Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

Development of Augmented Reality-Based "KARINA" Media to Improve Learning Outcomes in Traditional Clothing Content for Grade III Students

Irsyanda Naufal Faiza*, Sigit Yulianto
Elementary School Teacher Education, Faculty of Education and Psychology,
Universitas Negeri Semarang, Indonesia.
*Corresponding Author. Email: irsyandana@students.unnes.ac.id

Abstract: This study aims to develop KARINA (National Interactive Card) learning media based on Augmented Reality (AR) to improve students' learning outcomes on the topic of traditional clothing for third-grade students. The study employed a Research and Development (R&D) method adapted from the four-dimensional (4D) development model, comprising the stages of define, design, develop, and disseminate. The research involved six students in a small group test and 23 students in a large group test. Data were collected using both testing and non-testing instruments. Testing instruments included pre-tests and post-tests, while non-testing instruments consisted of interviews, questionnaires, and documentation studies. Data analysis was performed using Shapiro–Wilk tests for normality, paired-sample t-tests, and N-Gain calculations with SPSS 31. Validation results indicated that the learning media is in the very feasible category, with scores of 88% from material experts and 93% from media experts. The effectiveness of the media was demonstrated by significant improvements in learning outcomes: in the small group test, the average score increased from 57.5 to 85 (N-Gain = 0.62), while in the large group test, it increased from 67.3 to 89 (N-Gain = 0.57). Both results are categorized as quite effective. These findings indicate that AR-based Interactive Cards are effective in improving students' conceptual understanding and learning outcomes in Pancasila Education.

Article History
Received: 02-02-2026
Revised: 09-03-2026
Accepted: 28-03-2026
Published: 20-04-2026

Key Words:
Learning Media;
Interactive Cards;
Augmented Reality;
Learning Outcomes;
Pancasila Education.

How to Cite: Irsyanda, & Sigit. (2026). Development of Augmented Reality-Based "KARINA" Media to Improve Learning Outcomes in Traditional Clothing Content for Grade III Students. *Jurnal Paedagogy*, *13*(2), 728-737. https://doi.org/10.33394/jp.v13i2.19865

https://doi.org/10.33394/jp.v13i2.19865

Introduction

Education is one of the most important aspects of human life. Improving the quality of education is essential to increase students' potential in daily life (Tasya Wislim et al., 2024). Education is a constitutional right of citizens, which is essential for developing an intellectual generation with moral integrity. The realization of this right is a fundamental indicator in determining the quality of human resources at the national level. In Article 31 of the 1945 Constitution, which aims to provide access to education for all citizens, especially students, have equal access to education and access (Hasanah, n.d.) . The Indonesian people have the right to develop themselves and obtain quality education to improve their welfare as contained in article 28c of the 1945 Constitution which regulates the rights of citizens in the field of education (Chandra, 2023).

According to Muslih (Harpeni Dewantara, 2020), the creativity of educators is reflected in their ability to choose relevant learning tools. To achieve pedagogical goals, the choice of media must be strategic and measurable, and in harmony with the characteristics of student needs and the dynamics of the latest technological developments. Currently, the use of Information Technology (IT)-based media is the dominant tool in teaching practices. The

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

integration of advanced technology into the educational process offers several significant advantages, including stimulating learning motivation, facilitating the visualization and explanation of complex ideas, and transforming abstract theoretical concepts into more tangible forms (Wulandari et al., 2023).

Learning media is a bridge used in the learning process between educators and students to provide information and convey messages so that the learning process can be created effectively and efficiently. The use of media is very important for teachers to do because to strive for teaching it can take place well (Niwisruti et al., 2024). As an educator, of course, it is required to have innovation to create something new so that in the learning process children are not bored and learning becomes interesting (Hutagulung & Rachman, 2023). After innovation is achieved, it is hoped that these innovations will also be implemented in educational units or institutions, and not only that, but must also be institutionalized. In order for innovation to be institutionalized in an educational unit, policies and regulations must be set by the leadership of the educational unit (Syafriafdi, 2020).

Based on interviews with third-grade homeroom teachers at Mewek Elementary School during Pancasila Education, it was found that students demonstrated quite high enthusiasm in participating in learning activities. Learning outcomes are an indicator of students' success in mastering knowledge, skills, and attitudes in accordance with the educational objectives set out in the curriculum. According to Wati (2021), changes in students' knowledge, behavior, and values can be indicators of the achievement of learning outcomes. However, in learning practices, teachers still use conventional media in the form of images and videos presented visually and audio-visually. The use of these media is considered less than optimal for conveying traditional clothing material because the learning objects have complex visual characteristics, such as shapes, motifs, and ornaments typical of each region. Two-dimensional media tends to be static, thus incapable of displaying objects comprehensively from various perspectives. This condition results in students' understanding of the details of traditional clothing being less than optimal, which impacts the learning outcomes of some students. Therefore, innovations in more interactive learning media are needed to help students understand the material more concretely and improve learning outcomes (Sofyan & Wardani, 2022).

One of the emerging learning media innovations in digital education is the use of interactive Augmented Reality-based media. Conceptually, AR is a technology that integrates two-dimensional and three-dimensional virtual elements into a real-time environment, thereby enriching the user's learning experience (Ni Wayan Cika Pratiwi et al., 2024). The novelty of this research lies in the development of the KARINA (National Interactive Card) media, which integrates learning about Pancasila values with visualizations of Indonesian culture. Through AR-based interactive cards, students not only read information about traditional clothing from books but also see representations of objects in the form of three-dimensional models that can be observed more realistically and interactively. This approach helps visualize previously abstract cultural concepts into more concrete forms, facilitating students' understanding (Wirayudi Aditama et al., 2019). Thus, the integration of AR technology in the KARINA media not only provides a more engaging learning experience but also strengthens students' understanding of cultural diversity as part of the implementation of Pancasila values in civics learning in elementary schools.

Based on this background, this study developed an Augmented Reality (AR)-based learning media called KARINA (Nusantara Interactive Card) to support the learning of traditional clothing material for third-grade elementary school students. This study aims to

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

determine the feasibility and effectiveness of AR-based KARINA media in improving student learning outcomes. Through interactive three-dimensional visualization of traditional clothing objects, this media is expected to be able to help students understand the characteristics of traditional clothing in a more concrete and in-depth manner. In addition, this research is also expected to contribute to the development of innovative digital technology-based learning media, especially in cultural learning in elementary schools.

Research Method

This research applies a *Research and Development* (R&D) approach by adapting the 4D development model as a framework in the development process. According to (Sugiyono, 2019), research methodology is a scientific procedure that is carried out regularly to obtain empirical data, the implementation of which is based on specific goals and the benefits of a specific target for scientific development or problem solving.

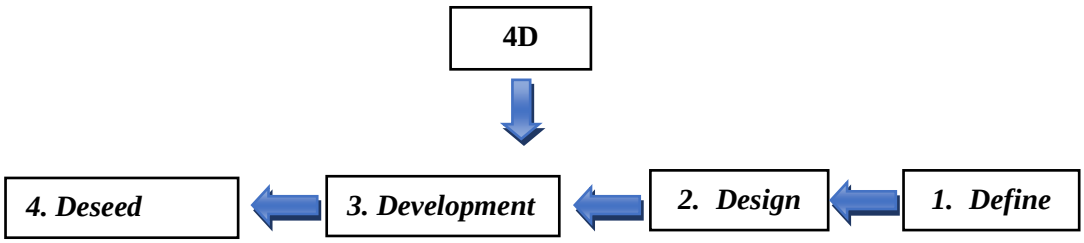

Figure 1. 4D Development Model Chart

The main focus of this method lies in the product development process followed by a validation test stage to determine the level of effectiveness of the resulting media (Okpatrioka, 2023). This study used the 4D development model (Define, Design, Develop, Disseminate). The study was conducted at SDN Mewek, Purbalingga Regency, Central Java, with 23 third-grade students selected using a total sampling technique, as all students in the class were used as research samples. The data obtained included quantitative data in the form of student test results through pre-tests and post-tests, as well as qualitative data obtained from observations, interviews, and documentation. Before being used in the study, the test instrument was first tested on fourth-grade students to test the validity of the items and adjust the level of difficulty. The selection of fourth-grade students as the subjects of the instrument trial was made because students at that level had studied similar material, so they had adequate ability to assess the clarity and level of difficulty of the items without affecting the results of the study conducted on third-grade students as the main sample.

Quantitative data analysis in this study was carried out through a series of comprehensive statistical tests, including the Normality Test, the T Test, and the N-Gain Test. The first stage is the Normality Test, which serves to verify whether the distribution of research data meets the assumptions of normal distribution. Because the sample size in this study was less than 50 subjects ($n < 50$), the normality estimation procedure was carried out using the Shapiro-Wilk method. This test was chosen because of its higher level of accuracy and sensitivity for small samples compared to other alternative methods (Zulkifli et al., 2025). The following is a formula used to test the normality of data distribution using the Shapiro-Wilk method.

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

Saphiro Wilk Formula

$$T_3 = \frac{1}{D}\left[\sum_{i=1}^{k} a_i (X_{n-i+1} - X_i)\right]^2$$

Figure 2. Saphiro Wilk's Normality Test Formula

Description:
n = Amount of data
α = Saphiro Wilk Coefficients

The following are the categories of normality test results:

Table 1. Normality Test Criteria

p-value	Interpretation
P > 0.05	Normally distributed data
P ≤ 0.05	Data is not normally distributed

After the assumption of the normal distribution of the data is verified, the analysis phase continues with the T-Test. In the framework of this study, the statistical method applied is the *Paired Sample T-Test*, which functions to analyze the significance of the difference in average score between two paired data groups. This dataset represents pre-test and post-test scores obtained from the same subject.

T-test Formula

$$t = \frac{\overline{x} - \mu_0}{s/\sqrt{n}}$$

Figure 3. T-test Test Formula

Description:
t = t calculation
x̄ = average sample
μ_0 = a specific average or a certain average (which is the standard)
s = standard deviation of the sample
n = number of samples

After the T-test is successfully carried out, the results of the analysis can be classified based on the following categorization:

Table 2. T-test Criteria

p-value	Interpretation
P ≥ 0.05	Insignificant results
P < 0.05	Significant results

The final stage of data analysis was carried out using the N-Gain (*Normalized Gain*) test. This procedure aims to measure the success of the learning process by evaluating the deviation between pre-test and post-test scores. Methodologically, the N-Gain test is an analytical instrument used to measure the effectiveness of educational interventions by comparing score growth or improvement in student competency before and after treatment (Harianja et al., 2024). This analysis provides a concrete picture of the progress of students' understanding after receiving treatment in the form of the use of Augmented Reality-based interactive card media. This allows researchers to measure the effectiveness of these development media in significantly improving learning outcomes.

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

N-Gain Formula:

$$N\text{-}Gain = \frac{Skor\ post\ test - skor\ pre\ test}{Skor\ maksimal - skor\ pre\ test}$$

Normalized Gain (N-Gain) tests can be classified based on the following categories:

Table 3. N-Gain Test Criteria

N-Gain Interpretation	Criteria
g > 0.7	Height
0.3 ≤ g ≤ 0.7	Medium
g < 0.3	Low

Results and Discussion

The researcher produced this augmented *reality-based interactive card media product* designed for grade III elementary school students, with a focus on traditional clothing materials for Pancasila Education subjects. The creation of learning media includes 4 stages according to the 4D development model: definition, design, development, and the final stage of dissemination (Waruwu, 2024).

Definition Stage

Based on the results of observation and needs analysis through questionnaires, both teachers and students gave a significant positive response. All teachers expressed full agreement with the proposed needs indicators, which proved that the design of the AR-based interactive card media was in line with the needs in the field. In line with these findings, the data collected from students also affirms the urgency of developing this instrument. Based on data analysis, it can be concluded that the use of *Augmented Reality* (AR)-based interactive cards has significant relevance to be implemented in learning practices to support the effectiveness of the learning process.

Planning Stage

AR-based interactive card media is a learning innovation that integrates conventional and digital elements. Physically, this medium comes in the form of cards measuring 8.9 x 12.7 cm that present an interesting combination of images, text, and colors. The integration of *Augmented Reality* (AR) technology on the card aims to increase student engagement and attention during the learning process. The back of the card displays pictures and a brief explanation of the main material being taught. The table below presents an explanation of the design framework applied in the development process of *Augmented Reality* (AR)-based interactive card learning media.

Table 4. Product Planning

Design		Remarks
		The visual configuration on the front of this interactive augmented card (AR) media displays a relevant graphic representation of traditional clothing. At the bottom of the card, a quick response code (QR) scanner

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

		serves as an accessibility tool to activate and project digital content.
		The back of the Interactive Card (AR)-based learning media contains narrative descriptions that provide a general explanation that aligns with the visual representation of the traditional clothing on display. This section serves to reinforce contextual information that supports students' understanding of projected cultural content.

Development Stage

The process of validating augmented reality-based interactive card media is carried out by a material expert and media expert. The assessment instrument used used a likert scale with a score range of 1 to 4, which included the categories Less (1), Sufficient (2), Good (3), to Very Good (4). The data obtained is then processed by comparing the actual score to the maximum score, then converted into a percentage to determine the level of media feasibility based on the set assessment criteria. From the score The results of material testing and media testing by material experts and media experts are processed by dividing the value obtained by the maximum value and multiplied by 100% so that the results obtained from the assessment can be synchronized with the assessment criteria (Wahab & Syahid, 2021). The resulting score is then analyzed through a feasibility test, with reference to a specific percentage category interval. The classification of the eligibility level of the instrument is determined based on the following interpretive criteria: unfeasible (0-49%), less feasible (50-69%), adequately feasible (70-84%), very feasible (85-100%) (Nesri & Kristanto, 2020).

Table 5. Results of Expert Assessment

No.	Assessment Aspects	Score	Total Score	Average	Introduce yourself	Criteria
1.	Eligibility Aspects of Content	30	74	88	88%	Highly Worth It
2.	Language eligibility aspects	21				
3.	Aspects of conformity	23				

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

	with the learning ability of Pancasila Education

Table 6. Media Expert Assessment Results

No.	Assessment Aspects	Score	Total Score	Average	Introduce yourself	Criteria
1.	Aspects of Graphic Qualification	45	75	94	94%	Highly Worth It
2.	Presentation Aspects	30				

After the implementation of the field trial, the collected pre-test and post-test data were analyzed through three main statistical techniques, namely the Normality Test, the T-Test, and the Normalized Gain (N-Gain) Test. The results of the normality test conducted on small group and large group research subjects are described in detail in the following section.

Table 7. Normality Test Results of Pretest and Posttest Learning Outcomes

Activities	Actions	Many Students	Significant Limits	Significance Value	Remarks
Small Group Trials	Pretest	6	0,05	0,191	Normally Distributed
	Posttest	6	0,05	0,960	Normally Distributed
Large Group Trials	Pretest	23	0,05	0,083	Normally Distributed
	Posttest	23	0,05	0,086	Normally Distributed

Based on the findings of the normality test analysis that has been carried out, it is concluded that the distribution of pre-test and post-test data in both sample categories, namely small groups and large groups, is distributed normally. This is evidenced by the significance value (p-value) obtained exceeding the predetermined significance threshold ($\alpha = 0.05$) (Jannah & Al Ghozali, 2020). Based on the data presented in the table, it can be seen that the significance values for the pretest and posttest in the small group were 0.191 and 0.960 respectively, where both values exceeded the set significance limit of 0.05. Similarly, the significance values for large groups in the pre-test and post-test were 0.083 and 0.086, respectively, exceeding the significance limit of 0.05. Therefore, from the collection and processing of data, it can be concluded that the data is distributed normally.

After the normality test was declared complete, the data analysis process was continued by implementing the T-Test and the Normalized Gain (N-Gain) Test which functioned to evaluate the level of learning effectiveness obtained through the use of Augmented Reality interactive card media

Table 8. T-Test Pretest and Posttest Test Results

Data	N	One-Sided p	Two-Sided p
Pretest - Small Group Posttest	6	0,001	0,003
Pretest - Large Group Posttest	23	<0.001	<0.001

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

It is known that the Sig. (2-tailed) value is 0.003 < 0.05 for the small group and the Sig. (2-tailed) value is < 0.001 < 0.05 for the large group. From this explanation, it can be concluded that there is a significant difference in the learning outcomes of Pancasila Education between before and after treatment, which is shown through pre-test and post-test scores. As a conclusion to the data analysis procedure, the *Normalized Gain* (N-Gain) Test was carried out which was used to evaluate the level of learning effectiveness and measure the amount of competency improvement achieved by the research subjects.

Table 9. Small Group N-Gain Test Results

	N	Minimum	Maximum	Red	Std. Deviation
N-Gain	6	0,43	0,90	0,6282	0,18986

Table 10. Large Group N-Gain Test Results

	N	Minimum	Maximum	Red	Std. Deviation
N-Gain	23	0,20	1,00	0,5791	0,20017

In Table 9 and 10, the analysis in the mean column shows that the Normalized Gain (N-Gain) score obtained by the small group is 0.6282, while the large group reaches 0.5791. Based on the criteria, the two achievements were in the range of $0.3 \leq g \leq 0.7$ which classified them into the medium category. These results confirm that Augmented Reality (AR)-based interactive card media is objectively effective in improving the learning outcomes of grade III students of SDN Mewek, especially in the material of traditional clothing in the Pancasila Education subject. This improvement occurred because AR technology is able to display traditional clothing objects in the form of interactive three-dimensional visualizations, so that students can observe the shape, motifs, and structure of clothing more clearly compared to two-dimensional images or videos. This finding is in line with research by Ni et al., (2024) which states that the use of Augmented Reality-based learning media can increase learning interest and help students understand concepts more concretely through interactive object visualization. In addition, research by Hannes and Fazli, (2023) also shows that the integration of AR technology in learning can increase student engagement and understanding because it allows direct interaction between students and digitally visualized learning objects. Thus, the use of AR-based KARINA media not only increases student interest in learning but also helps strengthen conceptual understanding of traditional clothing more effectively.

Conclusion

This study successfully developed and validated the KARINA (Nusantara Interactive Card) learning media based on Augmented Reality (AR) on traditional clothing material in Pancasila Education subjects for third-grade elementary school students. The integration of AR technology in interactive card media is able to transform previously abstract cultural concepts into more concrete and interactive visual experiences for students. The validation results showed a very high level of feasibility, with a score of 88% from material experts and 93% from media experts. In addition, the results of the effectiveness test showed a significant increase in learning outcomes, as indicated by the t-test value with a significance of $p < 0.05$ (0.003 and <0.001) and an N-Gain value of 0.6282 in small groups and 0.5791 in large groups which are in the medium category. These findings indicate that the AR-based KARINA media not only increases student engagement and learning motivation, but also helps students understand the characteristics of traditional clothing in more depth. Thus, KARINA media can be an alternative innovative learning media that is able to bridge the

needs of cultural learning with the development of digital technology and help teachers overcome the limitations of material visualization in elementary school classes.

Recommendation

Based on the research results, teachers are advised to utilize KARINA media based on Augmented Reality as an alternative learning medium to increase students' motivation and understanding of cultural diversity material, especially Indonesian traditional clothing, as well as develop its application to other abstract materials. For further researchers, they can develop this media by adding variations in content and interactive features and testing its effectiveness at a wider educational level and context to obtain more comprehensive findings.

References

Chandra, A. (2023). *The National Education System Law as the Legal Umbrella of Education in Indonesia* (Vol. 6, Number 4). http://Jiip.stkipyapisdompu.ac.id

Hake, R. R. (n.d.). Analyzing Change/Gain Scores. Retrieved from https://web.physics.indiana.edu/sdi/AnalyzingChange-Gain.pdfHandayani

Hannes Magdalena Hutagalung, & Fazli Rachman. (2023). Android-based Augmented Reality Media in Learning Pancasila and Citizenship Education. *Jurnal Pedagogi Dan Pembelajaran*, *6*(3), 385–396. https://doi.org/10.23887/jp2.v6i3.66149

Ni Wayan Cika Pratiwi, I Gede Margunayasa, & I Wayan Lasmawan. (2024). Media Pembelajaran Augmented reality Berbasis Profil Pelajar Pancasila Untuk Meningkatkan Minat Belajar IPA Kelas IV SD. *Jurnal Ilmiah Pendidikan Profesi Guru*, *7*(1), 110–122. https://doi.org/10.23887/jippg.v7i1.73179

Waruwu, M. (2024). Metode Penelitian dan Pengembangan (R&D): Konsep, Jenis, Tahapan dan Kelebihan. *Jurnal Ilmiah Profesi Pendidikan*, *9*(2), 1220–1230. https://doi.org/10.29303/jipp.v9i2.2141

Harianja, M. R., Yusup, M., & Sardianto Markos Siahaan. (2024). N-Gain Test on the Effectiveness of Game Use with SGQ Strategy to Improve Computational Thinking in Energy Literacy. *Journal of Intellectualita: Islam, Social and Science*, *13*(2). https://doi.org/10.19109/intelektualita.v13i2.25168

Harpeni Dewantara, A. (2020). TEACHERS' CREATIVITY IN UTILIZING IT-BASED MEDIA IS REVIEWED FROM THE STUDENTS' LEARNING STYLES. *Journal of Primary Education*, *1*(1), 15–28. https://jurnal.iain-bone.ac.id/index.php/algurfah/index

Hasanah, I. R. (n.d.). *IMPLEMENTATION OF THE RIGHTS AND OBLIGATIONS OF INDONESIAN CITIZENS IN THE FIELD OF EDUCATION REVIEW FROM ARTICLE 31 OF THE 1945 CONSTITUTION*.

Hutagulung, M. H., & Rachman, F. (2023). Android-based Augmented RealityMedia in Learning Pancasila and Citizenship Education. *Journal of Pedagogy and Learning*, *6*.

Jannah, F. N., & Al Ghozali, M. D. H. (2020). Development of Flash Mx-Based Learning Media in Muhadatsah Subjects. *An Nabighoh: Journal of Arabic Language Education and Learning*, *22*(01), 87. https://doi.org/10.32332/an-nabighoh.v22i01.1751

Nesri, F. D. P., & Kristanto, Y. D. (2020). Development of Technology-Assisted Teaching Modules to Develop Students' 21st Century Skills. *AXIOM: Journal of the*

Vol. 13 No. 2 : April 2026
E-ISSN: 2722-4627
pp. 728-737

Mathematics Education Study Program, *9*(3), 480. https://doi.org/10.24127/ajpm.v9i3.2925

By Wayan Cika Pratiwi, I Gede Margunayasa, & I Wayan Lasmawan. (2024). Augmented Reality Learning Media Based on Pancasila Student Profiles to Increase Science Learning Interest in Grade IV Elementary School. *Scientific Journal of Teacher Professional Education*, *7*(1), 110–122. https://doi.org/10.23887/jippg.v7i1.73179

Niwisruti, Rakhmawati, D., & Handayani, A. (2024). THE ROLE OF TEACHERS IN THE FORMATION OF LEARNING CHARACTERISTICS OF ELEMENTARY SCHOOL STUDENTS. *PGSD Scientific Journal FKIP Mandiri University*, *10*.

Okpatrioka. (2023). Research and Development (R&D) Innovative Research in Education. *DHARMA ACARIYA NUSANTARA : Journal of Education, Language and Culture*, *1*.

Sofyan, A., & Wardani, F. P. (2022). Digital-Based Mathematics Learning Innovation in Elementary School. In *Journal of Social Education and Humanities* (Vol. 1, Number 3).

Sugiyono. (2019). *Research & Development Methods and Development*. Alphabet.

Sugiyono. (2020). *Quantitative and Qualitative Research Methods and R&D*. Alphabet.

Syafriafdi, N. (2020). THE ROLE OF EDUCATIONAL TECHNOLOGY IN LEARNING. *Al-Aulia Journal*, *06*.

Tasya Wislim, Yelfa Desica Jusman, & Zefanya Fathiha Waldina. (2024). The Importance of Teacher Competency Development on the Quality of Education. *Syntax: Publications of English Linguists and Literature*, *2*(1), 98–105. https://doi.org/10.61132/sintaksis.v2i1.272

Wahab, A., & Syahid, A. (2021). *Education and Learning Journal Presentation of data in a frequency distribution table and its application to education*. *2*(1), 40–48. http://jurnal.fai@umi.ac.id

Watts, A. (2021). *Development of Snake and Ladder Game Media to Improve Learning Outcomes of Elementary School Students* (Vol. 2, Number 1).

Wirayudi Aditama, P., Nyoman Widhi Adnyana, I., & Ayu Ariningsih, K. (2019). AUGMENTED REALITY IN MULTIMEDIA LEARNING. In *Proceedings of the National Seminar on Design and Architecture (SENADA)* (Vol. 2).

Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). The Importance of Learning Media in the Teaching and Learning Process. *Journal on Education*, *05*(02), 3928–3936.

Zulkifli, A., Gusniati, J., Septi Zulefni, M., Aldania Afendi, R., Asni, W., & Fitriani, Y. (2025). *Normality test and homogeneity test tutorial using the SPSS* application (Vol. 1, Number 2). https://creativecommons.org/licenses/by/4.0/

