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THE EFFECT OF AUGMENTED REALITY (AR) MEDIA ON THE ABILITY OF HOTS IPAS IN CLASS V STUDENTS OF SDN GERIH 1

Tasya Dian Lestari[1a*], Miratu Chaeroh[2b], and Aulia Fajar Khasanah[3c]

[1]Elementary School Teacher Education, Faculty of Teacher Training and Education, STKIP Modern Ngawi, Jl. Ir. Soekarno No. 9 (West Ring Road) Grudo, Ngawi, 63216, Indonesia

[a]*E-mail: tasyadianlstr@gmail.com*
[b]*E-mail: miratuchaeroh95@gmail.com*
[c]*E-mail: aulia.fajar83@gmail.com*

(*) Corresponding Author
tasyadianlstr@gmail.com

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ABSTRACT
The low ability of Higher Order Thinking Skills (HOTS) students in science subjects, especially natural disasters that affect environmental change, shows the need for innovation in more interactive learning media. The use of conventional methods causes students to be less optimal in understanding concepts and solving hots-based problems. Augmented Reality (AR) learning Media is seen to be able to visualize concepts concretely and interactively so that it has the potential to improve students ' high-level thinking skills. This study aims to determine the effect of Augmented Reality (AR) learning media on the ability of HOTS students in Grade V of SDN Gerih 1. The research uses quantitative approach with quasi experiment method and non-equivalent control group design. The research sample consisted of 35 fifth grade students consisting of experimental class at Sdn Gerih 1 and control class at SDN Keraskulon 1. Data were collected through pretest and posttest hots test, then analyzed using normality test, homogeneity, Paired Sample T-Test, and SPSS-assisted Independent Sample T-Test. The results showed that learning media Augmented Reality (AR) significantly affect the ability of HOTS students. The average value of the experimental class increased from 63.75 to 77.25, while the control class from 48.67 to 46.00. The test results showed a significance value of 0.000 < 0.05, so that Augmented Reality (AR) learning media is effective in improving the ability of HOTS students in science subjects.

INTRODUCTION

Education is a fundamental process that plays an important role in the development of the individual and society. Based on Law No. 20 of 2003 on the National Education System, education is a conscious and planned effort to realize the learning atmosphere and the learning process so that students actively develop their potential, both in spiritual aspects of religion, self-control, personality, intelligence, noble character, and skills needed in community

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life, nation, and state. Strictly speaking, the function and purpose of National Education as stated in Article 3 of Law No. 20 of 2003 is to develop the ability and form a dignified national character and civilization in order to educate the life of the nation. Education is also the main foundation in forming superior human resources, character, and adaptive to the Times (Juita et al., 2024).

Along with the development of the era, Indonesia has been meSeiring with the development of the era, Indonesia has entered the era of the Industrial Revolution 4.0 which brought significant changes in various aspects of life including the education system entering the era of the Industrial Revolution 4.0 which brought significant changes in various aspects of life including the education system (Setyowati & Rahma, 2025). In line with the educational demands of the 21st Century, Learning no longer focuses on mastering factual knowledge alone, but also on developing Higher Order Thinking Skills (HOTS). HOTS become an important requirement in the era of globalization because students are required to be able to think critically, creatively, logically, and solve problems in everyday life (Muthoharoh, 2020). In the implementation of learning in elementary school, teachers face diverse classroom situations so that they are required to be sensitive to the characteristics of learners and be able to adjust the strategies, methods, and learning media used. An interesting and fun learning environment also influences the motivation and activeness of learners in finding and processing knowledge independently (Chaeroh et al., 2023).

Conventional learning methods that are still centered on lectures and the use of textbooks as the main source are often less able to attract attention and encourage active participation of learners, potentially inhibiting the development of their learning potential optimally (Khasanah et al., 2025). In line with this, the subject of natural and Social Sciences (IPAS) in elementary school has a strategic role in training high-level thinking skills (HOTS) learners. IPAS is an integration between natural and social sciences that emphasizes the connection of concepts with everyday life (Hidayatullah et al., 2025). Through learning science, students are expected to be able to observe various phenomena, analyze events, and draw logical conclusions. However, in practice, science learning is still often carried out traditionally by relying on textbooks and teacher verbal explanations (Syafi'e et al., 2025), so that the active involvement of learners in the learning process has not been developed optimally.

This condition causes less contextual and interactive learning. As a result, Student Involvement is low and learning motivation tends to decrease as evidenced by Nurjannah & Mediatati (2024) which shows that the learning activity of fourth grade students in IPAS learning only reaches 65.56% based on observation and 63.97% based on questionnaires, which is still below the learning success criteria of 75%.

Based on observations, found in learning science at SDN Gerih 1, especially in Class V students, the results of learning evaluation of HOTS capabilities on natural disaster materials that affect environmental change are still relatively low. Based on the assessment data, of the 20 students, there were 18 students who obtained scores below the KKTP, which was set at 70, while only 2 students achieved completeness. The average grade is also still at 50.04, which shows that the ability of learners in solving hots-based problems is not optimal. Emerging abilities are still dominated by low-level cognitive domains such as remembering and understanding. Learners experience difficulties when faced with problems that demand the ability to analyze, evaluate, and create. In addition, the involvement of students in the learning process is still limited, characterized by low activity to ask and discuss. This condition shows that the purpose of learning science in developing high-level thinking skills (HOTS) has not been fully achieved. If this condition is left unchecked, learners have the potential to experience difficulty in following learning at a higher level because they are less accustomed to critical and analytical thinking.

The low ability of HOTS learners can not be separated from several factors that affect the learning process (Beddu, 2019). One of the main factors is the use of methods and learning media that are still conventional and less varied (Yuniarti et al., 2023). Teachers tend to use lecture and textbook methods as the main learning resources so that learning becomes one-way and less interesting (Rivalina & Siahaan, 2020). The use of media, especially on natural disaster materials, affects environmental changes that are asbestos. In addition, abstract science materials are difficult to understand without concrete visualization (Swistiyawati & Indrayani, 2024). he limitations of Innovative Learning media and the lack of exploration opportunities have an impact on the low level of high thinking skills of learners (Sahidin & Pradjono, 2022).

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The problem of low student HOTS is an urgent issue that needs to be addressed immediately according to the demands of 21st Century Education. Learners are required not only to understand the material but also to be able to process, analyze, evaluate, and apply knowledge in various real situations (Mashudi, 2021). HOTS is an important skill in the world of education, social life, and the world of work that demands the ability to think critically and creatively (Primayana, 2020). If it is not developed since elementary school, learners will be less prepared to face learning challenges in the future. Low HOTS also have an impact on the low quality of science learning outcomes that demand conceptual understanding and high-level reasoning (Hulaipah et al., 2023). Therefore, the improvement of HOTS is a priority through innovative strategies and Learning media (Maslihah et al., 2025).

One of the solutions that can be applied to improve the HOTS of learners is the use of technology-based learning media, especially Augmented Reality (AR). AR media is able to incorporate virtual objects into the real world interactively so that abstract IPAS concepts can be visualized concretely (Khulaifatuzzahra et al., 2024). The use of AR encourages learners to actively observe, analyze, evaluate, and solve problems. In addition, interactive and fun learning experiences can increase students ' interest and motivation to learn. Thus, AR media has the potential to increase the ability of HOTS learners optimally (Ferdiansyah et al., 2023).

The advantage of Augmented Reality learning media lies in its ability to deliver interactive, interesting, and contextual learning experiences (Apriliyanto, 2025). R allows learners to interact directly with learning objects that are presented visually and realistically. This helps learners understand the concept of abstract science to be more concrete and easy to understand. The use of AR media also increases the involvement of students in the learning process. This innovation is a novelty value in science learning oriented to the development of HOTS (Darmawan & Firdausa, 2024). Learning focuses not only on the end result, but also on the learner's thought process.

Various previous studies have shown that the use of augmented Reality-based learning media contributes positively to the increase in HOTS learners. Research Djati et al. (2022) shows that the application of AR media is able to train students ' analytical, evaluation, and creation skills. This is due to AR's ability to visualize abstract concepts concretely and interactively. Similar findings were also presented by Riska & Qurrotu (2024) which shows that AR media has a significant effect on students ' learning outcomes and critical thinking skills. These results reinforce the effectiveness of AR in learning science. Therefore, relevant media AR used to develop hots learners.

Based on the description, increasing the ability of HOTS learners in science subjects, especially natural disaster material to affect environmental change is an urgent need. Augmented Reality Learning Media is seen as the right solution to overcome the low HOTS of Class V students of SDN Gerih 1. AR Media not only enhances understanding of concepts, but also encourages learners to think critically and analytically through interactive learning experiences. Learning is becoming more relevant to the educational demands of the 21st century. Therefore, research on the effect of the use of Augmented Reality media on the ability of HOTS in science subjects is important to do. This study is expected to influence the use of Augmented Reality (AR) learning media on the ability of HOTS natural disaster subjects to affect environmental changes in Class V students.

METHOD

This research was conducted in January-May 2026 at two elementary schools in Ngawi regency, East Java, namely SDN Gerih 1 as an experimental class and SDN Keraskulon 1 as a control class. SDN Gerih 1 was chosen because of the readiness of educators and students in utilizing technology-based media, especially Augmented Reality (AR), and the school's openness to learning innovation. Meanwhile, SDN Keraskulon 1 was chosen as the control class because it has relatively comparable characteristics, such as class level, curriculum, and learning conditions of Class V.

This study uses a quantitative approach with quasi experiment method using non-equivalent control group design, namely experimental design without randomization of research subjects by utilizing existing classes as experimental and control groups (Sugiyono, 2023). The experimental class was given treatment in the form of the use of Augmented Reality (AR) learning media in science subjects on natural disaster materials that affect environmental change, while the control class used conventional learning without AR media.

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The study population includes all students in Class V in both schools with a total of 35 students, consisting of 20 students in Class V of SDN Gerih 1 as an experimental class and 15 students in Class V of SDN Keraskulon 1 as a control class. Sampling technique using saturated sampling (total sampling) because all members of the population were sampled considering the relatively small number of population (Sugiyono, 2023).

The technique of data collection was done using higher Order Thinking Skills (HOTS) in the form of pretest and posttest. Pretest was given before treatment to determine the initial ability of students, while posttest was conducted after learning to measure changes in HotS ability. The test instrument is in the form of 40 multiple choice questions prepared based on the Revised Bloom Taxonomy indicators, especially the cognitive realm of applying (C3), analyzing (C4), and evaluating (C5) on natural disaster material that affects environmental changes in Class V Science subjects.

Before being used, the research instrument is tested through validity, reliability, difficulty level, and problem difference power tests to ensure the quality of the measurement instrument. Validity test was conducted using Pearson product moment correlation, while reliability was analyzed using Cronbach's Alpha with the help of SPSS 27. In addition, difficulty and difference power analysis is used to ensure that the problem is able to accurately measure the ability of HOTS ((Sugiyono, 2023); (Arikunto, 2021)).

Data analysis was conducted through descriptive statistics to see an overview of student learning outcomes based on average grades, minimum-maximum grades, and standard deviations. Furthermore, prerequisite tests were conducted, namely the Shapiro-Wilk normality test and Levene's homogeneity Test to ensure the data meet the assumptions of parametric statistics. Hypothesis testing was conducted using Paired Sample T-Test to determine the difference between pretest and posttest scores in each group and Independent Sample T-Test to compare the average posttest results between experimental and control classes at a significance level of 0.05 (Sugiyono, 2023). The results of the analysis were used to determine the effect of the use of Augmented Reality (AR) learning media on the ability of Higher Order Thinking Skills (HOTS) Class V students in science subjects.

Chart 1. IPAS multiple choice grid

No	Tujuan Pembelajaran	Indikator	Aspek Kognitif	Nomor Soal	Jenis soal
1	Peserta didik dapat menganalisis bencana alam yang dapat memengaruhi perubahan lingkungan (C4)	menerapkan pengetahuan tentang ciri jenis bencana alam untuk memprediksi perubahan lingkungan di sekitar tempat tinggalnya	C3	1, 2, 3, 4, 5	Pilihan Ganda
		menganalisis hubungan sebab-akibat antara bencana alam dengan perubahan lingkungan	C4	6, 7, 8, 9, 10, 11, 12	
		mengevaluasi perubahan lingkungan akibat bencana alam berdasarkan kerusakan ekosistem dan dampak jangka panjang	C5	13, 14, 15, 16, 17, 18, 19, 20	
2	Peserta didik dapat menyimpulkan upaya penanganan/mitigasi bencana alam dalam meminimalkan perubahan lingkungan (C5)	memilih konsep mitigasi untuk merancang langkah pencegahan sederhana	C4	21, 22, 23, 24, 25, 26, 27	Pilihan Ganda
		menganalisis keberhasilan upaya mitigasi dalam mengurangi perubahan lingkungan	C4	28, 29, 30, 31, 32, 33, 34	
		mengevaluasi kekurangan upaya mitigasi terhadap bencana alam berdasarkan perubahan lingkungan yang masih terjadi	C5	35, 36, 37, 38, 39, 40	

RESULT AND DISCUSSION

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This study involved 35 fifth grade students consisting of 20 experimental class students at Sdn Gerih 1 and 15 Control class students at SDN Keraskulon 1. The experimental class was treated using Augmented Reality (AR) learning media, while the control class used conventional learning without AR media. Research Data obtained through the ability test Higher Order Thinking Skills (HOTS) in the form of pretest and posttest on the subject of natural disaster science materials that affect environmental change.

The results of descriptive statistics showed an increase in HotS capabilities in the experimental class after the use of Augmented Reality (AR) learning media.

Chart 2. Descriptive Statistical Test Results

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Eksperimen	20	30	90	63.75	15.293
Posttest Eksperimen	20	45	100	77.25	15.345
Pretest Kontrol	15	25	80	48.67	15.174
Posttest Kontrol	15	15	85	46.00	18.727

Source: Results Of Research Data (2026)

Based on Table 2, the average hots score of students in the experimental class increased from 63.75 to 77.25 after the use of Augmented Reality (AR) media. Meanwhile, the control class has changed from 48.67 to 46.00. This finding shows that learning using AR Media provides better hots capability improvement compared to conventional learning.

Before being used as a data collection tool, the research instruments in the form of 40 multiple choice questions were first tested for quality through validity, reliability, difficulty level of the questions, and power difference. The results of the validity test showed that of the 40 questions tested, as many as 20 questions were declared valid and worthy of use in research, while the other 20 questions were declared invalid. Furthermore, the results of the reliability test obtained Cronbach's Alpha value of 0.933, which indicates that the instrument is in the category of very reliable so that it has a very high level of consistency in measuring the ability of Higher Order Thinking Skills (HOTS) students.

The results of the difficulty analysis showed that most of the questions are in the medium category, which is as many as 38 questions (95%), while 2 questions (5%) are in the easy category. The composition shows that the instrument has a level of difficulty that is proportional and appropriate to measure the ability of students. Meanwhile, the results of the power difference test showed that as many as 20 Questions (50%) were in the good category, 9 questions (22.5%) were categorized as very good, 5 questions (12.5%) were categorized as sufficient, and 3 questions (7.5%) were categorized as bad, and there were 2 questions (5%) that had negative values so that they needed to be revised or not used. Overall, the majority of the questions were in the good and excellent category, which shows that the instrument is able to distinguish students with high and low abilities effectively. Thus, the research instrument was declared feasible to be used to measure the ability of Higher Order Thinking Skills (HOTS) students in the subject of science material natural disasters affect environmental change (Phase C).

Furthermore, a normality test was conducted to determine whether the data on the ability of Higher Order Thinking Skills (HOTS) students in science subjects were normally distributed or not. This normality test aims to ensure that the pretest and posttest data in experimental and control classes meet the assumptions of parametric statistics before hypothesis testing. Data is normally distributed if the value of significance (Sig.) > 0.05, while if the value of significance (Sig.) < 0.05 then the data is not normally distributed. In this study, normality testing was conducted with the help of IBM SPSS Statistics 27 application using the Shapiro-Wilk test, because the number of research samples was less than 50 respondents. The results of testing the normality of HOTS ability data of Class V students after the application of Augmented Reality (AR) learning media can be seen in Table 3.

Chart 3. Experimental and control Class normality test results

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Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Kode	Statistic	df	Sig.	Statistic	df	Sig.
Hasil Nilai HOTS Siswa	Pretest Kelas Eksperimen	.116	20	.200*	.968	20	.707
	Posttest Kelas Eksperimen	.168	20	.140	.916	20	.084
	Pretest Kelas Kontrol	.149	15	.200*	.969	15	.839
	Posttest Kelas Kontrol	.136	15	.200*	.966	15	.791

Source: Results Of Research Data (2026)

Based on the results of the normality test presented in Table 3, the value of significance (Sig.) Shapiro-Wilk for experimental class pretest of 0.707 and posttest of 0.084. In the control class, the pretest significance value of 0.839 and 0.791 for posttest. All significant values are greater than 0.05. Thus, it can be concluded that the pretest and posttest data in the experimental class and the control class is normally distributed. Therefore, the data meet the assumption of normality and can proceed to the analysis of parametric statistics.

The next step in the prerequisite test is to perform a homogeneity test which aims to determine whether the variance of data between research groups have similarities (homogeneous). In this study, homogeneity test was conducted to compare the variance of Higher Order Thinking Skills (HOTS) ability data of students in science subjects between experimental classes that received treatment using Augmented Reality (AR) learning media and control classes that followed conventional learning without AR media. Homogeneity testing was done with the help of IBM SPSS Statistics 27 for Windows application using Levene's Test for Equality of Variances. The basis for decision making is based on the value of significance (Sig.), that is, if the significance value < 0.05 then the data is declared inhomogeneous, whereas if the significance value > 0.05 then the data is declared homogeneous. The results of the homogeneity test of HOTS ability data for Class V Science subjects can be seen in Table 4.

Chart 4. Homogeneity Test

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Hasil Nilai HOTS Siswa	Based on Mean	.278	3	66	.841
	Based on Median	.288	3	66	.834
	Based on Median and with adjusted df	.288	3	62.831	.834
	Based on trimmed mean	.276	3	66	.843

Source: Results Of Research Data (2026)

Based on the homogeneity test table presented in Table 4 above, a significance value of 0.841 was obtained. The value is greater than 0.05, so it can be concluded that the variance of the data is homogeneous. Thus, the data meet one of the conditions for parametric testing.

After the data is declared to be normally distributed and homogeneous based on the results of the previous prerequisite test, the next step is to perform a hypothesis test to determine the effect of the use of Augmented Reality (AR) learning media on the ability of Higher Order Thinking Skills (HOTS) of Class V Science subjects on natural disasters affecting environmental change (Phase C). Hypothesis testing was conducted using parametric statistics with the help of IBM SPSS Statistics 27.

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Hypothesis analysis in this study used two types of t-test, namely paired sample t-test and independent sample t-test. Paired sample t-test is used to determine the difference in the ability of HOTS students before and after treatment in the experimental class through the comparison of pretest and posttest values. Meanwhile, the independent sample t-test was used to determine the difference in HotS capabilities between the experimental class that obtained learning using Augmented Reality (AR) media and the control class that followed conventional learning.

The basis of decision making on hypothesis testing is based on the value of significance (GIS. 2-tailed) with a significance level of 0.05. If the value of significance < 0.05, then the rejected and accepted H_2 H_1, which means there is a significant effect or difference. On the other hand, if the significance value is > 0.05, then H_2 is accepted and H_1 is rejected, which means there is no significant effect or difference. The results of hypothesis testing are shown in Table 5 and Table 6.

The first is the paired sample t-test test conducted to determine the increase in the ability of HOTS students in the experimental class after applying Augmented Reality (AR) learning media. The test was conducted by comparing the value of pretest and posttest experimental class students.

Tabel 5. Hasil Uji *Paired Sample T-Test*

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Pretest - Posttest	-13.500	8.599	1.923	-17.525	-9.475	-7.021	19	.000

Source: Results Of Research Data (2026)

Based on the test results of paired sample t-test in Table 5 above, the value of significance (Sig. 2-tailed) of 0.000, less than the significance level of 0.05 (0.000 < 0.05). In addition, the calculated t value is -7.021 with a mean difference of -13.500, which indicates that the posttest value is higher than the pretest. Thus, it can be concluded that there is a significant increase in the ability of Higher Order Thinking Skills (HOTS) students after applying Augmented Reality (AR) learning media to IPAS subjects.

The second is the independent sample t-test test conducted to determine the difference in HotS capabilities between experimental and control classes based on posttest results. This test aims to determine the effectiveness of the use of Learning media Augmented Reality (AR) compared to conventional learning.

Chart 6. Independent Sample T-Test Results

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper

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Posttest	Equal variances assumed	.646	.427	5.426	33	.000	31.250	5.760	19.532	42.968
	Equal variances not assumed			5.271	26.667	.000	31.250	5.929	19.077	43.423

Source: Results Of Research Data (2026)

The test results of the independent sample t-test in Table 6 above, it can be concluded that the value of significance (Sig. 2-tailed) by 0.000, smaller than 0.05 (0.000 < 0.05). These values indicate a significant difference in HotS ability between students in the experimental class and the control class. In addition, the mean difference value of 31,250 indicates that the average ability of HOTS students in the experimental class is higher than the control class. Thus, it can be concluded that the use of Augmented Reality (AR) learning media has a significant effect on the ability of Higher Order Thinking Skills (HOTS) of science subjects for Class V students.

Based on the results of data analysis and hypothesis testing, it can be concluded that the use of Augmented Reality (AR) learning media has a significant effect on the ability of Higher Order Thinking Skills (HOTS) of Class V students in the subject of Natural Disaster Science material affects environmental change (Phase C). This is evidenced by the results of the paired sample t-test Test which showed a calculated t value of -7.021 greater than the table t (2.093) and a significance value of 0.000 < 0.05, which showed a significant difference between the ability of HOTS students before and after treatment. In addition, there was an increase in the average value of students in the experimental class from 63.75 during the pretest to 77.25 in the posttest, which indicates an increase in HotS capabilities after the application of AR learning media. Thus, the null hypothesis (H_0) was rejected and the alternative hypothesis (H_1) was accepted, so that Augmented Reality (AR) learning media proved effective in improving the ability of Higher Order Thinking Skills (HOTS) students in IPAS subjects.

The results showed that the use of Augmented Reality (AR) learning media has a significant effect on the ability of Higher Order Thinking Skills (HOTS) of Class V students in the subject of Natural Disaster Science Materials affect environmental change (Phase C). This can be seen from the increase in the average value of students in the experimental class from 63.75 on the pretest to 77.25 on the posttest, while in the control class did not show a significant increase. The findings were reinforced through the results of paired sample t-test which showed a significance value of 0.000 < 0.05, so that there is a significant difference between the ability of HOTS students before and after treatment using AR media. In addition, the results of the independent sample t-test also showed a significance value of 0.000 < 0.05, which indicates a significant difference in HotS capabilities between experimental and control classes. Thus, Augmented Reality (AR) learning media proved to be more effective than conventional learning in improving students ' high-level thinking skills in science subjects.

The improvement of students HOTS ability can be explained through the characteristics of science learning that emphasize the relationship between scientific concepts and real phenomena in the environment around students. In the material natural disasters affect Environmental Change, students are not only required to understand the concept theoretically, but also be able to analyze cause-and-effect relationships, evaluate environmental impacts, and understand disaster mitigation measures. In this context, the use of Augmented Reality (AR) media helps students visualize natural disaster phenomena more concretely through the display of interactive three-dimensional virtual objects. The visualization makes it easier for students to understand abstract concepts so that the learning process becomes more meaningful and contextual ((Suhelayanti et al., 2023), (Nasution et al., 2020)).

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The findings of this study are also in line with the revised Bloom taxonomy theory developed by Anderson and Krathwohl, that the ability of Higher Order Thinking Skills (HOTS) includes the ability to analyze (C4), evaluate (C5), and create (C6). Through the use of AR media, students gain a more active learning experience because they not only receive information verbally, but also observe the visualization of phenomena directly, identify the causes of disasters, and evaluate their impact on the surrounding environment. This condition supports the theory of Constructivism which emphasizes that knowledge is actively built through the learning experience of learners. Thus, AR media not only serves as a visual aid, but is also able to stimulate students ' critical, reflective, and analytical thinking skills in the learning process (Subarjo et al., 2024).

The results of this study are in line with previous research that shows the effectiveness of Augmented Reality (AR) media in improving learning outcomes and high-level thinking skills of students. Research by Dewi et al. (2024showed that the use of AR media had a significant effect on the learning outcomes of elementary school students with an average learning outcome of the experimental class higher than the control class (Dewi et al., 2024). In addition, Nuraini's (2021) research also proves that AR media is able to increase the ability of Higher Order Thinking Skills (HOTS) of learners through more visual, interactive, and contextual learning (Nuraini, 2021). Thus, the results of this study reinforce previous findings that the use of augmented Reality (AR) learning media has a positive contribution in improving the ability of Higher Order Thinking Skills (HOTS) students, especially in learning science in elementary school.

CONCLUSION

Based on the results of research and data analysis, it can be concluded that the use of Augmented Reality (AR) learning media has a significant effect on increasing the ability of Higher Order Thinking Skills (HOTS) of Class V students in the subject of natural disaster science materials affecting environmental change (Phase C) at Sdn Gerih 1 Ngawi Regency as an experimental class compared to classes that do not use AR media. This is evidenced by an increase in the average value of 63.75 on the pretest to 77.25 on the posttest, as well as the results of the paired sample t-test which showed a significance value of $0.000 < 0.05$ so that there is a significant difference between before and after treatment. The use of Augmented Reality (AR) media helps students understand concepts more concretely, interactively, and contextually through the visualization of three-dimensional objects, making it easier for students to analyze, evaluate, and understand cause-and-effect relationships in natural disaster materials. Thus, Augmented Reality (AR) learning media can be used as an effective alternative learning media to improve the ability of Higher Order Thinking Skills (HOTS) students in learning science in elementary school.

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