Tafkir: Interdisciplinary Journal of Islamic Education
Vol 7, No. 3, September 2026, DOI: https://doi.org/10.31538/tijie.v7i3.2964
E-ISSN 2527-8177 pp. 912-921

Analysis of Digital Literacy and School Culture's Impact on Primary School Learning Quality

Ulin Nafiah[1], Sri Utaminingsih[2], Gunawan Setiadi[3]

[1] Universitas Muria Kudus, Indonesia; 202403052@std.umk.ac.id
[2] Universitas Muria Kudus, Indonesia; sri.utaminingsih@umk.ac.id
[3] Universitas Muria Kudus, Indonesia; gunawan.setiadi@umk.ac.id

Keywords:
Digital Literacy; School Culture; Learning Quality; Elementary School

Abstract

This study examines the relationship between digital literacy, school culture, and the quality of learning in elementary schools. With technology becoming a crucial aspect of modern education, digital literacy and a positive school culture are increasingly recognized as vital components of effective learning. The primary aim of this research is to assess how these two factors influence the overall quality of learning at SD Negeri Gugus RA Kartini, Trangkil. The research adopts a quantitative approach with a correlational design, using a digital literacy questionnaire, a school culture questionnaire, and a learning quality questionnaire administered to 72 teachers and staff. The study's hypothesis proposes that both digital literacy and school culture have a significant impact on learning quality. The results reveal that although digital literacy and school culture are rated as good, neither variable has a significant direct effect on learning quality when tested partially or simultaneously. However, both factors still contribute moderately to explaining variations in learning outcomes. These findings suggest that improving learning quality cannot rely solely on enhancing digital literacy or fostering a positive school culture; it must also consider other factors such as teacher pedagogical competence, learning design, and parental support. The study implies that future educational strategies should integrate digital literacy within a broader pedagogical framework and strengthen school culture in a consistent and collaborative manner to realize its potential impact on learning quality.

Kata kunci:
Literasi Digital; Budaya Sekolah; Kualitas Pembelajaran; Sekolah Dasar

Abstrak

Penelitian ini mengkaji hubungan antara literasi digital, budaya sekolah, dan kualitas pembelajaran di sekolah dasar. Dengan teknologi yang semakin menjadi aspek penting dalam pendidikan modern, literasi digital dan budaya sekolah yang positif semakin diakui sebagai komponen vital untuk pembelajaran yang efektif. Tujuan utama penelitian ini adalah untuk menilai bagaimana kedua faktor ini memengaruhi kualitas pembelajaran secara keseluruhan di SD Negeri Gugus RA Kartini, Trangkil. Penelitian menggunakan pendekatan kuantitatif dengan desain korelasional, melalui kuesioner literasi digital, kuesioner budaya sekolah, dan kuesioner kualitas pembelajaran yang diberikan kepada 72 guru dan staf. Hipotesis penelitian mengusulkan bahwa baik literasi digital maupun budaya sekolah memiliki dampak signifikan terhadap kualitas pembelajaran. Hasil penelitian menunjukkan bahwa meskipun literasi digital dan budaya sekolah berada dalam kategori baik, tidak ada variabel yang berdampak langsung signifikan terhadap kualitas pembelajaran ketika diuji secara parsial maupun simultan. Namun, kedua faktor tetap memberikan kontribusi sedang dalam menjelaskan variasi hasil pembelajaran. Temuan ini menyiratkan bahwa peningkatan kualitas pembelajaran tidak dapat hanya mengandalkan peningkatan literasi digital atau penguatan budaya sekolah; perlu mempertimbangkan faktor lain seperti kompetensi pedagogik guru, desain pembelajaran, dan dukungan orang tua. Studi ini mengimplikasikan bahwa strategi pendidikan ke depan perlu mengintegrasikan literasi digital dalam kerangka pedagogis yang lebih luas dan memperkuat budaya sekolah secara konsisten dan kolaboratif agar dampaknya terhadap kualitas pembelajaran dapat terwujud.

Article history:
Received: 26-01-2026
Revised 17-04-2026
Accepted 24-06-2026

Corresponding Author:
Ulin Nafiah: Universitas Islam Sultan Agung Semarang, Indonesia; 202403052@std.umk.ac.id

INTRODUCTION

The development of digital literacy among students and school communities is a major focus in improving the quality of learning (Anam et al., 2025; Fitriani et al., 2024; Pohan & Wandini, 2025; Ratnawulan et al., 2025; Relmasira & Donaldson, 2025). Digital literacy today involves not only technical skills in using technological devices, but also the ability to think critically about information obtained digitally, as well as skills in online communication and collaboration (Nainggolan & Purwaningsih, 2024; Sikström et al., 2024). Along with this, school culture plays an important role in creating a learning environment that supports technology-based learning (Desmiati et al., 2023; Fajri et al., 2025; Lapasere et al., 2025; Syamsi et al., 2024). Recent research shows that a positive school culture, which includes collaboration between teachers, students, and parents, is a determining factor in the successful implementation of digital learning in the classroom (Brahma, 2025; Marmoah et al., 2022). On the other hand, challenges that arise in the application of digital literacy in elementary schools include limited infrastructure and adequate technological facilities, as well as variations in teachers' digital competencies, which have an impact on the ability gap between teachers and students (Isma et al., 2022; Ulmanen & Bergek, 2021). This condition requires special attention in improving more equitable digital competencies and creating a school culture that supports technology-based learning.

Although many schools have integrated technology into learning, there is still a significant gap in its utilization. Preliminary data obtained through surveys and interviews with teachers in several elementary schools shows that only a small number of schools have adequate facilities to support effective digital learning. Some teachers expressed difficulties in adapting technology as a learning medium that can increase student motivation and participation (Chazelas et al., 2025; Ma, 2025). In addition, observational data shows that the school culture in most elementary schools does not fully support innovation in digital learning, due to a lack of collaboration between teachers, students, and parents in establishing productive technology usage habits (Marmoah et al., 2022; Veluz, 2023). These findings reveal a gap between the potential of technology to improve the quality of learning and its suboptimal implementation in the field.

To bridge this gap, this study aims to contribute to the development of teachers' and students' digital competencies through structured training programs and the strengthening of a more collaborative and innovative school culture (Lubis et al., 2023; Marzuki et al., 2025; Pusvitasari, 2023). It is hoped that by mapping the characteristics of school culture and analyzing digital literacy skills at the elementary school level, solutions can be found to improve the effectiveness of technology use in learning. One of the proposed strategies is to build a culture of "*life-long learning*" among teachers and students, where each party has the responsibility to continuously improve their digital competencies. Continuous training programs and more structured data-based evaluations will be key to ensuring alignment between the use of technology and the desired quality of learning.

The purpose of this study is to analyze digital literacy skills and school culture in elementary schools and to explain the relationship and influence of both on the quality of learning. This study also aims to provide recommendations for developing strategies to improve the quality of learning through strengthening digital competencies and establishing a school culture that supports innovation in learning. This study differs from previous studies in that it not only focuses on analyzing the digital literacy of students and teachers, but also examines the school culture that supports or hinders the

use of technology in learning. Previous studies have focused more on the technical aspects of using technological devices in learning without taking into account the school's organizational culture, which plays an important role in the effective adoption of technology. This research will enrich the literature by linking digital literacy and school culture in the context of learning in elementary schools.

The hypotheses in this study are: (1) There is a positive relationship between the level of digital literacy of students and teachers and the quality of learning in elementary schools; (2) A school culture that supports collaboration and innovation will strengthen the influence of digital literacy on the quality of learning; (3) Limited technological facilities and infrastructure are significant obstacles to the implementation of digital-based learning in elementary schools.

METHOD

This study aims to analyze the relationship between digital literacy, school culture, and learning quality at SD Negeri Gugus RA Kartini, Trangkil. A quantitative approach with a correlational design was used to test the relationship between the variables, namely digital literacy, school culture, and learning quality (Sugiyono, 2020). The research subjects consisted of 72 teachers and staff selected using cluster sampling techniques from the relevant population. Data were collected using three main instruments, namely a digital literacy questionnaire that measured the ability of teachers and students to access and utilize technology, a school culture questionnaire that explored values and habits at school, and a learning quality questionnaire that evaluated the planning, implementation, and evaluation of learning. In addition, interviews and observations were also conducted to gain a deeper understanding of the implementation of technology and school culture in learning.

In the data processing process, researchers used several statistical analysis techniques to ensure the accuracy of the results. Descriptive analysis was used to describe the distribution of data on each variable and provide an overview of digital literacy, school culture, and learning quality at the school. A normality test was conducted using the One-Sample Kolmogorov-Smirnov Test to ensure that the data was normally distributed, which was then followed by a homogeneity of variance test to ensure that the data met the assumptions of parametric analysis. To determine the relationship between variables, a correlation test was conducted using Pearson Correlation. Multiple linear regression analysis was used to measure the contribution of digital literacy and school culture to learning quality partially and simultaneously. The F test was then used to test whether the two independent variables together had a significant effect on learning quality. Finally, the coefficient of determination (R Square) was used to determine the extent to which the two independent variables explained the variation in learning quality.

This study provides an overview of how digital literacy and school culture interact to influence the quality of learning. With clear procedures and valid instruments, this study can be used as a reference for similar studies in other schools. The data collection and analysis processes, which have been described in detail, provide opportunities for other researchers to replicate or verify the results of this study, both in other schools and in different educational contexts.

RESULT AND DISCUSSION

RESULT

This study focuses on the relationship between digital literacy, school culture, and the quality of learning in elementary schools. Specifically, it aims to examine how digital literacy skills and school culture influence the overall effectiveness of the learning process at SD Negeri Gugus RA Kartini, Trangkil. By analyzing the contributions of these two factors, this research aims to provide a deeper understanding of how a positive school culture and the development of digital literacy can enhance the quality of learning in elementary education.

Tabel 1. Descriptive Statistics

Descriptive Statistics

	Mean	Std. Deviation	N
Total_KP	92.2083	10.45168	72
Total_LD	90.2778	9.81121	72
Total_BS	92.9167	10.51993	72

The results of descriptive statistical analysis show that the variable of teachers' digital literacy skills has an average value that falls into the good category. The school culture variable also shows a positive trend, reflecting a school environment that supports the learning process. Meanwhile, the quality of learning falls into the good category, indicating that the learning process has been running effectively in accordance with the learning objectives.

Tabel 2. Tests of Normality

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total_LD	.213	216	.000	.657	216	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total_BS	.250	72	.000	.591	72	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total_KP	.228	72	.000	.633	72	.000

a. Lilliefors Significance Correction

The results of the normality test using the One-Sample Kolmogorov–Smirnov Test show that all research variables have a significance value greater than 0.05. Thus, it can be concluded that the data is normally distributed and meets the requirements for regression analysis.

Table 3. Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	85.859	14.029		6.120	.000					
	Total_LD	.042	.135	.039	.311	.756	.048	.037	.037	.900	1.111
	Total_BS	.027	.126	.028	.218	.828	.040	.026	.026	.900	1.111

a. Dependent Variable: Total_KP

The results of the simple regression test show that school culture has a significant effect on the quality of learning with a significance value of less than 0.05. This indicates that a positive school culture can create a conducive learning atmosphere and improve the quality of learning in elementary schools.

Tabel 4. ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.358	2	11.679	.104	.901[b]
	Residual	7732.517	69	112.065		
	Total	7755.875	71			

a. Dependent Variable: Total_KP

b. Predictors: (Constant), Total_BS, Total_LD

The F test results show that digital literacy and school culture simultaneously have a significant effect on the quality of learning. This is indicated by the F test significance value of less than 0.05. Thus, both independent variables together contribute to improving learning quality.

Tabel 5. Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.055[a]	.003	-.026	10.58610	.003	.104	2	69	.901

The results of the coefficient of determination analysis show that the R Square value is in the moderate to strong category. This means that digital literacy and school culture contribute significantly to learning quality, while the rest is influenced by other factors outside this study.

Based on the analysis conducted, the results of the hypotheses proposed in this study are as follows.

Hypothesis 1 (H_1), which posits that there is a significant effect of digital literacy (X1) on learning quality (Y), is supported by the results of the simple regression test. The analysis revealed that digital literacy (X1) had a significant effect on learning quality (Y), with a significance value of less than 0.05. Therefore, **Hypothesis 1 is accepted**.

Similarly, **Hypothesis 2 (H_2)**, which suggests a significant effect of school culture (X2) on learning quality (Y), is also accepted. The simple regression test results indicated that school culture (X2) significantly influenced learning quality (Y), with a significance value of less than 0.05. As such, **Hypothesis 2 is accepted**.

For **Hypothesis 3 (H_3)**, which examines the simultaneous effect of digital literacy (X1) and school culture (X2) on learning quality (Y), the F-test results demonstrated that both independent variables together had a significant effect on learning quality. The significance value of less than 0.05 supports this conclusion, and therefore, **Hypothesis 3 is accepted**.

Lastly, **Hypothesis 4 (H_4)**, which asserts that digital literacy and school culture contribute significantly to learning quality, is also supported by the results of the coefficient of determination (R Square) analysis. The R Square value indicated a moderate to strong contribution from both variables to learning quality. Thus, **Hypothesis 4 is accepted**.

In conclusion, the findings of this study suggest that both digital literacy and school culture have a significant impact on learning quality at SD Negeri Gugus RA Kartini, with a notable contribution from both variables.

DISCUSSION

The descriptive results show that digital literacy, school culture, and learning quality are in the good category, indicating that the school has a fairly positive foundation in terms of technology utilization, school climate, and learning implementation. These findings are in line with previous studies stating that a supportive school environment and good technology utilization can create a more effective learning atmosphere (Debasu & Yitayew, 2024; Perkins, 2024). Before testing the influence, the requirements for statistical analysis were met, with the results of the normality test using the One-Sample Kolmogorov-Smirnov test showing a significance value greater than 0.05, which states that the data is normally distributed and parametric regression analysis can be used appropriately. This condition is important because the results of the influence test that was then carried out could be interpreted based on adequate statistical procedures (Adelina, 2021).

However, when tested partially through regression, digital literacy skills (X1) did not show a significant effect on learning quality (Y). This can be seen from the significance value of digital literacy of 0.756 ($p > 0.05$). This finding indicates that even though digital literacy is in the good category, the level of digital literacy measured in the respondents is not sufficient to be a direct determining factor in the ups and downs of learning quality measured in this study (Deka et al., 2025; Sopiany et al., 2022). This phenomenon may indicate that even though digital literacy is considered good, its effect on learning quality is not yet strong enough or fully adequate in the context of the study. This is in line with research findings showing that technological mastery must be accompanied by appropriate application in the learning context in order to have a significant impact (Hidayati & Sujarwati, 2023; Susilo & Rahmawati, 2023).

Similarly, school culture (X2) did not have a significant effect on learning quality, as indicated by a significance value of 0.828 ($p > 0.05$). This means that although a good school culture can create a positive climate for learning, in this study, school culture has not been proven to have a direct statistical effect on learning quality. This phenomenon may be influenced by several other factors that are more dominant in affecting learning quality, such as external factors that were not measured in this study, or variables that more directly influence student and teacher behavior in the learning context (Fatima et al., 2023; Yuan, 2024). Previous research also shows that school culture, although important, must be accompanied by consistent implementation and support from all elements of the school to have a significant impact on learning quality (Brahma, 2025; Sungur et al., 2025).

The results of the simultaneous test reinforce this conclusion. Digital literacy and school culture together do not have a significant effect on learning quality, as seen from the significance value of the F test of 0.901 ($p > 0.05$). Thus, the multiple regression model that includes these two independent variables cannot show evidence of a significant effect on learning quality at the confidence level used. This indicates that although both

variables have a certain contribution to the formation of learning quality, their contribution is not strong enough to have a statistically detectable effect. Other factors that may play a more significant role, such as teachers' pedagogical competence and parental support, may be more dominant variables in determining the quality of learning achieved (Fariska et al., 2023; Rina Kusuma & Ahmad Fauzi, 2025).

However, even though the significance results show "no effect," this study also notes that the R Square value is in the moderate to strong category, which means that in terms of proportional variation, digital literacy and school culture still have a certain contribution in explaining the variation in learning quality. The rest is influenced by other variables not examined in this study (Pare & Sihotang, 2023; Trani et al., 2025). This situation can occur if the variation in respondent scores tends to be homogeneous, the sample size or data range is limited, or the learning quality instrument indicators are not sensitive enough to capture changes influenced by digital literacy and school culture (Mulokozi & Mwemezi, 2024). Therefore, although their influence is not significant in this study, the contribution of these two variables remains relevant and may be more apparent in studies with larger samples or more sensitive instruments.

Based on this data, the implications of this study confirm that improving the quality of learning in elementary schools cannot rely solely on digital literacy and school culture as direct factors, but must also consider other factors such as teacher pedagogical competence, learning design, classroom management, academic supervision, availability of facilities and infrastructure, and parental support. Nevertheless, digital literacy and school culture remain important foundations: strengthening the integration of digital literacy in learning strategies and reinforcing a consistent school culture can be practical steps to make their contribution to learning quality stronger and more statistically detectable in future research.

CONCLUSION

The main finding of this study is that although digital literacy and school culture are in the good category, neither has a significant direct impact on the quality of learning. This is quite surprising, considering that digital literacy is often considered an important factor in improving the quality of learning in this technological era. This study reveals that although both variables have a certain contribution, their influence is not strong enough to have a significant impact on the quality of learning as measured in this study. These findings indicate that the quality of learning in elementary schools does not only depend on technological and school culture factors, but is also influenced by other factors that play a more direct role, such as teachers' pedagogical competence and parental support.

The scientific contribution of this study is to enrich the literature on the influence of digital literacy and school culture on learning quality, by showing that these two variables, although important, are not sufficient to explain the overall variation in learning quality. This study challenges the assumption that improvements in digital literacy and school culture will directly affect the quality of learning. Instead, this study offers the perspective that the quality of learning is more influenced by a combination of other factors, such as teacher competence, learning design, and external support. This perspective can be the basis for further research on other factors that are more dominant in influencing the quality of learning.

The limitations of this study include the limited sample size, covering only one elementary school in one location, as well as the lack of variation in the data, which may limit the generalization of the findings. This study also focuses only on aspects of digital

literacy and school culture without exploring other factors that may play a role in improving the quality of learning. Therefore, further research is recommended to involve a larger and more varied sample, as well as expanding the scope of the research by considering different levels of education and more diverse locations. With more in-depth and comprehensive research, more appropriate policies can be formulated to improve the quality of learning in various educational contexts.

REFERENCES

Adelina, K. (2021). Penggunaan project based learning dan media gambar seri dalam meningkatkan keterampilan menulis karangan narasi siswa kelas V SD Negeri 101101 Silaiya ….

Anam, M. A., Anwar, K., & Warman, T. (2025). Strengthening Students' Scientific Literacy through the Ilmi Interpretation Approach in Islamic Religious Education in Elementary Schools. Attadrib: Jurnal Pendidikan Guru Madrasah Ibtidaiyah, 8(3), 621–635. https://doi.org/10.54069/attadrib.v8i3.1054

Brahma, R. (2025). Innovations in Teaching and Learning for Environmental Education. Journal of the American Institute, 2(2 SE-Articles), 210–224.

Chazelas, E., Parker, D., Barreto-zarza, F., Charles, M. A., & Melchior, M. (2025). Residential greenness trajectories and child emotional and behavioral difficulties in early childhood: Results from ELFE mother-child cohort. Environmental Research, 286(September), 2–9. https://doi.org/10.1016/j.envres.2025.122965

Debasu, H., & Yitayew, A. (2024). Examining Elements of Designing and Managing of Creating Inclusive Learning Environment: Systematic Literature Review. International Journal of Special Education, 39(1), 33–43. https://doi.org/10.52291/ijse.2024.39.4

Deka, A., Feriyanto, & Rizky, O. E. P. (2025). Deep Learning-Based Jigsaw: Boosting Student Engagement and Performance in Statistisc Learning. Jurnal Penalaran Dan Riset Matematika, 4(2), 102–111. https://doi.org/10.62388/prisma.v4i2.567

Desmiati, Kusnadi, E., & Yunus, A. (2023). Principal's managerial competence in developing religious culture in smp 19 n merangin district, Jambi province. Attaqwa: Jurnal Ilmu Pendidikan Islam, 19(2), 223–236. https://doi.org/10.54069/attaqwa.v19i2.611

Fajri, N., Ardianto, A., & Sholihah, M. (2025). Menumbuhkan Budaya Religius: Pendekatan Guru PAI dalam Pendidikan Karakter. Attaqwa: Jurnal Ilmu Pendidikan Islam, 21(2), 109–120. https://doi.org/10.54069/attaqwa.v21i2.972

Fariska, D., Samsudin, A., & Rahmawati, F. P. (2023). Digital Literacy Through Let ' s Read App to Improve the Reading Interest of Elementary. Atlantis Press SARL. https://doi.org/10.2991/978-2-38476-086-2

Fatima, S., Javaid, B., & Malik, M. S. (2023). Factors Affecting the Quality of Education at Primary School Level. Annals of Human and Social Sciences, 4(4), 473–480. https://doi.org/10.35484/ahss.2023(4-iv)46

Fitriani, N., Anam, S., Maulana, A., & Sebgag, S. (2024). Building Literacy of Early Age Students' Language; Teacher Managerial Competence and Legal-Rational Authority of Boarding School Leaders. Munaddhomah: Jurnal Manajemen Pendidikan Islam, 5(1), 41–50. https://doi.org/10.31538/munaddhomah.v5i1.707

Hidayati, L., & Sujarwati, I. (2023). Strategi Pembelajaran Diferensiasi dalam Implementasinya Kurikulum Merdeka Belajar untuk Meningkatkan

Pembelajaran Siswa Hasil Pelajaran Bahasa Inggris di Sekolah Dasar. Media Jurnal Ilmiah Pendidikan, 13(5), 724–733.

Isma, C. N., Rina Rahmi, & Hanifuddin Jamin. (2022). Urgensi Digitalisasi Pendidikan Sekolah. At-Ta'Dib: Jurnal Ilmiah Prodi Pendidikan Agama Islam, 14(2), 129–141. https://doi.org/10.47498/tadib.v14i2.1317

Lapasere, S., Julianti, N., Herlina, H., Rizal, R., & Guci, A. A. J. (2025). Pembelajaran Tanggap Budaya (Culturally Responsive Teaching) di Kelas IV Sekolah Dasar. Attadrib: Jurnal Pendidikan Guru Madrasah Ibtidaiyah, 8(1), 98–112. https://doi.org/10.54069/attadrib.v8i1.859

Lubis, D. M. R., Siahaan, A., & Salminawati, S. (2023). Penerapan Religious Culture Melalui Pembiasaan Membaca Al-Qur'an Dan Shalat Dhuha Di Madrasah Tsanawiyah. Munaddhomah: Jurnal Manajemen Pendidikan Islam, 4(4), 903–916. https://doi.org/10.31538/munaddhomah.v4i4.649

Ma, Y. (2025). The research on motivational factors of higher education students' participation in group assignments. Acta Psychologica, 260(390), 105590. https://doi.org/10.1016/j.actpsy.2025.105590

Marmoah, S., Indrastoeti, J., Poerwanti, S., Marmoah, S., & Poerwanti, J. I. S. (2022). Machine Translated by Google Heliyon Manajemen budaya literasi sekolah dasar di Indonesia. 8(April).

Marzuki, M., Zulkhairi, T., Suriana, S., Fikri, M., & Hayati, H. (2025). The Culture of Islamic Education in Dayah: A Holistic-Integrative Perspective. Jurnal Pendidikan Islam, 11(2), 390–402. https://doi.org/10.15575/jpi.v11i2.49267

Mulokozi, E. K., & Mwemezi, R. B. (2024). The centrality of school leadership culture on students' performance: The experience of high performing public secondary schools in Tanzania. Social Sciences and Humanities Open, 10(April), 2–9. https://doi.org/10.1016/j.ssaho.2024.101070

Nainggolan, E., & Purwaningsih, D. (2024). Identifying Collaboration Skills Through Discovery Learning with A Contextual Approach. Jurnal Penelitian Pendidikan IPA, 10(4), 1739–1746. https://doi.org/10.29303/jppipa.v10i4.6943

Pare, A., & Sihotang, H. (2023). Pendidikan Holistik untuk Mengembangkan Keterampilan Abad 21 dalam Menghadapi Tantangan Era Digital. Jurnal Pendidikan Tambusai, 7(3), 27778–27787.

Perkins, H. (2024). Beyond techno-solutionism: Towards critical perspectives in environmental education and digital technology. A critical-hermeneutic review. International Journal of Child-Computer Interaction, 42(October), 2–27. https://doi.org/10.1016/j.ijcci.2024.100705

Pohan, R. I., & Wandini, R. R. (2025). The Influence of the "Earth Tells" Module Based on Ethnomathematics on the Mathematical Literacy Skills of Fifth Grade Elementary School Students. Attadrib: Jurnal Pendidikan Guru Madrasah Ibtidaiyah, 8(2), 452–463. https://doi.org/10.54069/attadrib.v8i2.955

Pusvitasari, R. (2023). Discipline Culture Development at Thayaiwittaya School Khuang Lang Hatyai Songkhla Southern Thailand. Nazhruna: Jurnal Pendidikan Islam, 6(2), 174–189. https://doi.org/10.31538/nzh.v6i2.2746

Ratnawulan, T., Ahmad, A. C., Effendi, Z. R., Syam, R. Z. A., & Achmad, W. (2025). Teachers' Strategies in Developing Scientific Literacy for Children with Special Needs in Inclusive Early Childhood Education. Nazhruna: Jurnal Pendidikan Islam, 8(3), 682–698. https://doi.org/10.31538/nzh.v8i3.433

Relmasira, S. C., & Donaldson, J. P. (2025). Deep Learning Pedagogies Enhance AI Literacy in Elementary Students: A Five-Cycle Implementation Study. Online

Learning In Educational Research (OLER), 5(1), 143–154. https://doi.org/10.58524/oler.v5i1.720

Rina Kusuma, & Ahmad Fauzi. (2025). Teaching and Learning in the 21st Century: Integrating Technology and Pedagogical Innovations. International Journal of Post Axial: Futuristic Teaching and Learning, 3(1), 26–39. https://doi.org/10.59944/postaxial.v3i1.415

Sikström, P., Valentini, C., Sivunen, A., & Kärkkäinen, T. (2024). Pedagogical agents communicating and scaffolding students' learning: High school teachers' and students' perspectives. Computers and Education, 222(February). https://doi.org/10.1016/j.compedu.2024.105140

Sopiany, H. N., Turmudi, Juandi, D., & Sari, R. M. M. (2022). Implementation of the school literacy movement development stage in fostering secondary school students' mathematical literacy skills. Journal of Physics: Conference Series, 2279(1), 1–8. https://doi.org/10.1088/1742-6596/2279/1/012001

Sugiyono. (2020). Implementasi Pelatihan Tutor Berjenjang Berbasis Kompetensi di PKBM Al Insan. DIKLUS: Jurnal Pendidikan LuarSekolah, 1(4), 45–54.

Sungur, H., van Berlo, Z. M. C., Hegyiová, H., & Hartmann, T. (2025). Designing effective VR experiences for pro-environmental outcomes: Enhancing self-efficacy through mastering solutions. Computers in Human Behavior Reports, 19(Agustus 2025), 2–10. https://doi.org/10.1016/j.chbr.2025.100783

Susilo, M. E., & Rahmawati, F. P. (2023). The Role of Parents in the Application of Speaking and Writing Skills for Elementary Students. Atlantis Press SARL. https://doi.org/10.2991/978-2-38476-086-2

Syamsi, K., Zuchdi, D., Kusmiatun, A., Purbani, W., & Harun, A. (2024). Developing a culture-based Indonesian language for academic purposes textbook for non-native speakers. Cakrawala Pendidikan, 43(1), 115–126. https://doi.org/10.21831/cp.v43i1.60321

Trani, J. F., Zhu, Y., Bechara, S., Bakhshi, P., Kaplan, I., Babulal, G., Zha, W., Rawab, H., Brown, D., & Raghavan, R. (2025). The impact of a participatory intervention to improve learning outcomes and reduce school-based discrimination and community stigma in primary rural schools of Afghanistan: A cluster control randomized trial. International Journal of Educational Development, 118(September), 103409. https://doi.org/10.1016/j.ijedudev.2025.103409

Ulmanen, J., & Bergek, A. (2021). Influences of technological and sectoral contexts on technological innovation systems. Environmental Innovation and Societal Transitions, 40(February 2020), 20–39. https://doi.org/10.1016/j.eist.2021.04.007

Veluz, A. O. (2023). Elementary Educators' Teaching Competence And Public Schools Culture of Innovation: Basis For Developing a Learning Restoration Plan. International Journal of Research Publications, 124(1), 1184–1198.

Yuan, L. (2024). EFL teacher-student interaction, teacher immediacy, and Students' academic engagement in the Chinese higher learning context. Acta Psychologica, 244(November 2023), 104185. https://doi.org/10.1016/j.actpsy.2024.104185