

THE EFFECT OF AUGMENTED REALITY USING ASSEMBLR EDU ON JUNIOR HIGH SCHOOL STUDENTS' MATHEMATICS LEARNING OUTCOMES

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ABSTRACT

This study aims to determine the effect of using Augmented Reality (AR) learning media supported by Assemblr EDU on the mathematics learning outcomes of students at UPTD SMP Negeri 1 Gunungsitoli Barat. This is a quantitative study using a quasi-experimental method with a Non-Equivalent Control Group Design. The study population consisted of seventh-grade students, and the sample comprised two classes: VII-A as the experimental class and VII-B as the control class. The sample was selected using probability sampling with a cluster random sampling technique. The instrument used in this study was an essay-type test. The mean score on the pre-test for the experimental class was 44.38 and for the control class was 42.50, while the mean score on the post-test for the experimental class was 82.78 and for the control class was 64.81. Based on the results of data analysis using the t-test at a 5% significance level, the calculated t-value was 4.769 and the critical t-value was 2.021. Since the calculated t-value is greater than the critical t-value – that is, $4.769 > 2.021$ – H_0 is rejected and H_a is accepted. Thus, it can be concluded that Augmented Reality using Assemblr EDU has an effect on junior high school students' mathematics learning outcomes.

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1. INTRODUCTION

Mathematics is a required subject that must be studied at every educational level, from elementary school through high school and even college [1]. Mathematics is a subject that requires students to think logically, diligently, critically, creatively, and proactively, so that these characteristics are expected to develop in students who study mathematics [2]. Mathematics also plays a vital role in daily life because, through mathematics education, students are equipped with and develop the ability to think logically, flexibly, and accurately when solving problems they encounter [3]. One area of mathematics that requires a high level of visualization and spatial reasoning is geometry, particularly three-dimensional shapes. This subject requires students to understand three-dimensional objects, geometric elements, nets, surface area, and volume. Due to the nature of this material, students need strong visualization skills to grasp the concepts being taught.

According to data from the 2024 Indonesian Education Report Card, the proportion of students who achieved the minimum numeracy competency increased from 45.24% in 2022 to 62.45% in 2023 and reached 67.94% in 2024 [4]. Although this shows a positive trend, the data indicates that there are still some students who have not yet achieved the expected minimum numeracy competency. This situation suggests that students' ability to understand concepts, reason, and apply mathematical knowledge in various everyday contexts still needs to be improved. In the context of school learning,

these abilities can be reflected in students' learning outcomes, particularly in the cognitive domain related to the understanding and mastery of mathematical concepts.

A similar issue was also found at the UPTD SMP Negeri 1 Gunungsitoli Barat. Based on observations and documentation of the End-of-Semester Summative Assessment (SAS) scores in mathematics for seventh-grade students during the Odd Semester of the 2024/2025 academic year, student achievement in mathematics remains relatively low. This is evident from the SAS scores in mathematics, the majority of which have not yet met the Learning Objective Achievement Criteria (KKTP) set at 75. In Class VII-A, only 8 out of 22 students met the standard, with an average score of 67; in Class VII-B, only 6 out of 20 students met the standard, with an average score of 63; and in Class VII-C, only 4 out of 20 students met the standard, with an average score of 61. These results indicate the need for instructional approaches that help students understand mathematical concepts in a more concrete way. This is especially true for the topic of solid geometry, where students are required to visualize three-dimensional objects, understand the relationships between elements, and connect visual representations with mathematical concepts. Therefore, learning experiences are needed that can present three-dimensional objects more concretely so that students can observe and explore the characteristics of solids more tangibly.

Based on the results of initial interviews with the 7th-grade math teacher at UPTD SMP Negeri 1 Gunungsitoli Barat, it was found that students' basic math skills still vary widely. The teacher noted that some students struggle to understand abstract mathematical concepts, particularly in topics that require visualization and reasoning skills. Students also stated that they find it easier to understand the material when lessons are accompanied by pictures, illustrations, or media that can be seen directly. This situation indicates that the use of visual and interactive learning media needs to be increased to make the learning process more effective. Therefore, improvements are needed in the mathematics learning process so that learning takes place more effectively and innovatively to enhance understanding and support student learning outcomes. Good learning outcomes can be achieved when students have a high interest in learning, as this interest helps them more easily understand the material presented during the learning process [5]. One supporting element that can be utilized to improve students' thinking skills in the learning process is instructional media [6].

One learning tool that can be used to help students understand abstract concepts is Augmented Reality (AR). Augmented Reality is a technology-based learning tool capable of presenting three-dimensional objects visually and interactively, thereby allowing students to interact directly with the displayed objects and facilitating a more concrete understanding of the material [7]. This technology also offers advantages in terms of interactivity because it uses markers as triggers to display specific three-dimensional (3D) objects when the smartphone camera is pointed at them [8]. Through this mechanism, students can observe and explore learning materials directly with the help of easily accessible digital devices. One alternative that can be used in the development of AR-based learning media is Assemblr EDU, which plays a role in improving the quality of the learning process and student learning outcomes [9]. Given the low levels of student achievement in mathematics and the need for learning media capable of visualizing abstract concepts more concretely, the use of AR-based learning media through Assemblr EDU is important to implement in mathematics education. The use of this medium is expected to help students understand geometric concepts more easily, increase student engagement in the learning process, and have a positive impact on mathematics learning outcomes [7], [9].

Assemblr EDU is a 3D application that supports the use of scanned images and can be accessed via desktop computers, laptops, or Android devices to facilitate a more effective learning process, thereby fostering student creativity and presenting learning materials in a more engaging way [6]. Through this app, learning activities become more enjoyable and facilitate interaction between teachers and students. Assemblr EDU can be accessed via smartphone and offers both free and paid services. This platform enables educators to design learning activities that are more interactive, collaborative, and enjoyable through the use of three-dimensional (3D) technology and Augmented Reality [10]. With the help of 3D and AR technology, students can visualize three-dimensional shapes realistically, observe them from various perspectives, and understand geometric concepts more deeply and contextually. The use of Assemblr EDU in teaching solid geometry aligns with the principles of the Merdeka Curriculum, which prioritizes meaningful learning experiences, student-centered learning, and the use of technology to support differentiated instruction tailored to students' diverse needs and learning styles.

A number of studies have shown that the use of Augmented Reality (AR)-based learning media has a positive impact on the learning process and outcomes in mathematics and science at various educational levels. The use of AR through the Assemblr EDU platform can help elementary school students understand mathematical concepts, particularly in topics that require spatial visualization skills [6]. The implementation of 3D-object-based AR with the help of Assemblr EDU also contributes to improved student learning outcomes and enhances motivation and active participation during the

learning process [11]. The use of AR supported by Assemblr EDU, combined with the Realistic Mathematics Education (RME) approach, has been reported to improve students' understanding of three-dimensional shapes because students can observe and manipulate geometric objects interactively [12]. Nevertheless, studies on the integration of AR technology into mathematics education remain general in nature and have not specifically examined the use of Assemblr EDU or its application at the junior high school level [13]. Furthermore, research that has implemented AR-based learning media at the junior high school level has primarily focused on science subjects and has not specifically addressed mathematics education [14].

Although the use of AR facilitated by Assemblr EDU has been extensively studied, previous research has shown variations in educational levels, learning materials, and the types of activities integrated with this technology. This study is unique in its application of AR facilitated by Assemblr EDU through marker scanning to display three-dimensional cubes and rectangular prisms in seventh-grade junior high school mathematics instruction. These three-dimensional objects are not only used as visualization tools but are also integrated with Student Worksheets (LKM) and observation activities to help students directly explore the characteristics, elements, and concepts of cubes and rectangular prisms. Thus, the uniqueness of this study lies in the integration of marker-based AR, Assemblr EDU, three-dimensional objects, and worksheet-assisted activities in teaching cubes and rectangular prisms at the junior high school level. Based on the above description, the researcher is interested in conducting a study titled "The Effect Of Augmented Reality Using Assemblr Edu On Junior High School Students' Mathematics Learning Outcomes."

2. RESEARCH METHOD

This study employs a quantitative approach using a quasi-experimental research design. The research design utilizes a quasi-experimental method with a Non-Equivalent Control Group Design, which involves two groups: an experimental class and a control class. This design was used to determine the effect of Augmented Reality (AR) learning media supported by Assemblr EDU on mathematics learning outcomes between the experimental group, which used Augmented Reality (AR), and the control group, which used conventional learning methods.

This study was conducted at UPTD SMP Negeri 1 Gunungsitoli Barat, Gunungsitoli Barat Subdistrict, Gunungsitoli City, North Sumatra Province. The population in this study consisted of all seventh-grade students at UPTD SMP Negeri 1 Gunungsitoli Barat for the 2025/2026 academic year, comprising three classes with a total of 62 students. The research sample consisted of two classes – the experimental class and the control class—selected using cluster random sampling. The instructional materials used included the Learning Objective Flowchart, teaching modules, Student Worksheets, test outlines, test items, and answer keys. The research instrument consisted of an essay-type mathematics achievement test comprising a pretest and a posttest. Before use, the test instruments first underwent a process of logical validation and pilot testing. The pilot testing was conducted to determine the suitability of the questions through tests of validity, reliability, difficulty level, and discriminative power. Data collection in this study was conducted through written essay-type tests administered to the experimental and control classes.

The data analysis techniques used in this study involved descriptive statistics and inferential statistics. Descriptive statistics were used to describe the students' mathematics learning outcomes in the experimental and control classes through the mean, standard deviation, and variance of the pretest and posttest scores. Furthermore, inferential statistics were used to test the research hypotheses. Student learning outcome data were obtained from pretest and posttest scores, which were then converted into final scores. Before conducting the hypothesis test, the data were first tested for normality and homogeneity as prerequisite tests for analysis. The normality test was conducted using the Shapiro-Wilk test with a 5% significance level to determine whether the data were normally distributed, while the homogeneity test was conducted using the test for homogeneity of variances to determine whether the two groups had homogeneous variances. The data were considered normally distributed if the significance value was > 0.05 and were considered homogeneous if the significance value was > 0.05 . After meeting the prerequisite tests, hypothesis testing was conducted using an independent samples t-test at a 5% significance level to determine the effect of Augmented Reality (AR) assisted by Assemblr EDU on students' mathematics learning outcomes.

The hypothesis is tested at a significance level of 5% or $\alpha = 0.05$. If the calculated t-value is greater than the critical t-value, then H_0 is rejected and H_a is accepted. This means that the use of Assemblr Edu-assisted Augmented Reality (AR) learning media has an effect on students' mathematics learning outcomes. If the significance level is less than 0.05, then H_0 is rejected and H_a is accepted. Conversely, if the significance value is ≥ 0.05 , then H_0 is accepted and H_a is rejected.

3. RESEARCH RESULTS AND DISCUSSION

3.1 Research result

The data obtained in this study consisted of students' mathematics achievement data collected through pretests and posttests administered to the experimental and control classes. The research data were analyzed using descriptive and inferential statistics.

Descriptive statistics were used to determine the profile of students' mathematics learning outcomes before and after the intervention. The pretest results for the experimental and control classes are presented in Table 1.

Table 1. Descriptive Statistics of Experiment and Control Pretest

Class	N	Mean	Standard Deviation	Varians
Experimental	22	44,38	17,377	300,558
Control	20	42,50	22,243	494,737

Based on the calculation results in table 1 above, it can be seen that there is a difference in the value of the initial test results for the experimental class and the control class. The average score of the experimental class is 44.38 while for the control class with an average score of 42.50, the standard deviation in the experimental class is 17.377 while the standard deviation in the control class is 22.243, and the variant for the experimental class is 300.558 while the variant for the control class is 494.737.

Furthermore, after the learning process was carried out, both classes were given a posttest to find out the students' mathematics learning results. The results of the posttest of the experimental class and the control class are presented in Table 2.

Table 2. Descriptive Statistics of Experiment and Control posttest

Class	N	Mean	Standard Deviation	Varians
Experimental	22	82,78	10,451	109,206
Control	20	64,81	13,874	192,479

Based on the table above, there is a difference between the value of the final test results in the experimental class and the control class. The average score of the experimental class is 82.78 while the average score in the control class is 64.81, the standard deviation in the experimental class is 10.451 while in the standard deviation in the control class is 13.874, and the variant for the experimental class is 109.206 while the variant of the control class is 192.479.

Before the hypothesis test is carried out, a prerequisite test is first carried out, namely the normality test and the homogeneity test.

The normality test is carried out to find out whether the data on students' mathematics learning outcomes are distributed normally or not. The results of the normality test are presented in Table 3 below.

Table 3. Normality Test Results

Class	Test	$L_{\text{calculated}}$	L_{table}	Remarks
Experimental	Beginning	0,167	0,183	Normal
	End	0,168		Normal
Control	Beginning	0,137	0,190	Normal
	End	0,154		Normal

Based on Table 3 above, the results of the normality test for the pre-test scores of the experimental class were $0.167 < 0.183$ and for the control class $0.137 < 0.190$, while for the post-test scores, the experimental class was $0.168 < 0.183$ and the control class was $0.154 < 0.190$. Since the calculated L-value is less than the table L-value at a 5% significance level ($\alpha = 0.05$), the data from the pre-test and post-test scores for both the experimental and control classes are normally distributed. Thus, the data meet the requirements to proceed to the homogeneity test.

The homogeneity test was conducted to determine whether the data from the experimental and control groups have homogeneous variances. The results of the homogeneity test are presented in Table 4 below.

Table 4. Homogeneity Test Results

Tes	Class	Varians	$F_{\text{calculated}}$	F_{table}	Remarks
Beginning	Experimental	300,558	1,646	2,109	homogeneous
	Control	494,737			
End	Experimental	109,216	1,762	2,109	homogeneous
	Control	192,479			

Table 4 above shows the results of the homogeneity test for the pre-test scores of the experimental and control groups, yielding an F-calculated value of 1.646 and an F-table value of 2.109. Since $F_{\text{calculated}} < F_{\text{table}}$, the samples are homogeneous. The homogeneity test for the post-test scores of the experimental and control groups yielded an F-calculated value of 1.762 and an F-table value of 2.109. Since $F_{\text{calculated}} < F_{\text{table}}$, the samples are homogeneous. Thus, the data meet the requirements for hypothesis testing using the t-test.

Hypothesis testing in this study was conducted using a parametric statistic, namely the independent samples t-test with a two-tailed test. The test was conducted at a 5% significance level or a 95% confidence level with 40 degrees of freedom (df). Based on the one-tailed hypothesis test calculations, the calculated t-value was 4.769 and the critical t-value was 2.021. Since $t_{\text{calculated}} = 4.769 > t_{\text{table}} = 2.021$, we reject H_0 and accept H_a , which means that the use of Augmented Reality learning media supported by Assemblr EDU has an effect on the mathematics learning outcomes of students at UPTD SMP Negeri 1 Gunungsitoli Barat.

3.2 Discussion

The results of the study indicate that the use of Augmented Reality (AR) learning media supported by Assemblr EDU has an impact on students' mathematics learning outcomes. This is evident from the difference in average final test scores between the experimental class and the control class. The experimental class achieved an average final test score of 82.78, while the control class achieved an average score of 64.81. Furthermore, the results of the hypothesis test showed a calculated t-value of 4.769 and a critical t-value of 2.021. Since the calculated t-value is greater than the critical t-value ($4.769 > 2.021$) and the p-value is $0.000 < 0.05$, H_0 is rejected and H_1 is accepted. Thus, there is an effect of using Assemblr EDU-assisted Augmented Reality (AR) learning media on students' mathematics learning outcomes. The improvement in learning outcomes in the experimental class occurred because the Assemblr EDU-assisted AR media was able to present material on flat-sided three-dimensional shapes in a visual, concrete, and interactive manner. Materials on cubes and rectangular prisms require visualization skills because students must understand their shapes, elements, nets, surface areas, and volumes. Through AR media, students can directly observe three-dimensional objects, making previously abstract concepts easier to understand. This encourages students to be more active in observing, discussing, asking questions, and completing assigned tasks during the learning process.

The success of using Augmented Reality learning media supported by Assemblr EDU is also evident in the progress of students' learning outcomes throughout the learning process. The development of students' understanding is also reflected in the increase in the average scores on daily assignments over the course of four sessions. In the first session, the average score on students' daily assignments was 45.25. This score increased to 61.25 in the second session, 74 in the third session, and 81.5 in the fourth session. This increase indicates that students became increasingly accustomed to using Augmented Reality learning media supported by Assemblr EDU and gradually gained a better understanding of the material being studied.

These research findings align with the role of learning media as a tool used to convey information or instructional material to students during the learning process [5]. Learning media also help teachers and students communicate and engage more actively during the learning process [15]. In this study, the use of Augmented Reality learning media supported by Assemblr EDU was able to create a more engaging, interactive, and student-centered learning experience, thereby encouraging students to be more active in building their understanding of the material being studied [5], [15]. Thus, the use of Augmented Reality learning media supported by Assemblr EDU in this study can help students become more active and better understand the material presented by the teacher.

The results of this study are also supported by the concept of Augmented Reality, which allows two-dimensional and three-dimensional virtual objects to be displayed as if they were in a real-world environment through the device's camera, thereby aiding the visualization of concepts and enhancing student engagement in learning [16]. This aligns with the learning process in the experimental class, where students can observe three-dimensional geometric shapes more realistically through AR. With

the help of these 3D object displays, abstract mathematical concepts become easier for students to understand, thereby supporting improved learning outcomes in the experimental class [16].

The use of Assemblr EDU in this study is also consistent with research findings indicating that this platform can be utilized as a learning medium that helps increase students' interest in learning and supports the achievement of learning outcomes [17]. The visualization and interactivity features available in Assemblr EDU provide a more engaging learning experience, making it easier for students to understand the mathematical concepts being studied and achieve better learning outcomes.

The results of this study are also consistent with previous research showing that the use of Augmented Reality media supported by Assemblr EDU has an impact on student learning outcomes, as evidenced by an increase in the average score from 51.55 on the pretest to 80.55 on the posttest [18]. Another study found that the average learning outcomes for the experimental class using Assemblr EDU-assisted Augmented Reality digital media were higher than those of the control class, specifically 75.00 for the experimental class and 61.30 for the control class [19]. Furthermore, Augmented Reality-based digital learning media have also been shown to have a positive effect on students' mathematics learning outcomes [20].

Based on the above discussion, it can be concluded that the use of Augmented Reality learning media supported by Assemblr EDU has an effect on students' mathematics learning outcomes. This effect is evident from the improvement in final test scores, the increase in daily assignment grades during the learning process, and the results of the hypothesis test, which indicate that H_0 is rejected and H_a is accepted. Thus, Augmented Reality learning media supported by Assemblr EDU can serve as a relevant alternative learning medium to improve mathematics learning outcomes.

4. CONCLUSION

Based on the research problem and objectives, it can be concluded that the use of Augmented Reality learning media using Assemblr EDU has an effect on the mathematics learning outcomes of students at UPTD SMP Negeri 1 Gunungsitoli Barat. This is evidenced by the final test results of the experimental class, which achieved an average score of 82.78, while the control class achieved an average score of 64.81. Furthermore, based on the results of the hypothesis test using an independent two-sample t-test, the calculated t-value was 4.769 and the critical t-value was 2.021 at a 5% significance level. Since the calculated t-value is greater than the critical t-value-that is, $4.769 > 2.021$, H_0 is rejected and H_a is accepted.

5. AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to acknowledge each author's contributions to the conduct of the research and the preparation of the article. The breakdown of the authors' contributions is presented in the following table.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
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Ratna Natalia Mendrofa	✓	✓		✓	✓					✓		✓		
Netti Kariani Mendrofa				✓						✓				
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C : C onceptualization I : I nterpretation Vi : V isualization M : M ethodology R : R esources Su : S upervision So : S oftware D : D ata Curation P : P roject administration Va : V alidation O : Writing - O riginal Draft Fu : F unding acquisition Fo : F ormal analysis E : Writing - Review & E ditng														

6. AI DISCLOSURE STATEMENT

The author declares that this research manuscript was prepared, researched, written, and developed independently without the use of artificial intelligence (AI) technologies or techniques.

REFERENCES

1. R. Rosmiati, Novaliyosi, and C. A. H. F. Sentosa, "Impelementasi Kurikulum Merdeka Dalam Pembelajaran Matematika di Kelas VII SMP Negeri 3 Kota Serang," *Proximal: Jurnal Penelitian Matematika dan Pendidikan Matematika*, vol. 6, no. 2, pp. 132–140, 2023, <https://doi.org/10.30605/Proximal.V5i2.2752>.
2. T. Indrasari, E. P. Astuti, and H. Kurniawan, "Pengembangan Modul Ajar Berbasis Problem Based Learning Untuk Meningkatkan Kemampuan Komunikasi Matematis Siswa," *JLEB: Journal of Law, Education and Business*, vol. 1, no. 2, pp. 802–812, 2023, <https://doi.org/10.57235/JLEB.V1i2.1156>

3. R. Ariawan, R. Utami, S. Herlina, and E. Istikomah, "Pengembangan Modul Ajar Dengan Model Problem Based Learning Berorientasi Kemampuan Pemecahan Masalah," *Gauss: Jurnal Pendidikan Matematika*, vol. 05, no. 01, pp. 71–82, 2022, <http://dx.doi.org/10.30656/gauss.v5i1.3930>.
4. Kementerian Pendidikan Dasar dan Menengah, "Kemendikdasmen Terbitkan Raport Pendidikan 2022–2024," Pusat Layanan Pembiayaan Pendidikan, [Online]. Available: <https://puslapdik.kemendikdasmen.go.id/kemendikdasmen-terbitkan-raport-pendidikan-2022-2024/>.
5. I. S. Ndraha, R. N. Mendrofa, and R. Lase, "Analisis Hubungan Minat Belajar Dengan Hasil Belajar Matematika Di SMK Negeri 1 Sogaeadu Tahun Pelajaran 2021/2022," *EJurnal Univa Medan*, vol. 1, no. 3, pp. 37–44, 2022, <https://doi.org/10.47662/jkpm.v1i3.341>.
6. M. Chairudin, Nurhanifa, T. Yustianingsih, Z. Aidah, Atoillah, and M. S. Hadi, "Studi Literatur Pemanfaatan Aplikasi Assemblr Edu Sebagai Media Pembelajaran Matematika Jenjang SMP/MTS," *Jurnal Pengabdian Masyarakat Universitas Pahlawan Tuanku Tambusai*, vol. 4, no. 2, pp. 1312–1318, 2023, <https://pelatihan-repo.umj.ac.id/13946/1/12881-Article%20Text-39442-1-10-20230322.pdf>.
7. A. Ulkhoiroh and Sukmawarti, "Pengembangan Media Pembelajaran Augmented Reality Berbantuan Assemblr Edu Pada Mata Pelajaran Matematika Untuk Meningkatkan Pemahaman Konsep Siswa Kelas V," *Pendas: Jurnal Ilmiah Pendidikan Dasar*, vol. 10, no. 2, pp. 50–61, 2025, <https://journal.unpas.ac.id/index.php/pendas/article/download/28496/17734>.
8. Masri, D. Surani, and A. Frictarani, "Pengaruh Penggunaan Media Augmented Reality Assemblr Edu dalam Meningkatkan Minat Belajar Siswa SMP," *Jurnal Penelitian, Pendidikan dan Pengajaran (JPPP)*, vol. 4, no. 3, pp. 209–216, 2023, [doi: 10.30596/jppp.v4i3.16429](https://doi.org/10.30596/jppp.v4i3.16429).
9. N. A. Fauzi and H. B. Saputro, "Pengembangan Media Pembelajaran Assemblr Edu Berbasis Augmented Reality (AR) Mata pelajaran Matematika Materi Bangun Ruang Kelas V Sekolah Dasar," *Mandalika Mathematics and Educations Journal*, vol. 7, no. 2, pp. 730–745, 2025, [doi: http://dx.doi.org/10.29303/jm.v7i2.9251](http://dx.doi.org/10.29303/jm.v7i2.9251).
10. M. L. Alik and N. Rahayu, "Pengaruh Model Pembelajaran PBL Berbantuan Media Assemblr EDU Terhadap Hasil Belajar IPA Siswa," *Lensa (Lentera Sains): Jurnal Pendidikan IPA*, vol. 14, no. 2, pp. 73–83, 2024, [doi: 10.24929/lensa.v14i2.555](https://doi.org/10.24929/lensa.v14i2.555).
11. M. Ginting and H. P. Tambunan, "Pengaruh Media Pembelajaran AR (Augmented Reality) Berbasis 3D Menggunakan Assemblr Edu Untuk Meningkatkan Hasil Belajar Siswa Kelas IV Tema 3 Sub Tema 1 Di SDN 065015 Medan," *IJMS: Indonesian Journal of Mathematics and Natural Science*, vol. 01, no. 03, pp. 132–139, 2023, <https://jurnal.academiacenter.org/index.php/IJMS>.
12. N. Choffiah, N. R. Sesanti, and S. Rahayu, "Media Pembelajaran ARBA (Augmented Reality Berbasis Assemblr EDU) Dengan Pendekatan Realistic Mathematics Education (RME) Pada Materi Bangun Ruang Siswa Kelas V Sekolah Dasar," *Jurnal Pendidikan dan Pengajaran*, vol. 2, no. 8, pp. 521–532, 2024, <https://doi.org/10.26618/7jc1ka97>.
13. F. Marian, D. Efendi, and K. M. Abdillah, "Integrasi Teknologi Augmented Reality Dalam Pembelajaran Matematika Untuk Meningkatkan Pemahaman Geometri Siswa," *JIPMat (Jurnal Ilmiah Pendidikan Matematika)*, vol. 10, no. 2, pp. 255–270, 2025, [doi: https://doi.org/10.26877/jipmat.v10i2.2510](https://doi.org/10.26877/jipmat.v10i2.2510).
14. C. Simanullang et al., "Pengaruh Penggunaan Modul Berbasis Augmented Reality Sebagai Media Pembelajaran Terhadap Hasil Belajar Siswa SMP Pada Mata Pelajaran IPA," *Jurnal Media Akademik (JMA)*, vol. 3, no. 12, 2025, <https://jurnal.mediaakademik.com/index.php/jma/article/download/3578/2794>.
15. P. R. P. I. Dewi, N. M. W. Wijayanti, and I. D. P. Juwana, "Efektivitas Penerapan Media Pembelajaran Digital Assemblr Edu Pada Mata Pelajaran Matematika Di SMK Negeri 4 Denpasar," *Jurnal Pengabdian Kepada Masyarakat Widya Mahadi*, vol. 2, no. 2, pp. 98–109, 2022, [doi: 10.59672/widyamahadi.v2i2.1961](https://doi.org/10.59672/widyamahadi.v2i2.1961).
16. N. N. Nasoba, Q. J. Adrian, and D. A. Megawati, "Implementasi Teknologi Augmented Reality Sebagai Media Promosi Interaktif Pada Toko Sunny Meubel Di Kota Metro Berbasis Android," *Jurnal Informatika dan Rekayasa Perangkat Lunak (JATIKA)*, vol. 2, no. 4, pp. 570–583, 2021, <http://jim.teknokrat.ac.id/index.php/informatika>.
17. D. R. Sari and S. F. Putri, "Pengembangan Media Pembelajaran Berbasis Augmented Reality Menggunakan Platform Assemblr Edu Pada Materi Pajak Pertambahan Nilai," *Prosiding National Seminar on Accounting, Finance, and Economics (NSAFE)*, vol. 4, no. 3, pp. 131–143, 2024, <https://conference.um.ac.id/index.php/nsafe/article/download/9004/3152>.
18. A. Agustin and H. A. K. Wardhani, "Pengaruh Media Augmented Reality (AR) Berbantuan Assemblr Edu Terhadap Hasil Belajar Siswa SMP IT Robbani Sintang," *Jurnal Keguruan dan Ilmu Pendidikan*, vol. 7, no. 2, pp. 7–13, 2023, <https://doi.org/10.51826/Edumedia.V7i2.952>.

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19. A. A. Suwardi, L. O. Amril, and A. Mawardini, "Pengaruh Media Digital Augmented Reality Berbantu Aplikasi Assemblr Edu Terhadap Hasil Belajar Matematika Siswa Sekolah Dasar," *Jurnal Pengajaran Sekolah Dasar*, vol. 3, no. 2, pp. 126–138, 2024, <https://elibrary.ru/item.asp?id=81529601>.
 20. J. U. N. Hidaningrum and A. P. Satria, "Pengaruh Penggunaan Media Pembelajaran Digital Berbasis Augmented Reality (AR) Terhadap Hasil Belajar Matematika Peserta Didik Kelas VI SDI AI - Ikhlas Karangrejo Tulungagung," *Jurnal Ilmiah Pendidikan Dasar*, vol. 10, no. 3, pp. 326–336, 2025, <https://doi.org/10.23969/jp.v10i3.31125>.