use of AR based on actual events in social studies learning has the potential to provide a more contextual, visual, and meaningful learning experience, as students can observe and explore current social phenomena more realistically.

Various studies show that augmented reality (AR) media is a learning technology that coherently integrates virtual objects into the real world, thereby enriching the learning experience without replacing reality itself (Ghulam Al Balushi JS., et al., 2024; Monfared M., et al., 2022; Marshall S., 2023). This integration allows students to interact directly with digital content in a real environment, which is highly effective in helping to visualize abstract and complex concepts and strengthen understanding and retention of learning material (Kononov M., 2025; Rohendi D., et al., 2025; AlGerafi MAM., 2023). In the context of school education, augmented reality is an important and interesting pedagogical tool, as it can improve academic performance, learning outcomes, and overall learning effectiveness (Wu, J., et al., 2025; Zhang et al., 2022; Sharma, D., 2025; Liu, P., et al., 2024). Various studies also confirm that the use of augmented reality has a positive impact on motivation, learning enjoyment, student attitudes, and active engagement in learning through interactive and immersive experiences (Na, H., & Sung, H., 2025; Gutiérrez-Jara, J. K., 2025; Liao, CH.D., et al., 2024; Mohammadhossein, N., et al., 2024; Marrahi-Gomez V. & Belda-Medina J., 2024; Marín V., 2022). Furthermore, dynamic augmented reality content has been proven to be more effective than static content in increasing student motivation and learning outcomes (Yap SC., 2025). Augmented reality also encourages more optimal cognitive engagement, increases intrinsic motivation, and supports the development of independent thinking, creativity, and critical analysis skills in students (Marshall S., 2023; Gill, A. S., 2025). Beyond individual

cognitive aspects, augmented reality has the potential to enrich social learning and human interaction within contextual and meaningful digital learning environments (Yadav A., 2023; Zielke, M. A., 2024).

The urgency of augmented reality media is given to students as part of the transformation of social studies learning because it is able to provide an immersive, interactive, and contextual learning experience. Through 3D visualization and real simulations, augmented reality media helps students understand abstract social studies concepts more clearly and contextually. In addition, augmented reality media can build emotional awareness of social issues by presenting actual events in a realistic, contextual, and up-to-date manner, as well as encouraging students' social spirit. Learning using augmented reality media also increases student engagement and motivation, making them more active in the learning process and more concerned about social issues that are close to them. By presenting relevant contexts and enabling collaboration between students, augmented reality media not only enriches cognitive understanding but also has the potential to change their attitudes and behaviors towards social dynamics and issues in a positive and sustainable way.

As an integrative field of education, social studies encompasses various social disciplines such as sociology, history, geography, economics, politics, law, and culture, which aim to shape knowledgeable, characterful citizens who actively participate in society (NCSS, 2017). Through contextual and meaningful learning, IPS plays a role not only in shaping students' cognitive understanding, but also their affective and psychomotor skills so that they are able to think critically, solve problems, and make wise decisions (NCSS, 2017). In this context, the application of augmented reality media is relevant because it is in line with the objectives of social studies to develop students' reflective and social skills. Thus, the application of event-based augmented reality media in social studies learning is a strategic approach that not only improves academic competence but also shapes students' social character and independent thinking holistically.

2. METHODS

This study used a pre-experimental quantitative research design with a one-group pretest-posttest design. The normality prerequisite test used Shapiro Wilk, and the homogeneity test used Levene's test. Hypothesis testing used the Paired Sample T-test to examine the effectiveness of augmented reality media on social studies learning outcomes.

Table 1. Experimental research design

Pre-test	Treatment	Post-test
O1	X	O2

Description:

O1 : Pretest scores before treatment

X : Treatment using augmented reality media

O : Posttest scores after receiving treatment

Sampling was conducted using cluster random sampling. This study was conducted in 2025. The sample consisted of 30 seventh-grade junior high school students. This study used a pre-experimental quantitative research method using a pretest and posttest one-group design model.

3. FINDINGS AND DISCUSSION

Next, an effectiveness test was conducted on the use of event-based augmented reality media in social studies learning with 30 students. Next, a pre-test consisting of 30 questions about previous learning was given to the students to determine their initial abilities before being exposed to event-based augmented reality media in social studies learning. In this study, a data normality test was conducted to measure whether the data obtained was normally distributed or not, so that the appropriate statistics could be selected. The data normality test was conducted to measure the

normality of the distribution so that the appropriate statistics could be selected. The normality test in this study used the Shapiro Wilk test with the following testing criteria.

If the significance value (sig) > 0.05, then it is stated that the data is normally distributed, or H0 is accepted, and H1 is rejected.

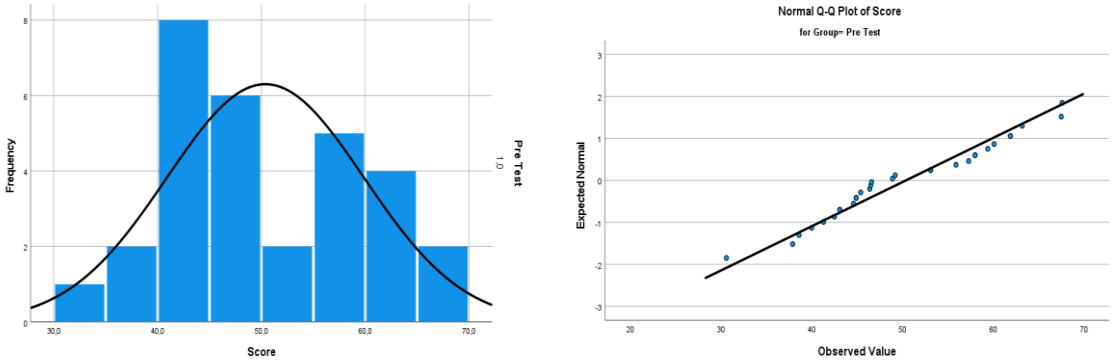
If the significance value (sig) <0.05, then it is stated that the data is not normally distributed or H1 is accepted, and H0 is rejected.

Table 2. Normality test results

Test of Normality			
	Kolmogorov-Smirnov		
	Statistic	df	Sig.
Pretest	0.962	32	0.344
Posttest	0.949	32	0.914

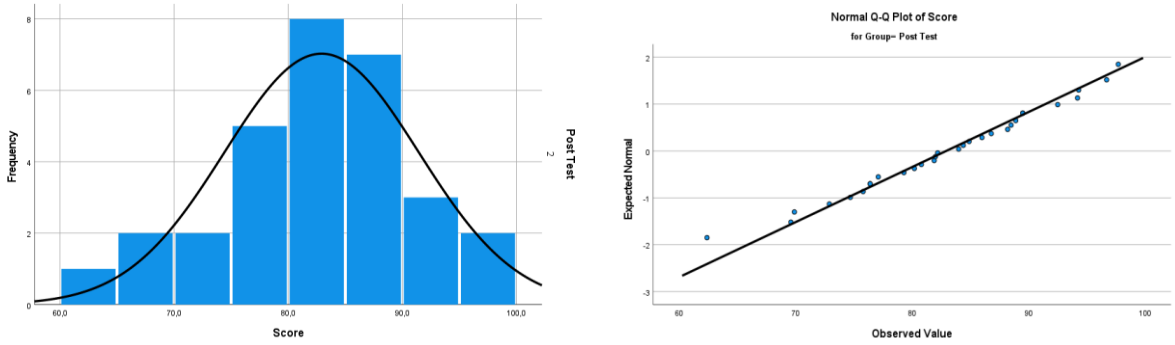
Based on the results of the one-sample Kolmogorov-Smirnov Test analysis in Table 2, it can be shown that the significance value (sig) is greater than the value of $\alpha = 0.05$, namely 0.962> 0.05 for the pretest value and 0.949> 0.05 for the posttest value. Therefore, based on the established testing criteria, H0 is accepted, meaning that both the pretest and posttest are normally distributed.

Figure 1. Normal distribution of pretest data



Students were given pretest and posttest questions using a Likert scale test instrument in accordance with the social studies learning material question grid, consisting of 30 questions. Based on the Q-Q Plot graph in Figure 1, it can be seen that the distribution of points is around and close to the diagonal line, and the characteristics of the diagram are bell-shaped and do not deviate to the right or left. This shows that the pretest data is normally distributed, as seen in Figure 1.

Figure 2. Normal disribution of post-test data



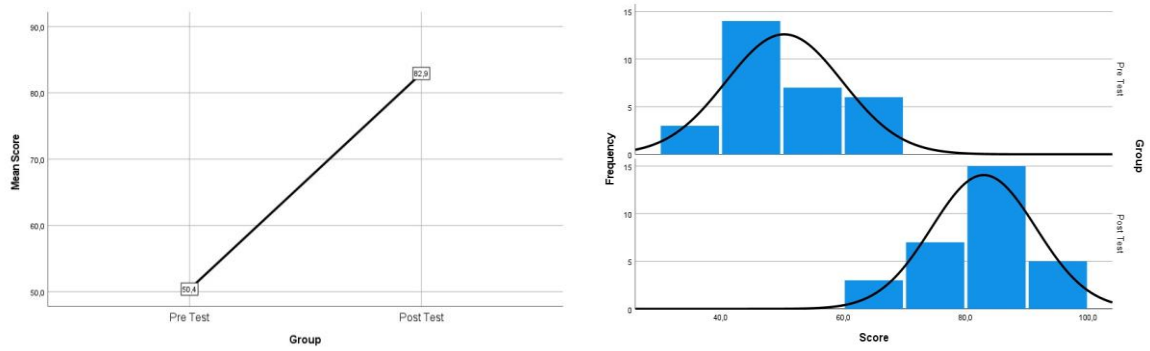
For the posttest based on the Q-Q Plot graph in Figure 2, it can be seen that the distribution of points is around and close to the diagonal line, and the characteristics of the diagram are bell-shaped and do not deviate to the right or left. This indicates that the posttest data is normally distributed as shown in Figure 2. Next, a homogeneity test was conducted to determine whether the population variance of the data between two or more data groups was the same or different, using the following testing criteria: If the significance value (sig) > 0.05, then the data distribution is said to be the same (homogeneous) or H0 is accepted and H1 is rejected. If the significance value (sig) < 0.05, then the data distribution is not homogeneous, or H1 is accepted and H0 is rejected.

Table 3. Results of the homogeneity test of pretest and posttest data

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Pretest and Posttest	Based on Mean	1.128	1	58	0.293
	Based on Median	0.692	1	58	0.409
	Based on the Median and with adjusted df	0.692	1	57.018	0.409
	Based on trimmed mean	1.129	1	58	0.292

Based on the results of the analysis of the variance homogeneity test output above, the significance value (sig) is greater than the value of $\alpha = 0.05$, namely 0.293 > 0.05. Therefore, based on the established testing criteria, it is concluded that H0 is accepted, which means that the data distribution is homogeneous.

Figure 3. Graphs and histograms of pretest and posttest homogeneity tests



Next, a hypothesis test was conducted using a paired t-test to determine whether there was a significant difference between students' pre-test learning outcomes before using event-based augmented reality media in social studies learning and students' post-test learning outcomes after using event-based augmented reality in social studies learning. The paired t-test was conducted using the following testing criteria: If the significance value (sig) > 0.05 or t-count < t-table, then it can be said that there is no difference in the average pre-test learning outcomes and post-test learning outcomes, or H0 is accepted, and H1 is rejected. If the significance value (sig) < 0.05 or t-count > t-table, then it can be said that there is a difference in the average pretest learning outcomes and posttest learning outcomes, or H1 is accepted, and H0 is rejected.

Table 4. Paired Samples Statistics

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	50.383	30	9.4970	1.7339

Posttest	82.923	30	8.5157	1.5548

Based on the results of the analysis of the paired samples statistics in Table 4, there is a summary of descriptive statistics from the two samples studied, namely the students' pretest and posttest learning outcomes. In the output table above, it is known that the number of respondents used as research samples was 30 students. In addition, the mean pretest score was 50.383, and the mean posttest score was 82.923. The pretest standard deviation was 9.4970, and the posttest standard deviation was 8.5157. The difference in the mean learning outcomes between the pretest and posttest results was observed in the use of augmented reality based on actual events in social studies learning.

Table 5. Paired Sample Test Results

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pretest-Posttest	-32.5400	13.9310	2.5434	-37.7419	-27.3381	-12.794	29	<.001

Based on the independent samples t-test results in Table 5, a significance value of 0.000 < 0.05 and a negative t-value of 12.862 were obtained, which can be interpreted as the pretest learning outcome average being lower than the posttest learning outcome average. Thus, the t-value of 8.862 > t-table 2.462. Based on the established testing criteria, it is known that H1 is accepted and H0 is rejected, which means that there is a difference in the average pre-test learning outcomes before using augmented reality media based on actual events in social studies learning and the post-test learning outcomes after using augmented reality media based on actual events in social studies learning.

After finding a difference in the average pretest learning outcomes before using augmented reality media based on actual events in social studies learning and the posttest learning outcomes after using augmented reality media based on actual events in social studies learning, the N-Gain value test was conducted. The N-Gain test was used to determine the effectiveness of using augmented reality media based on actual events in social studies learning. The categorization of N-Gain values can be determined based on the N-Gain value or the N-Gain value in percentage form. The following are Table 17 and Table 18 for the criteria and interpretation of N-Gain values.

Table 6. N-Gain score criteria

Skor Gain	Criteria
g > 0,7	High
0,3 < g ≥ 0,7	currently
g ≤ 0,3	Low

Table 7. Effectiveness of the N-Gain category

Presentase (%)	Interpretation
<40	Ineffective
40-55	Less Effective
56-75	Quite Effective
> 76	Effective

Table 8. Result N-Gain

Statistik Deskriptif					
	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	30	30.6	67.6	50.383	9.497
Post-test	30	62.4	97.7	82.923	8.5157
NGain score	30	.10	.95	.6327	.21303
NGain %	30	10.48	95.10	63.6746	21.30287
Valid N	30				

Based on the N-Gain results in Table 8, the N-Gain value obtained is 0.63. Based on the N-Gain value criteria table, the N-Gain value obtained falls within the moderate criteria. Meanwhile, when viewed from the percentage, the N-Gain score of 63% means that it is effectively included in the moderate category. In other words, it can be said that the use of augmented reality media based on actual events is quite effective in improving the social studies learning outcomes of seventh-grade junior high school students.

4. CONCLUSION

Augmented reality media based on current events has proven to be effective in social studies learning. The use of this media is able to provide a more contextual, interactive, and meaningful learning experience, so that students not only understand concepts theoretically, but are also able to relate them to real social phenomena. The integration of current events in augmented reality media encourages increased learning engagement, motivation, and critical thinking skills among students, which has a positive impact on social sciencies humanities learning outcomes. Thus, augmented reality media based on current events can be used as an alternative innovative learning media that is relevant to the demands of 21st-century learning and is worthy of wider implementation in SSH learning.

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