Teachers' Technological Capability through Pedagogical Competence on Students' Digital Literacy

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ABSTRACT

In this rapidly evolving era of disruption, the world is undergoing significant transformations that reshape how individuals communicate, collaborate, and access information. These changes present critical challenges for educators, particularly in embedding digital literacy within pedagogical frameworks. This study examines the influence of Information and Data Literacy and Pedagogical Competence on teachers' Technological Capability, with Student Communication and Collaboration as a potential mediating variable. Employing a quantitative design with snowball sampling, data were collected via questionnaires and analyzed through path analysis. The findings reveal that Pedagogical Competence significantly enhances Technological Capability ($\beta = 0.17$), both directly and indirectly through improved student communication and collaboration ($\beta = 0.14$). In contrast, Information and Data Literacy demonstrates a minimal direct effect ($\beta = 0.08$) and even a slight negative indirect influence ($\beta = -0.0028$), highlighting gaps in translating digital access into effective classroom practice. Moreover, Student Communication and Collaboration does not act as a strong mediator, suggesting that fostering interaction skills alone is insufficient without pedagogical alignment. These insights underscore the urgent need for evidence-based professional development programs that focus not only on technical proficiency but also on pedagogical innovation. The study contributes valuable implications for educational policymakers, school leaders, and teacher training institutions in crafting strategic interventions to empower educators in navigating digital transformation effectively.

Keywords: Teachers' Technological Capability; Pedagogical Competence; Students' Digital Literacy; Technology in Education; Technology-Enhanced Teaching; Teacher Competence; Impact of Technology on Learning; Educational Innovation; Digital Literacy Improvement.

1. Introduction

Digital literacy is not merely the ability to operate technological devices in daily life. According to the Directorate of Primary Schools, digital literacy is one of the six fundamental literacies that students must master in the modern era. The implementation of digital literacy at the elementary school level is closely related to the School Literacy Movement initiated by the government. The six fundamental literacies that students need to acquire include reading and writing literacy, scientific literacy, numerical literacy, digital literacy, financial literacy, and cultural and civic literacy.

In the rapidly evolving era of disruption, the world is experiencing significant transformations that drive changes in various aspects of life, including how individuals communicate and access information. The development of social media and digital communication presents its own challenges, one of which is the widespread dissemination of hoax news. Tsaniyah and Juliana (2019) emphasize that without adequate digital literacy skills, individuals are vulnerable to inaccurate information and struggle to distinguish between facts and opinions. Therefore, digital literacy has become an urgent necessity, especially for the younger generation, to help them filter and assess the credibility of the information they receive.

Beyond the challenge of misinformation, the advancement of digital technology also brings other negative impacts, such as the rise of cybercrime and deviant online behaviors. Data from the Indonesian Child Protection Commission (KPAI) in 2020 recorded 103 cases of children being victims of online sexual crimes, nine cases of children as perpetrators of online sexual crimes, 91 reports of children exposed to pornographic content via social media, and 389 cases of children possessing media containing pornographic content. Additionally, there were 46

reports of children being victims of cyberbullying and 13 reports of children as perpetrators of online bullying. The Directorate of Primary Schools also noted that around 40% of bullying cases among children occur in the digital space, primarily through social media. These data highlight the pressing threats in the digital world. Thus, digital literacy education in schools should not only focus on technical skills in using digital devices but also instill ethical values, responsibility, and mutual respect in online interactions (Farid, 2023). As such, digital literacy equips students not only with technological proficiency but also with the wisdom, critical thinking, and ethical behavior necessary for navigating an increasingly complex digital era.

In developed countries, primary and secondary education curricula have emphasized the importance of Information and Communication Technology (ICT) in learning. Digital competency should be integrated into teaching activities at all educational levels as an essential basic skill. Therefore, internet access should be available both at school and at home to support more effective and innovative learning processes (Blikstad-Balas, 2015). Digital education is often described as an ever-evolving field with the emergence of new technologies. This rapid change can pose challenges for educators but also offers opportunities to enhance the quality of learning (Zawacki-Richter & Jung, 2023). Adequate digital literacy skills among educators significantly impact the effectiveness of classroom learning. Unfortunately, many teachers still use various online sources without first evaluating their validity. This issue arises from a lack of understanding of search techniques and accurate information verification, despite digital literacy being crucial for accessing and filtering high-quality learning materials (Diputra, Tristiantari & Jayanta, 2020).

In addition to its positive impacts, digital technology also has various negative consequences, such as exposure to inappropriate content, including violence, pornography, human trafficking, and cyberbullying (Mazdalifah & Sitepu, 2018). Another common negative impact on teenagers is the shift in moral and ethical values in daily life. This phenomenon is evident in the way teenagers dress and speak, which is increasingly influenced by popular culture without filtering values that align with social norms (Kurniawan et al., 2023). Given these challenges, it is clear that digital literacy must become an integral part of education, starting from primary to secondary levels. Teachers play a crucial role in guiding students to not only become proficient technology users but also to critically analyze and evaluate information while engaging in ethical and responsible digital activities (Yunitasari & Prasetya, 2022; Agustina, Adha & Mentari, 2023).

In the educational context, digital media has become an inseparable part of students' lives. Digital skills required are not limited to technical abilities such as connecting devices, downloading documents, or saving files but also include effective communication and information processing through various digital interactions, including reading, writing, and speaking in online environments (Luthfia et al., 2021). For teenagers, digital literacy is essential in helping them analyze and compare various information sources quickly and accurately. These skills enable them to avoid misinformation and hoaxes that are widely spread on the internet (Sumiati & Wijonarko, 2020). At the junior high school level, digital literacy refers to students' ability to effectively and critically use information and communication technology (ICT) to search, evaluate, process, and communicate via digital platforms (Hidayat & Subando, 2024). With the rapid advancement of technology, digital literacy is no longer an option but a necessity that every student must possess to adapt to the ever-evolving digital world (Johanes, Suroyo,

& Budiastra, 2022). In this regard, teachers' pedagogical competence plays a crucial role in developing students' digital literacy. Teachers are expected not only to master the subject matter deeply but also to leverage digital technology as a teaching tool.

Pedagogical competence includes understanding how to integrate technology into teaching methods, creating innovative learning experiences, and guiding students to think critically and ethically when using digital media (Oktarin & Saputri, 2024). Therefore, strengthening digital literacy in education must begin with improving teachers' pedagogical competence to shape a digitally literate, critical, and responsible generation in facing the challenges of the digital era. Digital literacy is an essential skill that encompasses an individual's ability to access, understand, evaluate, and communicate information through various digital devices and platforms. In today's digital era, digital literacy is not only a necessity for students but also for educators as learning facilitators. The level of digital literacy in a region can be influenced by various factors, such as access to technology, the quality of education, teachers' digital competence, family support, and government policies in promoting technology integration in schools.

In the educational context, teachers' pedagogical competence plays a vital role in developing students' digital literacy. Pedagogical competence involves teachers' ability to design, manage, and evaluate effective learning processes that align with students' needs (Anwar, 2018). Teachers with strong pedagogical competence can integrate digital technology into the learning process, thereby enhancing students' digital literacy skills optimally (Batubara, Sinaga & Haidir, 2024). This study aims to analyze teachers' readiness and pedagogical competence in supporting the development of students' digital literacy, particularly in Sekolah Penggerak at the junior high school level. The research focuses on strategies employed by teachers to enhance students' digital literacy, challenges faced in digital-based learning, and efforts made to optimize technology integration in education. By understanding the extent of teachers' preparedness in facing the challenges of the digital era, the findings of this study are expected to provide recommendations for educational policy development and improving teachers' pedagogical competence in supporting digital literacy in schools.

2. Theoretical Review

2.1. Educator Competence

In the field of education, teacher quality plays a central role in determining the effectiveness of the learning process. According to the Indonesian Minister of National Education Regulation No. 16 of 2007 on Academic Qualification Standards and Teacher Competence, four main competencies serve as indicators of teacher quality in Indonesia: pedagogical competence, personality competence, social competence, and professional competence. These four aspects are interrelated and must be mastered by every teacher to optimally carry out their duties in guiding and developing students' potential. These competencies include:

1) Pedagogical competence, which refers to a teacher's ability to effectively manage the learning process and understand students' characteristics (Sukmawati, 2019).

2) Personality competence, which reflects the character qualities that a teacher must possess in carrying out their professional duties (Lase, 2016).

3) Social competence, which relates to a teacher's ability to communicate and interact effectively with various stakeholders, including students, colleagues, school staff, and the wider community (Huda, 2017).

4) Professional competence, which pertains to mastering subject matter in-depth and developing and implementing effective teaching strategies (Nurtanto, 2016).

These four competencies not only contribute to improving education quality but also support effective instructional delivery, classroom management, communication, problem-solving, and student learning assessment. A competent teacher must be able to apply various teaching techniques and strategies that align with students' needs to achieve optimal learning outcomes (Peklaj, 2015). Enhancing teacher competencies should be a priority in every educational policy to create a generation that is intelligent, critical, and prepared for future challenges (Purwoko et al., 2017).

2.2. Pedagogical Competence

Referring to Government Regulation of the Republic of Indonesia No. 19 of 2005 on National Education Standards, specifically in Article 28, Paragraph (3), Point A, pedagogical competence is defined as a teacher's ability to manage student learning. This competence includes understanding student characteristics, designing and implementing effective learning processes, evaluating learning outcomes, and fostering students' potential so they can be optimally actualized (Habibullah, 2012). Minister of National Education Regulation (Permendiknas) No. 16 of 2007 on Educational and Teaching Standards states that pedagogical competence is a teacher's ability to manage student learning. This competence encompasses fundamental aspects that an educator must possess to ensure effective learning processes that meet students' needs. According to Suprihatiningrum (2014), pedagogical competence includes:

1)   Understanding educational principles and foundations, including the ability to manage learning.

2)   Understanding student characteristics.

3)   Designing systematic and student-centered learning plans.

4)   Implementing an educational and interactive learning process.

5)   Utilizing technology to enhance teaching effectiveness.

6)   Evaluating learning outcomes to assess student achievements and the effectiveness of learning strategies.

7)   Developing students' potential for self-actualization.

Pedagogical competence is a fundamental skill that distinguishes the teaching profession from others (Akbar, 2021; Somantri, 2021). Mastering this competence is essential for every teacher to improve learning quality and optimize student development. It is a crucial aspect that allows teachers to manage learning effectively, encompassing understanding students' characteristics, designing and implementing suitable learning approaches, conducting comprehensive evaluations, and fostering students' potential (Anwar, 2018; Susanto & Rozali, 2020).

2.3. Technology in Education

In today's rapidly evolving digital era, technology has become an inseparable part of daily life, including education. The integration of technology in the learning process has brought significant changes, both in teaching methods and in how students acquire and process information (Isti'ana, 2024). Technology, as a product of scientific advancement, influences various aspects of life, including education. Therefore, leveraging technology in education is essential to support and enhance the effectiveness of the learning process (Lestari, 2018). The advancement of Information and Communication Technology (ICT) has significantly impacted education, with various technology-based learning models such as e-learning, Computer-Assisted Instruction (CAI), Computer-Based Instruction (CBI), and e-teaching being widely adopted to support teaching and learning (Khotimah, Astuti, & Apriani, 2019; Hidayatullah et al., 2023). These learning models allow teachers and students to access and explore learning materials independently using the internet and computers as learning media (Kristiawan, 2014).

2.4. Digital Literacy

Digital literacy is not only beneficial in education and healthcare but also plays a crucial role in industries, the economy, tourism, and various other sectors. Mastery of digital literacy skills, particularly in utilizing the internet, has become an urgent necessity to support economic growth. This is evident in the rapid expansion of online marketplaces, which increasingly dominate digital trade activities (Widyastuti, Nuswantoro, & Sidhi, 2016). In general, digital literacy provides ten main benefits, including saving time, accelerating learning, reducing costs, improving security, facilitating access to updated information, enhancing internet connectivity, supporting better decision-making, fostering creativity, increasing efficiency in work and study, and enabling easier access to the global world (Sumiati & Wijonarko, 2020: Disonglo & Limpot, 2023). Today, digital media is widely used across generations and age groups due to its ability to provide information, facilitate communication, simplify tasks, and offer convenience in shopping. This has become even more apparent during the COVID-19 pandemic, when people relied on digital services from home (Yulianti et al., 2021).

In education, digital literacy plays a crucial role in fostering students' digital awareness. Teachers are responsible for guiding students to develop technical skills in using digital tools and systems that align with learning needs (Admiraal et al., 2017). Additionally, optimizing digital resources in the classroom not only helps students grasp learning materials but also raises their awareness of ethical considerations and the impact of technology use in daily life (Falloon, 2020). Digital literacy encompasses the ability to search for, evaluate, and process information and complete tasks using digital devices and the internet in learning, work, and social interactions. It is also a combination of cultural and literary literacy, which, when applied to local issues, results in the concept of local digital literacy that can be introduced from early childhood education (Wei, 2022).

3. Methodology

This study employs a quantitative research method to analyze the relationship between teachers' pedagogical competence and digital literacy in junior high schools in Karawang Regency, Indonesia. This approach enables researchers to objectively measure variables and identify patterns and causal relationships within the collected data.

3.1. Sampling Technique and Participants

A snowball sampling technique is utilized to progressively select informants. This method begins with a small group of key participants who then recommend other potential respondents with relevant expertise and experience (Sugiyono, 2015). The study sample consists of 150 participants, including:

1) School Principals, who provide insights into school policies related to digital literacy integration and technological implementation in learning environments.

2) Teachers, who directly engage with students and offer perspectives on the challenges and readiness of educators in implementing digital literacy in classrooms.

3) School Supervisors, responsible for overseeing educational policies and evaluating digital literacy practices in schools, ensuring alignment with national education standards.

3.2. Data Collection and Analysis

Data is collected through structured questionnaires, designed to comprehensively capture information about teachers' pedagogical competence, technological proficiency, and digital literacy practices in schools. The collected data is analyzed using path analysis, a statistical technique that assesses the strength and direction of relationships between multiple variables in a research model. Path analysis is particularly useful in identifying both direct and indirect effects within complex educational settings.
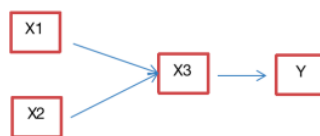
This study specifically examines the relationship between Information and Data Literacy (X1) and Pedagogical Competence (X2) on Technology Proficiency (Y), with Student Communication and Collaboration (X3) as a mediating variable. By incorporating a mediation analysis, this research aims to provide deeper insights into how teachers' digital literacy skills influence technological adoption and classroom interaction.

3.3. Practical Implications

The findings of this study will contribute to the development of targeted teacher training programs, emphasizing the enhancement of pedagogical and technological competencies. Additionally, the results will provide valuable recommendations for educational policymakers and school administratorsto refine digital literacy strategies, ensuring that teachers are better equipped to facilitate student engagement in digital learning environments.

4. Results and Discussion

4.1. Direct Effect of Information and Data Literacy on Technological Capability

The path analysis results show differences in the influence of predictor variables (independent variables) on the response variable (dependent variable). In statistical analysis, the P-value is used to determine the significance of relationships between variables, with a common threshold of 0.05. If the P-value < 0.05, the null hypothesis (no relationship) can be rejected, indicating a significant relationship. Conversely, if the P-value > 0.05, the null hypothesis cannot be rejected, meaning no significant relationship is found.

Table 1. Direct Effect Results

Direct effects						95% Confidence Interval	
		Estimate	Std. Error	z-value	p	Lower	Upper
X1	→ Y	-0.023	0.051	-0.464	0.642	-0.123	0.076
X2	→ Y	0.171	0.071	2.414	0.016	0.032	0.309

Note. Delta method standard errors, normal theory confidence intervals, ML estimator.

The results for X1 on Y show a P-value of 0.642, which is greater than 0.05, indicating no significant relationship between X1 and Y. Thus, statistically, data literacy does not have a direct significant influence on technological capability. The results for X2 on Y show a P-value of 0.016, which is less than 0.05, indicating a significant relationship between X2 and Y. This finding supports the hypothesis that the higher the level of communication and collaboration, the greater its impact on the ability to use technology.

4.2. Indirect Effect of Information and Data Literacy on Technological Capability through Security

The indirect effect path analysis results show that variable X3 acts as a mediator between predictor variables X1 and X2 and the response variable Y. The results for X1 through X3 as a mediator on Y show a P-value of 0.785, which is greater than 0.05, indicating no significant relationship between X1 and X3, nor between X3 and Y. This means that the indirect effect through variable X3 is not significant, and X3 does not mediate the relationship between X1 and Y. The results for X2 through X3 on Y show a P-value of 0.784, which is also greater than 0.05. This indicates no significant relationship between X2 and X3, nor between X3 and Y. Therefore, the indirect effect through variable X3 is also not significant, meaning X3 does not mediate the relationship between X2 and Y. This suggests that the influence of both predictor variables on Technological Capability does not depend on Security as an intermediary.

Table 2. Indirect Effect Results

Indirect effects				Std.			95% Confidence Interval	
			Estimate	Error	z-value	p	Lower	Upper
X1	→ X3	- Y	0.008	0.031	0.273	0.785	-0.052	0.069
X2	→ X3	- Y	0.015	0.054	0.274	0.784	-0.090	0.120

Note. Delta method standard errors, normal theory confidence intervals, ML estimator.

4.3. Total Effect of Information and Data Literacy on Technological Capability

The path analysis results show differences in the overall effect of variables X1 and X2 on Y. The total effect of X1 on Y has an Estimate of -0.015 and a P-value of 0.708, indicating no significant influence. Meanwhile, the total effect of X2 on Y has an Estimate of 0.185 and a P-value < 0.001, indicating that X2 has a significant influence on Y.

Table 3. Total Effect Results

Total effects							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
X1	→	Yi	-0.015	0.040	-0.374	0.708	-0.094	0.064
X2	→	Y	0.185	0.046	4.008	< .001	0.095	0.276

Note. Delta method standard errors, normal theory confidence intervals, ML estimator.
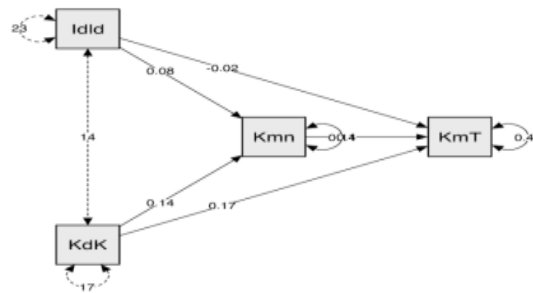
Figure 1. Representation of Pathplot Results

X1= Idld; X2 = Kmn; X3 = Kdk; Y = KmT.

The results of the path analysis reveal a complex dynamic between Information and Data Literacy (X1), Pedagogical Competence (X2), and Technological Ability (Y), with Student Communication and Collaboration (X3) serving as a mediating variable. The direct influence of Pedagogical Competence on Technological Ability is recorded at 0.17, indicating a stronger contribution compared to the direct influence of Information and Data Literacy, which stands at only 0.08. This finding suggests that the enhancement of teachers' technological ability is more substantially driven by pedagogical capacity than by mere access to or proficiency in data literacy. Moreover, Pedagogical Competence contributes positively to improving student communication and collaboration ($\beta = 0.14$), which in turn also positively impacts technological ability ($\beta = 0.14$). In contrast, the path from Information and Data Literacy to Student Communication and Collaboration demonstrates a weak and negative relationship ($\beta = -0.02$), highlighting that increased data literacy does not necessarily strengthen students' social interaction in digital learning environments.

From the mediation perspective, the role of Student Communication and Collaboration as a mediating variable shows only a modest contribution. The indirect effect of Pedagogical Competence on Technological Ability through this mediator is positive at 0.0196, while the mediating effect from Data Literacy through the same path is negative and very weak (-0.0028). These findings emphasize that to improve technological ability in the context of 21st-century learning, prioritizing the enhancement of teachers' pedagogical competence and collaborative approaches has a more significant impact than solely relying on interventions based on data literacy improvements. This supports the argument that educational digital transformation must be anchored in comprehensive teacher competencies—not only technical-informational but also pedagogical and social-communicative.

5. Conclusion

The path analysis results indicate that the variable Student Communication and Collaboration (X3) does not serve as a significant mediator in the relationship between Information and Data Literacy (X1) and Pedagogical Competence (X2) with Technological Capability (Y). In the indirect path, the relationship between X1 through X3 to Y has a P-value of 0.785 (greater than 0.05), indicating no significant relationship between X1 and X3 or between X3 and Y. Thus, the indirect effect through X3 is not significant, meaning X3 does not mediate the relationship between X1 and Y. The analysis also confirms that there are differences in the influence of predictor variables on the response variable. Based on the P-value, if P-value < 0.05, the relationship is significant, whereas if P-value > 0.05, the relationship is not significant. In the direct path, the relationship between X1 and Y has a

P-value of 0.642, which is greater than 0.05. This indicates no significant relationship between Information and Data Literacy and Technological Capability, meaning that statistically, data literacy does not have a direct significant effect on technological mastery. Conversely, the relationship between X2 and Y has a P-value of 0.016, which is less than 0.05, indicating a significant relationship. This finding supports the hypothesis that the higher the level of pedagogical competence, the greater its impact on Technological Capability.

In another indirect path, the relationship between X2 through X3 to Y has a P-value of 0.784, which is also greater than 0.05. This shows that there is no significant relationship between X2 and X3 or between X3 and Y. Therefore, the indirect effect through X3 is not significant, meaning X3 does not mediate the relationship between X2 and Y. Overall, the path analysis results show that the influence of X1 on Y has an estimate of -0.015 with a P-value of 0.708, indicating no significant effect. Conversely, X2 on Y has an estimate of 0.185 with a P-value < 0.001, indicating that Pedagogical Competence has a significant influence on Technological Capability. Thus, this study concludes that Pedagogical Competence plays a crucial role in enhancing Technological Capability, while Information and Data Literacy does not show a significant effect. Additionally, Student Communication and Collaboration does not act as a mediating variable in the relationship between predictor and response variables.

6. Future Recommendations

1. Future studies should explore other potential mediating variables such as digital teaching strategies or self-efficacy in technology use, which might better explain the relationship between Information and Data Literacy and Technological Capability.

2. Professional development programs should focus on enhancing pedagogical competence with integrated technology training, as this study confirms its strong influence on technological capability.

3. A longitudinal study design is recommended to investigate how changes in pedagogical competence over time affect teachers' technological capability and students' digital literacy in a dynamic educational environment.

4. Further research should involve a broader sample across diverse educational levels and regions to validate and generalize the findings beyond the current study's scope.

References

Agustina, A., Adha, M.M., & Mentari, A. (2023). Pengaruh Literasi Digital Terhadap Etika Bermedia Sosial Peserta Didik. Mindset: Jurnal Pemikiran pendidikan dan pembelajaran. 3(2): 52–64. https://doi.org/10.56393/mindset.v3i2.1696.

Akbar, A. (2021). Pentingnya kompetensi pedagogik guru. JPG: Jurnal Pendidikan Guru, 2(1): 23–30. https://doi.org/10.32832/jpg.v2i1.4099.

Anwar, B. (2018). Kompetensi pedagogik sebagai agen pembelajaran. Shaut Al Arabiyyah, 6(2): 114–125. https://doi.org/10.24252/saa.v6i2.7129.

Batubara, N.K.I., Sinaga, A.I., & Haidir, H. (2024). Analisis kompetensi pedagogik guru fikih dalam melaksanakan pembelajaran pada kurikulum merdeka di madrasah aliyah. Jurnal EDUCATIO: Jurnal Pendidikan Indonesia, 10(1): 300–306. https://doi.org/10.29210/1202424138.

Blikstad-Balas, M. (2015). Digital literacy in upper secondary school–what do students use their laptops for during teacher instruction?. Nordic Journal of Digital Literacy, 10: 122–137. https://doi.org/10.18261/issn1891-943x-2015-jubileumsnummer-09.

Diputra, K.S., Tristiantari, N.K.D., & Jayanta, I.N.L. (2020). Gerakan literasi digital bagi guru-guru sekolah dasar. JCES (Journal of Character Education Society), 3(1): 118–128. https://doi.org/10.31764/jces.v3i1.1483.

Disonglo, M.P., & Limpot, M.Y. (2023). Digital Literacy, Pedagogical Knowledge, and Research Skill: A Structural Equation Model in Professional Competence of Teachers. Asian Journal of Education and Social Studies, 42(4). https://doi.org/10.9734/ajess/2023/v42i4928.

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. Educational Technology Research and Development, 68(5): 2449–2472. https://link.springer.com/article/10.1007/s11423-020-09767-4.

Farid, A. (2023). Literasi digital sebagai jalan penguatan pendidikan karakter di era Society 5.0. Cetta: Jurnal Ilmu Pendidikan, 6(3): 580–597. https://doi.org/10.37329/cetta.v6i3.2603.

Habibullah, A. (2012). Kompetensi pedagogik guru. EDUKASI: Jurnal Penelitian Pendidikan Agama dan Keagamaan. https://doi.org/10.32729/edukasi.v10i3.169.

Hidayat, M., & Subando, J. (2024). Strategi Penanaman Nilai-Nilai Karakter Dalam Mencegah Degradasi Moral Siswa Pada Era Digital. Didaktika: Jurnal Kependidikan, 13(001): 523–534. https://doi.org/10.58230/27454312.1554.

Hidayatullah, M.T., Asbari, M., Ibrahim, M.I., & Faidz, A.H.H. (2023). Urgensi aplikasi teknologi dalam pendidikan di Indonesia. Journal of Information Systems and Management (JISMA), 2(6): 70–73. https://doi.org/10.4444/jisma.v2i6.785.

Huda, M.N. (2017). Peran Kompetensi Sosial Guru dalam pendidikan. Ta'dibi: Jurnal Manajemen Pendidikan Islam, 6(1): 42–62.

Isti'ana, A. (2024). Integrasi teknologi dalam pembelajaran pendidikan Islam. Indonesian Research Journal on Education, 4(1): 302–310. https://doi.org/10.31004/irje.v4i1.493.

Johanes, V.E., Suroyo, S., & Budiastra, A.K. (2022). Analisis Hubungan Gaya Kepemimpinan Kepala Sekolah dan Literasi Digital dengan Kinerja Guru Sekolah Dasar. Jurnal Basicedu, 6(2): 2793–2801. https://doi.org/10.31004/basicedu.v6i2.2471.

Khotimah, H., Astuti, E.Y., & Apriani, D. (2019). Pendidikan berbasis teknologi (permasalahan dan tantangan). In Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang. https://jurnal.univpgri-palembang.ac.id/index.php/prosidingpps/article/view/3050.

Kurniawan, A., Daeli, S.I., Asbari, M., & Santoso, G. (2023). Krisis Moral Remaja di Era Digital. Jurnal Manajemen Pendidikan, 1(02): 21–25.

Lestari, S. (2018). Peran teknologi dalam pendidikan di era globalisasi. EDURELIGIA: Jurnal Pendidikan Agama Islam, 2(2): 94–100. https://doi.org/10.33650/edureligia.v2i2.459.

Lase, F. (2016). Kompetensi Kepribadian Guru Profesional. Pelita Bangsa Pelestari Pancasila, 11(1). https://festiva.ejournal.unri.ac.id/index.php/jpb/article/view/3655/3561.

Luthfia, A., Wibowo, D., Widyakusumastuti, M.A., & Angeline, M. (2016). The role of digital literacy on online opportunity and online risk in Indonesian youth. Asian Journal for Public Opinion Research, 9(2): 142–160. https://doi.org/10.15206/ajpor.2021.9.2.142.

Mazdalifah, F.L., & Sitepu, Y.S. (2018). Pelatihan Melek Media Bagi Siswa SMP Di Kota Medan. Senadimas.

Nurtanto, M. (2016). Mengembangkan kompetensi profesionalisme guru dalam menyiapkan pembelajaran yang bermutu. In Prosiding Seminar Nasional Inovasi Pendidikan.

Oktarin, I.B., & Saputri, M.E.E. (2014). Sosialisasi literasi digital sebagai langkah transformasi pendidikan di sekolah dasar. EduImpact: Jurnal Pengabdian dan Inovasi Masyarakat, 1(1): 24–32.

Peklaj, C. (2015). Teacher competencies through the prism of educational research. Center for Educational Policy Studies Journal, 5(3): 183–204. https://doi.org/10.26529/cepsj.134.

Peraturan Menteri Pendidikan Nasional (Permendiknas) No. 16 Tahun 2007 tentang Standar Pendidik dan Kependidikan.

Purwoko, A.A., Andayani, Y., Muntar, M., & Diartha, I.N. (2017). Efforts in improving teachers' competencies through collaboration between teacher forum on subject matter (MGMP) and pre-service teacher training institution (LPTK). Jurnal Pendidikan IPA Indonesia, 6(1). https://doi.org/10.15294/jpii.v6i1.8858.

Sukmawati, R. (2019). Analisis kesiapan mahasiswa menjadi calon guru profesional berdasarkan standar kompetensi pendidik. Jurnal Analisa, 5(1): 95–102. https://doi.org/10.15575/ja.v5i1.4789.

Sumiati, E., & Wijonarko, W. (2020). Manfaat literasi digital bagi masyarakat dan sektor pendidikan pada saat pandemi Covid-19. Buletin Perpustakaan Universitas Islam Indonesia, 3(2): 65–80. https://journal.uii.ac.id/buletin-perpustakaan/article/view/17799.

Suprihatiningrum, J. (2014). Guru profesional: pedoman kinerja, kualifikasi & kompetensi guru. Ar-Ruzz Media.

Somantri, D. (2020). Abad 21 Pentingnya kompetensi pedagogik guru. Equilibrium: Jurnal Penelitian Pendidikan dan Ekonomi, 18(02): 188–195. https://doi.org/10.25134/equi.v18i2.4154.

Susanto, R., & Rozali, Y.A. (2020). Model Pengembangan Kompetensi Pedagogik.

Tsaniyah, N., & Juliana, K.A. (2019). Literasi digital sebagai upaya menangkal hoaks di era disrupsi. Al-Balagh: Jurnal Dakwah dan Komunikasi. 4(1): 121–140.

Yunitasari, Y., & Prasetya, H. (2022). Literasi Media Digital Pada Remaja Ditengah Pesatnya Perkembangan Media Sosial. Jurnal Dinamika Ilmu Komunikasi, 8(1): 12–25. https://mail.journal.moestopo.ac.id/index.php/dinamika/article/view/2101/0.

Zawacki-Richter, O., & Jung, I. (2023). Handbook of Open, Distance and Digital Education. https://doi.org/10.1007/978-981-19-2080-6.