Development of AR-Based PPT Media in Science Subjects to Increase Learning Motivation of 6th Grade Elementary School Students

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Keywords
Augmented Reality; PPT Media; Motivation;

ABSTRACT
This study aims to explore the development of AR-based PowerPoint (PPT) media for teaching Natural Sciences (IPA), specifically the solar system topic, in sixth-grade elementary school. The research employed a Research and Development (R\&D) approach using the ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation phases. The study was conducted at SDIT An-Nisa and involved 26 sixth-grade students as respondents. Data were collected through observation, interviews, and questionnaires. Validation sheets were used to assess the media's quality, evaluated by media experts, subject matter experts, and language experts. The effectiveness of the media was measured using the N-Gain score. The validation results indicated that the AR-based learning media was highly valid, with an average score percentage of 95.31%. In terms of effectiveness in enhancing students' learning motivation, the media achieved a score of 84.75%, which is categorized as effective. Based on these findings, the AR-based PPT learning media can serve as an effective alternative tool for teaching Natural Sciences and can significantly improve the learning motivation of sixth-grade students.

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INTRODUCTION

The rapid advancement of science and technology in the modern era has significantly influenced various sectors, including education. In the educational context, technology serves as a medium to facilitate learning activities, aiming to create an efficient and effective learning environment.[1] Accordingly, technology should provide both educators and students with greater ease in achieving learning objectives. One of the key factors influencing this process is the teaching material employed. In the era of the Industrial Revolution 4.0, teaching materials have evolved into various forms, including digital media the simple to the very sophisticated.[2] An example of a learning media transformation that utilizes technological developments in the world of education Among others, Classroom, Google Meet, animated videos, Augmented Reality, etc. The use of information and communication technology in

[1]Nuridayanti dkk., "Peran Teknologi Pendidikan dalam Implementasi Kurikulum Merdeka," *Journal on teacher education* 5 (2023): 88–93.

[2]Alfitriana Purba dan Alkausar Saragih, "Peran Teknologi dalam Transformasi Pendidikan Bahasa Indonesia di Era Digital," *All Fields of Science J-LAS* 3, no. 3 (2023): 43–52.

learning media is considered important and can provide an interesting and new impression for students.[3]

Augmented Reality is a technology that can be used in the field of education that bridges the gap between virtual space and reality and is displayed using the help of Android smartphones and computers.[4] In its use, Augmented Reality technology can display various images, text or even 3D models in the real world that can be felt by its users. The main components used in Augmented Reality technology include hardware (smartphones, cameras, sensors, batteries, speakers, etc.) and software. Essentially, those key components work together and collaborate with each other to create an interactive and impressive AR experience.[5]

In the curriculum, science subjects are designated as integrated subjects to develop scientific attitudes, as well as using procedures and explaining with reasoning until a conclusion is reached.[6] In compiling science learning, standard skills must be paid attention to including measurement, observation and communication as well as advanced process skills such as compiling hypotheses, experimental design to carrying out experiments.[7] Therefore, science learning requires an activity plan and interesting learning media to help students understand the material presented.

Various learning media are used by educators in supporting the science learning process, both two- and three-dimensional media and technology-based media. But in reality, many teachers still rely on package books or only use makeshift pictures. In science subjects, there is material that requires more than just pictures to provide real experience to students so that the material learned is easy to understand. As is the case with the matter of the human body system and the solar system.

The results of initial observations and interviews that have been conducted at SDIT An-Nisa to grade VI students totaling 26 students and one of the science subject teachers stated that; 1) educators still use simple media in the form of printed books / package books and pictures as learning media in the classroom; 2) lack of students' enthusiasm in participating in science learning caused by the absence of interesting media use; 3) and low student motivation to learn, this can be seen from the attitude of students who are less enthusiastic in participating in learning and many students who do not pay attention to the teacher's explanation. In line with the results of the observations, the researchers also conducted an interview with one of the teachers in the science subject who stated that teachers only use image media obtained from the internet and those contained in package books to support learning in the classroom.

In essence, learning is an effort in education carried out by teachers to help students meet their needs and preferences.[8] In participating in classroom learning, students need learning motivation in achieving their learning goals. Motivation can be interpreted as a state

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[3] Ira Restu Kurnia dan Titin Sunaryati, "Media Pembelajaran Video Berbasis Aplikasi Canva Untuk Meningkatkan Minat Belajar Siswa" 9, no. 3 (2023): 1357–63, https://doi.org/10.31949/educatio.v9i3.5579.

[4] Zulkifli Ahmad, Hasna Ahmad, dan Zulkarnain Abd. Rahman, "Penggunaan Media Pembelajaran Augmented Reality Berbantuan Assemblr Edu Untuk Meningkatkan Hasil Belajar Siswa SMA Negeri 5 Kota Ternate" 8, no. 23 (2022): 514–21.

[5] I Kadek Mahada Putra dkk., "Media Pembelajaran berbasis Augmented Reality " PRIARMIKA """ 4 (2020): 110–22.T Muhammadiyah Rawalo, Rawalo District, Banyumas Regency, Thesis," *IAIN Purwokerto* (2021).

[6] Muhammad Fadli Ramadhani, "Kreativitas Guru Dalam Membuat Media Pembelajaran Tematik Di Kelas II SD IT Muhammadiyah Rawalo Kecamatan Rawalo Kabupaten Banyumas Skripsi," *IAIN Purwokerto* (2021).

[7] Harlinda Syofyan dkk., "Pelatihan Penerapan Keterampilan Proses Dalam Pembelajaran IPA di SD Pelita 2 , Jakarta Barat," 2018.

[8] Nurlina Ariani Harahap dkk., *Buku Ajar Belajar dan Pembelajaran*, 2022.

that exists in a person to do something to achieve a goal.[9] In addition, Barokah said that learning motivation is a means and goal to help the student learning process in achieving their learning goals.[10] To increase learning motivation, several efforts are needed that must be made by educators, including; 1) educators must set clear learning goals; 2) create a fun learning process; 3) occasionally give praise to students; 4) provide objective assessments and create competition and cooperation in learning activities.[11]

Previous research with the same topic on the material of the human reproductive system has found that the formation of a product in the form of Augmented Reality application media can provide benefits to students' insights into the concept of the reproductive system.[12] As evidenced by data analysis, the media received a positive response, indicating that it can be considered a valuable tool for both students and teachers. In this context, the use of technology in instructional media facilitates students' understanding of the material and serves as a useful aid for teachers during the teaching and learning process. The relevance of previous studies to the current research lies in the development of Augmented Reality-based learning media and the evaluation of its effectiveness in the learning process. The distinguishing feature of this research is the development of AR-based learning media in the form of a PowerPoint (PPT), which is easily accessible anytime and anywhere. As a result, students do not need to install additional applications to use the media. Furthermore, the use of engaging instructional media can create an interactive and enjoyable learning experience, thereby enhancing students' motivation to participate in the learning process.[13] Therefore, the researcher then developed an Augmented Reality (AR)-based learning media for solar system materials. The media can be created using the Assemblr application which can be used to create more interactive, collaborative, and fun learning activities based on 3D and AR. This software It was developed by Assemblr Indonesia Official, featuring various advanced AR capabilities, and is used in conjunction with Assemblr Studio and the Assemblr mobile application

RESEARCH METHODOLOGY

The design and development strategy employed in this study utilized a Research and Development (R & D) approach. The research procedure adapted the ADDIE development model, which consists of five stages: 1) Analyze; 2) Design; 3) Development; 4) Implementation; and 5) Evaluation. The respondents in this study included a team of expert validators—comprising a subject matter expert, a media expert, and a language expert—while the target users of the developed media were 26 sixth-grade students at SDIT An-Nisa.

Data collection was conducted through observation, interviews, and questionnaires. The instruments used in this study included validation questionnaires completed by the media expert, subject matter expert, and language expert; assessments from teachers and students regarding the use of the developed media; as well as a questionnaire evaluating the effectiveness of the Augmented Reality (AR) media in enhancing the learning motivation of sixth-grade students in the Natural Sciences subject, specifically the solar system topic. The

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[9]Sunarti Rahman, "Pentingnya motivasi belajar dalam meningkatkan hasil belajar," no. November (2021): 289–302.

[10]Awalina Barokah, "Pengaruh Problem Based Learning dan Sains Teknologi Masyarakat Terhadap Motivasi Belajar" 3, no. 1 (2021): 70–83.

[11] Imtihan Hanim dkk., *Psikologi Belajar*, ed. oleh Fransiska Anggraini (Tsngerang: WADE Publish, 2022).

[12] Ditya Wiyana Karuni, "Pengembangan Media Pembelajaran Augmented Reality Pada Konsep Sistem Reproduksi Manusia" (Universitas Islam Negeri Syarif Hidayatullah, 2021).

[13] Munawir, Ainur Rofiqoh, dan Ismi Khairani, "Peran Media Interaktif Dalam Meningkatkan Motivasi Belajar Siswa pada Mata Pelajaran SKI di Madrasah Ibtidaiyah," *Jurnal Al-Azhar Indonesia Seri Humaniora* 9, No. 1 (2024): 63–71, http://dx.doi.org/10.36722/sh.v9i1.2828.

study employed a Likert scale with five categories as proposed by Sugiyono[14], which are classified in Table 1.

Table 1. Likert Scale

Category	Score
Strongly agree	5
Agree	4
Neutral/Skeptical	3
Disagree	2
Strongly Disagree	1

The data obtained from interviews and observations will be analyzed qualitatively. Meanwhile, the data collected from the validation questionnaires completed by the media expert, subject matter expert, language expert, as well as the responses from teachers and students—using Likert-scale questions—will first be converted into quantitative data. Subsequently, the results from the questionnaires completed by these experts will be calculated using the following formula:

$$\text{Percentage} = \frac{\text{Empirical total score}}{\text{Maximum total score}} \text{ x } 100$$

Thus, the percentage score of the media feasibility assessment questionnaire, as well as the teachers' and students' response questionnaires to the Augmented Reality-based learning media, were obtained and categorized according to the criteria proposed by Akbar[15] as follows:

Table 2. Scale of Evaluation Criteria Media Eligibility Questionnaire

Achievement Rate	Category
81,00 % - 100 %	Highly Valid
61,00 % - 80,00 %	Quite Valid
41,00 % - 60,00 %	Less Valid
21,00 % - 40,00 %	Invalid
00,00 % - 20,00 %	Highly Invalid

To determine the effectiveness of the AR-based learning media, the researcher employed the N-Gain test using the following formula:

$$N\text{-}gain = \frac{Skor\ postest - skor\ pretest}{Skor\ ideal - skor\ prestest}$$

So that the assessment score of the effectiveness of Augmented Reality-based learning media on students' learning motivation was obtained and criteria were obtained in accordance with the statements made by the Volunteers[16] as follows:

[14] Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D* (Bandung: ALFABETA, CV, (2013).

[15] Akbar,p S. Instrumen Perangkat Pembelajaran. (Bandung : PT. Remaja Rosdakarya, 2013).

[16] Sukarelawan, dkk. N-Gain vs Stacking Analisis Perubahan Abilitas Peserta Didik dalam Desain One Group Pretest-Posttest (1 st ed.). (Yogyakarta : Suryacahya, 2024).

Table 3. Scale of Assessment Criteria for Media Effectiveness Test on Student Learning Motivation

Gain Score	Interpretation
0, 70 ≤ g ≤ 100	High
0,30 ≤ g ≤ 0, 70	Moderate
0, 00 ≤ g ≤ 0, 30	Low
g = 0,00	No Improvement
-1, 00 ≤ g ≤ 0,00	Decrease Occured

RESULTS AND DISCUSSION

This research and development has resulted in an Augmented Reality (AR)-based learning media product for teaching in the field of solar system material science in the form of an interactive PowerPoint and equipped with its AR markers.

Analyze Stage

The first stage to be carried out is the analysis phase. In this phase, the researcher analyzes the importance of the media development and the learning needs that must be addressed in order to achieve the intended objectives. The researcher conducted observations and interviews with teachers and students to determine what media were being used and what challenges they faced during the learning process. Based on interviews with the sixth-grade teacher at SDIT An-Nisa, it was found that the teacher is not yet familiar with using technology-based media. During the learning process, the teacher primarily relies on textbooks and images obtained from the internet. Furthermore, the teacher is not accustomed to implementing technology-integrated media due to limited time and a lack of supporting tools, such as projectors. The limited availability of learning media provided by the school and the teacher is one of the factors contributing to the low learning motivation among students. In addition, the explanations in the textbooks are relatively brief, which requires the teacher to provide more detailed explanations and visual representations through learning media to better motivate students to engage in science learning.

Design Stage

After completing the analysis stage, the researcher proceeded to the design stage, which involved planning the media layout, adjusting the content, and developing evaluation questions. The design of the AR-based learning media began with gathering materials related to the topic being developed, such as images, the creation of AR markers, and the selection of color schemes appropriate to the solar system material. The media design was tailored based on the information obtained during the analysis stage and aligned with the lesson plan (RPP) for the science subject. Additionally, the researcher created a storyboard to facilitate the development process of the Augmented Reality (AR)-based learning media.

The content included in the AR-based learning media was aligned with the learning objectives and based on the sixth-grade Theme 9 student textbook, the teacher's guidebook, and relevant academic journals as references. The final component of the AR-based learning media consisted of practice questions, which could be displayed in both 3D and AR formats. These evaluation questions aimed to measure students' mastery of the learning material and to provide a positive stimulus for students to explore further information related to the topic. The following is the display of the developed media that has been validated by the expert validators.

Figure 1. Welcome Screen and Menu Display on AR Media

Figure 2. Display of Material without QR Code and Evaluation on AR-Based Learning Media before validation

Figure 3. Display of Material with QR Code and Evaluation on AR-Based Learning Media after Validation

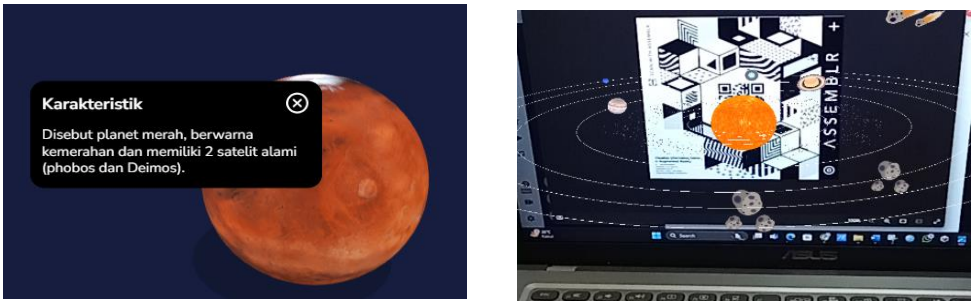

Figure 4. AR Results Display

Development Stage

At this stage, the researcher conducted validation tests with a media expert, a subject matter expert, and a language expert. The validation was carried out to obtain information regarding the feasibility of the media, language, and content of the developed learning media.

The results of the validation of the Augmented Reality-based learning media are summarized in Table 4.

Table 4. Expert Validation Recapitulation

No	Assessment Aspects	Percentage Score (%)			Category
		Media Expert	Language Expert	Subject matter Expert	
1.	Media Display Design	92,50	-	-	Highly Valid
2.	Software Engineering	86,66	-	-	Highly Valid
3.	Benefits	100	-	-	Highly Valid
4.	Typography	-	86,66	-	Highly Valid
5.	Content	-	100	-	Highly Valid
6.	Content accuracy	-	-	96,66	Highly Valid
7.	Presentation	-	-	100	Highly Valid
8.	Evaluation	-	-	100	Highly Valid
Average overall percentage score		**95,31**			**Highly Valid**

Based on the table above, the assessment results from the experts on the Augmented Reality (AR)-based learning media can be categorized as "Highly Valid" with an average percentage score of 93.33 %, accompanied by a suggestion to improve the QR Code on the evaluation screen by combining it for greater practicality. The language expert's evaluation also categorized the media as "Highly Valid" with an average percentage score of 93.33 %, recommending improvements in simplifying sentence structures and using terms that are easily understood by elementary school students. Meanwhile, the subject matter expert's assessment was categorized as "Highly Valid" with an average percentage score of 98.00 %, with a suggestion to provide more detailed material on the characteristics of each planet.

Implementation Stage

At the implementation stage, the researcher conducted a trial of the use of AR-based learning media to find out the response of educators and students of grade VI SDIT An-Nisa. In conducting this test, the researcher divided into two groups, namely a small group test involving 6 grade VI students at SDIT An-Nisa and a field test or group involving 26 grade VI students at SDIT An-Nisa. In the small group test, the researcher explained to the students the material to be discussed, then introduced and explained about the AR-based learning media that will be used to students. After that, the researcher directed students to use smartphones and open the PowerPoint that had been shared so that they could use the learning media independently. Researchers periodically pay attention to and answer the obstacles experienced by students in using AR-based learning media. In the last session, students answered quizzes that had been provided in AR learning media and the researcher corrected the answers of each student. In the field trial (large group) with a target of 26 students. As for the field trial process, the researcher conducts apperception, followed by explaining to students briefly about the material of the solar system, then introducing AR-based learning media that will be used to students. After that, the researcher divided the students to use the smartphones they brought with their classmates and opened the

PowerPoint that had been shared so that they could use the AR learning media. Researchers periodically pay attention to and answer the obstacles experienced by students in using AR-based learning media. After that, the researcher gave several students the opportunity to scan the markers contained in PowerPoint on the projector screen so that the AR view of the planet can be seen as real as in a classroom environment. In the last session, students were given a response questionnaire related to the media being tested.

The results of the analysis of the student response questionnaire showed an average percentage of 88.58% with the category "Very Valid". Meanwhile, to test the effectiveness of AR-based PPT media on student learning motivation, the researcher used the N-Gain test from the results of the motivation sheet that had been distributed to grade VI students of SDIT An-Nisa. The indicators contained in the questionnaire include aspects of enthusiasm, confidence, desire and desire to learn, diligence in doing tasks and being able to complete tasks well. The following are the results of the analysis of the N-Gain score of the effectiveness of AR-based PPT learning media on students' learning motivation before media use and after media use:

Table 5. Recapitulation of N-Gain Score Calculation

CALCULATION OF N-GAIN SCORE								
No	**Student Name**	**Pre test**	**Post test**	**Post - Pre**	**Ideal Score (100 - Pre)**	**N Gain Score**	**Increased**	**N Gain Score (%)**
1	BR	50	76	26	30	0,86	High	86
2	NZAU	47	75	28	33	0,84	High	84
3	NYZ	43	70	27	37	0,72	High	72
4	KSA	50	61	11	30	0,36	Moderate	36
5	NAM	41	67	26	39	0,66	Moderate	66
6	HNF	46	68	22	34	0,64	Moderate	64
7	KSD	44	70	26	36	0,72	High	72
8	KNV	45	68	23	35	0,65	Moderate	65
9	SR	43	69	26	37	0,72	High	72
10	LHR	47	73	26	33	0,78	High	78
11	TAA	40	64	24	40	0,6	Moderate	60
12	NZU	45	65	20	35	0,51	Moderate	51
13	NS	43	69	26	37	0,72	High	72
14	KNW	50	67	17	30	0,56	Moderate	56
15	ACD	46	70	24	34	0,7	Moderate	70
16	HNF	39	60	21	41	0,51	Moderate	51
17	AF	44	71	27	36	0,75	High	75
18	KH	43	69	26	37	0,72	High	72
19	NZ	40	69	29	40	0,72	High	72
20	IRH	48	64	16	32	0,5	Moderate	50
21	FA	47	77	30	33	0,9	High	90
22	RSK	40	58	18	40	0,45	Moderate	45
23	NB	39	61	22	41	0,53	Moderate	53
24	RB	40	67	27	40	0,67	Moderate	67
25	F	42	61	19	38	0,5	Moderate	50
26	AH	47	74	27	33	0,81	High	81
Mean		**44,14**	**67,8**	**23,61**	**35,8**	**0,65**	**Moderate**	**65**

Based on the data analysis of the pre-test and post-test, the average score of students during the pre-test (before using the AR-based PowerPoint media) was 44.14, while the post-test average (after using the AR-based Power Point media) was 67.8. This indicates that the post-test scores were higher than the pre-test scores. The data show an increase in score of 23.61. Meanwhile, the average N-Gain score, as shown in the table, was 65%, which falls into the moderate category. Therefore, it can be concluded that the AR-based Power Point media can improve learning motivation of sixth-grade students if utilized optimally.

Evaluation Stage

The last stage is evaluation, at this stage the researcher makes a final revision of the AR-based PPT media developed. This last stage is based on suggestions obtained from expert assessment questionnaires, educator and student response questionnaires.

Based on the results of the analysis and discussion that has been carried out, it can be concluded that Augmented Reality-based PPT media is suitable for use and utilization in learning solar system material in grade VI elementary school as one of the alternative media that can increase student motivation in learning. In the process of using it, the AR-based PPT media developed is easy to use and modified for other subjects. With this media, students can more easily understand the material presented by the teacher and can see the picture of the object more realistically. The display design used by the researcher on AR-based PPT media is interesting so that it can make students more motivated and provide new experiences in learning solar system material. In addition, in the learning process using AR-based PPT media, it can be seen that students are more enthusiastic in learning the material and actively asking questions related to unknown material. This is evidenced by the learning motivation questionnaire sheet that was distributed after students used the media that had been developed.

In line with the results of the research, Bunyamin[17] said that there are several indicators that show that students have high enthusiasm characteristics, including individuals with high motivation tend to choose tasks with medium difficulty levels. Students' motivation to learn can be raised and improved by the will of oneself and support from parents, teachers and the surrounding environment.[18] Previous research also stated that the characteristics of students who have high learning motivation are diligent in doing assignments, expecting feedback on tasks that have been done and being able to complete tasks better.[19] Some of the efforts that can be made by teachers to increase learning motivation include by adjusting learning materials to the needs of students, adjusting learning materials to their own abilities and experiences, the need for the use of varied learning models and strategies.[20]

Overall, based on the analysis of validation results and media effectiveness, it shows that the developed media, which has been tested, is feasible for use and can be utilized to enhance the learning motivation of sixth-grade students in the science subject on the solar system material. The developed AR-based PowerPoint media has several weaknesses, including that the material presented only covers the concept of the solar system, improvements are needed in student evaluation feedback, and the camera scanner for the 3D object markers is less responsive.

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[17]Bunyamin. Belajar dan Pembelajaran. (Jakarta : UPT UHAMKA Press, 2021).

[18]Zakiah Nur Harahap dkk., "Motivasi, Pengajaran dan Pembelajaran," *Journal on Education* 5, no. 3 (2023): 9258–69, https://doi.org/10.31004/joe.v5i3.1732.

[19]Asrifa Rosa Khaerunisa dkk., "Indonesian Journal of Learning Education and Counseling Pengaruh Model Pembelajaran Problem Based Learning Terhadap Motivasi Belajar Siswa Artikel info" 5, no. 1 (2022): 53–58.

[20]Hanim et al., *Learning Psychology*.

CONCLUSION

Based on the results of the research on the development of Augmented Reality (AR)-based learning media to enhance students' learning motivation using the ADDIE development model, the researcher concludes that the development process was carried out starting from analysis, design, development, implementation, and evaluation. The AR-based learning media was validated by experts and received scores of 93.33 % from media experts with a "very valid" category, 93.33 % from language experts with a "very valid" category, and 98.00 % from material experts also in the "very valid" category. Furthermore, the AR-based learning media proved effective in increasing the learning motivation of sixth-grade students in the science subject on the solar system material. The analysis showed an increase in learning motivation of 29.51 %. From the overall results presented, it can be concluded that the AR-based learning media on the solar system material can relatively improve students' learning motivation.

DAFTAR PUSTAKA

Ahmad, Zulkifli, Hasna Ahmad, dan Zulkarnain Abd. Rahman. "Penggunaan Media Pembelajaran Augmented Reality Berbantuan Assemblr Edu Untuk Meningkatkan Hasil Belajar Siswa SMA Negeri 5 Kota Ternate" 8, no. 23 (2022): 514–21.

Barokah, Awalina. "Pengaruh Problem Based Learning dan Sains Teknologi Masyarakat Terhadap Motivasi Belajar" 3, no. 1 (2021): 70–83.

Hanim, Imtihan, Titi Rachmi, Dian Tri Utami, Widyaning Hapsari, Siti Khumaidatul Umaroh, dan Dina Mardiana. Psikologi Belajar. Diedit oleh Fransiska Anggraini. Tsngerang: WADE Publish, 2022.

Harahap, Nurlina Ariani, Zulaini Masruro, Siti Zahra Saragih, Rosmidah Hasibuan, Siti Suharni Simamora, dan Toni. Buku Ajar Belajar dan Pembelajaran, 2022.

Harahap, Zakiah Nur, Nurul Azmi, Wariono Wariono, dan Fauziah Nasution. "Motivasi, Pengajaran dan Pembelajaran." Journal on Education 5, no. 3 (2023): 9258–69. https://doi.org/10.31004/joe.v5i3.1732.

Khaerunisa, Asrifa Rosa, Eva Meizara, Puspita Dewi, dan Nur Akmal. "Indonesian Journal of Learning Education and Counseling Pengaruh Model Pembelajaran Problem Based Learning Terhadap Motivasi Belajar Siswa Artikel info" 5, no. 1 (2022): 53–58.

Kurnia, Ira Restu, dan Titin Sunaryati. "Media Pembelajaran Video Berbasis Aplikasi Canva Untuk Meningkatkan Minat Belajar Siswa" 9, no. 3 (2023): 1357–63. https://doi.org/10.31949/educatio.v9i3.5579.

Munawir, Ainur Rofiqoh, dan Ismi Khairani. "Peran Media Interaktif Dalam Meningkatkan Motivasi Belajar Siswa pada Mata Pelajaran SKI di Madrasah Ibtidaiyah." Jurnal Al-Azhar Indonesia Seri Humaniora 9, no. 1 (2024): 63–71. http://dx.doi.org/10.36722/sh.v9i1.2828.

Nuridayanti, Sri Muryaningsih, Badriyah, Everhard Markiano Solissa, dan Klemens Mere. "Peran Teknologi Pendidikan dalam Implementasi Kurikulum Merdeka." Journal on teacher education 5 (2023): 88–93.

Purba, Alfitriana, dan Alkausar Saragih. "Peran Teknologi dalam Transformasi Pendidikan Bahasa Indonesia di Era Digital." All Fields of Science J-LAS 3, no. 3 (2023): 43–52.

Putra, I Kadek Mahada, Ni Luh, Putu Ning, Septyarini Putri, dan I Putu. "Media Pembelajaran berbasis Augmented Reality " PRIARMIKA "" 4 (2020): 110–22.

Rahman, Sunarti. "Pentingnya motivasi belajar dalam meningkatkan hasil belajar," no. November (2021): 289–302.

Ramadhani, Muhammad Fadli. "Kreativitas Guru Dalam Membuat Media Pembelajaran Tematik di Kelas II SD IT Muhammadiyah Rawalo Kecamatan Rawalo Kabupaten Banyumas Skripsi." IAIN Purwokerto, 2021.

Sugiyono. Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung: ALFABETA, CV, 2013.

Sukarelawan, dkk. N-Gain vs Stacking Analisis Perubahan Abilitas Peserta Didik dalam Desain One Group Pretest-Posttest (1 st ed.). (Yogyakarta : Suryacahya, 2024).

Syofyan, Harlinda, Rindra Soraya, Universitas Esa Unggul, dan Kebun Jeruk. "Pelatihan Penerapan Keterampilan Proses Dalam Pembelajaran IPA di SD Pelita 2 , Jakarta Barat," 2018.

Wiyana Karuni, Ditya. "Pengembangan Media Pembelajaran Augmented Reality Pada Konsep Sistem Reproduksi Manusia." Universitas Islam Negeri Syarif Hidayatullah, 2021.