International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Exploring Digital Literacy Among Junior High School Students in Marginalized Areas: A Qualitative Case Study in Lembang District

Rezki Adilah Nawir[1], Mukhlisin[2], Hasanah Nur[3], Ninik Rahayu Ashadi[4]

[1] Student of Technology and Vocational Education, Universitas Negeri Makassar, Indonesia
[2] Lecturer in Engineering and Vocational Education, Universitas Negeri Makassar, Indonesia
[3,4] Lecturer in Engineering Faculty, Universitas Negeri Makassar, Indonesia

Corresponding Author: mukhlisin@unm.ac.id

Abstrac

This study aims to describe the digital literacy levels of Phase D students (Grades VIII and IX) in three junior high schools classified as severely underdeveloped in Lembang District, Pinrang Regency, South Sulawesi. Employing a qualitative descriptive approach, data were collected through observation, interviews, and documentation. The results indicate that most students have acquired basic digital skills, such as operating computers, using word and data processing software, and understanding the use of the internet and email. However, awareness of digital security remains very low. Major challenges include limited infrastructure, such as the small number of available computer devices, unstable electricity, and restricted internet access. Despite these constraints, students demonstrate strong enthusiasm, and teachers show initiative in maximizing available resources to support digital learning. This study recommends improving infrastructure, providing continuous teacher training, and implementing contextual learning strategies to strengthen digital literacy development in 3T (frontier, outermost, and disadvantaged) regions..

Keyword: Digital Literacy, Underdeveloped Schools, Phase D Students, Educational Infrastructure, Contextual Learning.

INTRODUCTION

The rapid development of information and communication technology has brought significant changes in the world of education (Herawati et al., 2022). Digital literacy is one of the main competencies needed to face the challenges of the 21st century. Digital literacy is not just

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

the skill of using computers, but the ability to understand and utilize information through digital technology critically, effectively, and ethically (Chaudhary, 2020). Digital literacy includes the ability to search, evaluate, use, and produce digital information in various formats. This ability is becoming increasingly important because digital information has become an integral part of daily life, including in the learning process (Nasrawati et al., 2022).

Digital literacy also includes cognitive dimensions (understanding and analysis of information), technical (use of digital devices), social (interaction in digital spaces), and ethics (awareness of digital security and responsibility (Antoniuk & Zasiadivko, 2023). Therefore, digital literacy is a complex skill that must be developed in an integrated manner in the learning process (Mukhlisin et al., 2023). The 21st century educational paradigm emphasizes collaboration, creativity, critical thinking, and communication (Lestari et al., 2020). Students must be able to adapt to dynamic technological changes and utilize technology to improve the learning process (Masyhura & Ramadan, 2021).

In the context of education in Indonesia, the Independent Curriculum provides a wider space for strengthening students' digital competencies through Informatics subjects (Arnanda et al., 2021). In Phase D (grades VIII and IX), students are not only introduced to the use of digital devices and applications, but also trained in computational thinking, understanding data, algorithms, and recognizing aspects of digital ethics and security (Huda & Rohaeti, 2024). This emphasizes that digital literacy is an integral part of the educational process that is not only technical, but also conceptual and contextual. Optimal digital literacy will equip students with relevant competencies to face challenges and opportunities in the digital era (Hidayat et al., 2020).

The implementation of technology in learning in the digital era presents its own challenges and opportunities (Mukhlisin et al., 2022). The integration of technology in learning can increase learning motivation, facilitate access to information, and support more personalized and adaptive learning (Zou et al., 2025). Education in the digital era offers benefits such as a more modern curriculum, improved learning outcomes through digital data analysis, an interesting and collaborative learning atmosphere, and ease of evaluation of learning outcomes (Ngongo et al., 2019). However, the use of technology in learning also faces obstacles such as gaps in access to technology and infrastructure, lack of training and support for teachers, and concerns related to data security and privacy (Subroto et al., 2023).

The 3T (disadvantaged, frontier, and outermost) regions in Indonesia still face quite complex challenges in the implementation of technology-based education (Subroto et al., 2023). Infrastructure limitations such as lack of ICT devices, uneven internet access, and instability in

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

electricity supply are the main obstacles (Adila & Rodiyah, 2024). In addition, the lack of teacher training and assistance in integrating technology in learning has also widened the digital divide between urban and remote areas. This challenge is exacerbated by the limited number of competent human resources in the field of ICT, making it difficult to maintain and repair existing technological devices (Asfiana et al., 2024).

The digital divide is still an urgent problem in Indonesia, hindering the full realization of the potential benefits of technology in education (Subroto et al., 2023). Unequal access to technology and the internet creates inequality of educational opportunities, which disadvantages students in rural and remote areas. The inadequate level of digital literacy of teachers also adds to this problem (Irwanto & Irwansyah, 2020). The use of ICT in the learning process is important to improve the quality of education and expand access to educational resources (Anwas, 2013; Ningsih et al., 2020). Teachers face various obstacles in using ICT, including time allocation, lack of student focus, and limited equipment (Ningsih et al., 2020).

This challenge has a direct impact on the achievement of students' digital literacy competencies in very disadvantaged areas. Teachers in 3T areas often have to rely on contextual approaches, unplugged methods, or the use of simple media to deliver Informatics material (Arkiang & Adwiah, 2021). Nevertheless, the spirit of student learning and the creativity of teachers in utilizing limited resources are forces that should be appreciated and developed. Increasing public knowledge and student learning resources shows that technology literacy is a necessity (Qashlim et al., 2021).

This condition also occurs in Lembang District, Pinrang Regency, South Sulawesi, where some areas are among the most underdeveloped areas. Schools in this area have limited infrastructure facilities that have a direct impact on the quality of Informatics learning and the achievement of digital literacy of students. Nevertheless, students' enthusiasm for learning and teachers' efforts in overcoming limitations are important aspects that need to be analyzed and given room for further development.

Studies on digital literacy in highly disadvantaged areas need to be conducted to understand the challenges and potentials that exist in a more in-depth manner (Owen et al., 2020). This is important as a basis for designing policy interventions, teacher training, and the development of teaching materials that are relevant to local conditions. This approach is in line with the principle of educational justice, where every student has the right to access quality learning, including in terms of digital literacy, regardless of geographical location (Maximova & Kim, 2021).

Digital literacy is the ability to use digital technology and the internet effectively and

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

responsibly (Setiawan et al., 2023). Digital literacy involves technical, cognitive, and social skills that enable individuals to access, understand, evaluate, and create information in a variety of digital formats (Asfiana et al., 2024). The digital era has brought significant changes in various aspects of life, including education, business, and social interaction (Aziz et al., 2020). Digital literacy is an important skill that everyone must have. Digital literacy is essential because it helps individuals to participate actively and critically in the digital society (Setiawan et al., 2023).

Based on this background, this study aims to analyze the level of digital literacy of Phase D students in three highly disadvantaged junior high schools in Lembang District, identify existing obstacles and potentials, and provide strategic recommendations to support improving the quality of digital literacy in the 3T area. This research is expected to make a real contribution to efforts to improve the quality of education in very disadvantaged areas, especially in equipping the younger generation with digital literacy skills that are relevant to the demands of the times.

METHOD

This study uses a qualitative descriptive approach to obtain a comprehensive picture of the digital literacy level of Phase D students (grades VIII and IX) in Junior High School with a very backward school status. The research was conducted in three junior high schools in Lembang District, Pinrang Regency, South Sulawesi, namely UPT SMP Negeri 10 Lembang, UPT SMP Negeri 6 Lembang, and UPT SMP Negeri 8 Lembang.

The research subjects consisted of 60 Phase D students (20 students for school each) and 3 Informatics subject teachers. Observations were made on the 10–20 May 2025. The data collection technique uses direct observation of the Informatics learning process and Review documents and student work outputs, such as assignments, notes, or projects related to digital literacy competencies.

Table 1. Derivatives of Final Stage Evaluation Variables

No	School Name	Village	School Status
1	SMP Negeri 10 Lembang	Basseang	Very Backward
2	SMP Negeri 6 Lembang	Letta	Very Backward
3	SMP Negeri 8 Lembang	Mesakada	Very Backward

Data analysis was carried out using the Miles and Huberman interactive analysis model, which included three main stages, namely: (1) Data reduction; filtering and summarizing raw

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

data from the field according to the focus of the research; (2) Data presentation; compile data in the form of narratives, tables, or matrices to facilitate interpretation; and (3) Drawing conclusions and verification; generalize findings and check the consistency of the data to ensure validity. To maintain the validity of the data, the researcher applied the triangulation technique of sources and methods, as well as conducting member checks on participants.

RESULTS AND DISCUSSION

This research was carried out in three junior high schools located in the Lembang District, Pinrang Regency, South Sulawesi Province. Lembang District is one of the areas with geographical characteristics of hills and limited infrastructure access. This area is included in the category of very disadvantaged areas based on the classification from the Ministry of Villages, Development of Disadvantaged Regions, and Transmigration. The three schools were chosen because they represent the general characteristics of schools that are very backward in mountainous areas that face major challenges in the development of digital literacy.

Availability of Facilities and Infrastructure

Based on the results of research conducted in the three schools, it shows the limitations of digital learning support facilities. The number of computer/laptop devices is very limited, which is between 8 to 15 units per school. Internet access is available but only at certain points and cannot be used optimally in the learning process. The electricity condition in the two schools is unstable, which also hinders the optimal use of digital devices. These conditions show that there is a need to improve facilities and infrastructure to support digital learning (Suparya et al., 2022).

The availability of adequate facilities and infrastructure has a positive correlation with the quality of learning and digital literacy achievements of students (Kowiyah et al., 2021). Good infrastructure creates a conducive learning environment, where teachers and students can make optimal use of technology. Teachers who have access to devices and a stable internet connection can develop more interactive and engaging learning materials, as well as provide faster feedback to students.

However, there is an interesting thing that was found that even with limited infrastructure facilities, students are quite enthusiastic about participating in learning. This can be seen from the high level of student attendance and active participation in learning activities. In conditions of limitation, teachers try to maximize existing resources by utilizing students' mobile phones as a learning medium.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

International Journal of Technology and Education Research

https://e-journal.citakonsultindo.or.id/index.php/IJETER

E-ISSN: 2986-0733

Students' Digital Literacy Levels

Observations in all three schools show that most Phase D students already have basic skills in the use of digital technology, although there are still gaps in certain aspects. As many as 85–90% of students have been able to turn computers on and off independently, indicating mastery at the most basic technical level. In addition, about 60–70% of students have been able to operate basic software such as word processing and data processing applications, although their use is still limited to simple functions. Students' understanding of the internet and email use is also quite good, with around 65% of students showing a basic understanding of information search, access to educational sites, and the use of email for simple communication.

However, students' awareness of digital security aspects is still relatively low. Only about 15–30% of students demonstrate a basic understanding of the importance of maintaining personal data confidentiality, using secure passwords, and being aware of potentially harmful content or links. These findings indicate that although students are starting to become accustomed to using digital technologies, they still do not have critical awareness and comprehensive digital literacy skills, particularly in the face of the challenges of a complex digital world and are vulnerable to security risks. Therefore, a more structured educational intervention is needed to strengthen students' understanding of the broader digital literacy aspect, not only from the technical side, but also from the ethical and safety side of technology use.

Teachers play a central role in the development of students' digital competencies (Habibah, 2022). However, the results of interviews with teachers show that most teachers in the three schools do not have adequate training related to the use of technology in learning. Teachers admit that they still use conventional learning methods that are less interactive and less relevant to technological developments. Teachers who have good digital competence will be able to design creative and innovative learning, as well as integrate technology into the learning process effectively (Sutisna & Safitri, 2022).

Use of Learning Strategies and Media

The learning strategies used by teachers vary in each school, adjusting to each condition. At SMPN 10 Lembang, learning is carried out using whiteboards and activity cards, while Scratch material is delivered theoretically through an analog approach. At SMPN 6 Lembang, teachers use the unplugged method almost entirely due to the limitations of digital devices. Meanwhile, SMPN 8 Lembang is a little more advanced by facilitating limited computer practice in turn, especially to create simple animation projects.

The selection of the right learning strategy is highly dependent on the availability of

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

resources and the teacher's competence in integrating technology into learning. In schools that have limited devices, teachers can implement innovative and creative learning methods by utilizing available resources. In addition, continuous training and mentoring for teachers is also very important to improve their digital competence (Supardi & Hakim, 2021).

The Potential for Digital Literacy Development

There is a positive potential that can be the starting point for digital literacy development. Students show high enthusiasm for Informatics lessons. In addition, some teachers have started to take the initiative to create local and digital-based learning aids. Students' creativity is also beginning to be seen, especially in the ability to think logically that is beginning to form even though learning is carried out with limited media and methods. These potentials can be valuable initial capital in designing a more comprehensive and sustainable digital literacy development program.

The use of technology in learning is becoming increasingly important in today's digital era (Purnasari & Sadewo, 2020). Teachers are required to innovate in utilizing technology to create more interactive learning, so that students are motivated to increase the intensity of learning both online and offline (Putri & Pratiwi, 2022). Teacher empowerment through digital literacy training can improve teachers' ability to optimize learning with technological support (Nugroho et al., 2021).

The results show that the digital literacy level of students in schools that are very lagging has reached the early stage of mastering basic skills. The ability to turn on the computer, use simple software, and understand the concept of the internet is already possessed by most students. However, there is still a serious gap in the understanding of digital security, which is an important part of Informatics education. In addition, teachers' competence in utilizing technology for learning also still needs to be improved (Suardi et al., 2023).

Limited facilities and infrastructure are the main challenges. The fact that internet access is only available at certain points and is unstable suggests that the digitalization of education in the 3T region still requires real infrastructure support. In addition, the uneven training of teachers has slowed down the process of integrating digital literacy into learning. Improving students' digital literacy can be done through strengthening teacher competence and fulfilling adequate supporting facilities. (Havizul, 2022; Herdyana et al., 2022).

However, the potential for development is still wide open. The enthusiasm of students and teachers' initiatives in using contextual methods, such as the unplugged approach, show that digital literacy can still be taught creatively even with limited resources. The use of analog

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

media, simulations, and problem-based learning strategies can be an alternative to cultivate computational thinking skills.

In this context, it is important for governments and stakeholders to design long-term and sustainable support strategies, such as the provision of offline-based teaching modules, teacher training that is appropriate to local conditions, and collaboration with the ICT community or non-profit institutions engaged in digital education. With the right steps, the digital literacy gap in the 3T area can be overcome so that students have enough provisions to compete in the digital era. The development of teachers' digital competencies is a crucial aspect in improving the quality of learning in the current digital era (Habibah, 2022).

CONCLUSION

This study reveals that the digital literacy level of Phase D students (Grades VIII and IX) in three junior high schools categorized as severely underdeveloped in Lembang District, Pinrang Regency, has reached the initial stage of mastering basic digital skills. Most students are able to operate a computer, use basic software, and understand fundamental concepts of the internet and email. However, their awareness of digital security remains very low, highlighting the urgent need to strengthen students' understanding of ethics and safety in technology use.

Limited facilities and infrastructure such as the insufficient number of computers, restricted and unstable internet access, and unreliable electricity in some schools pose major challenges to the implementation of digital learning. Furthermore, teachers' digital competencies remain inadequate due to the lack of continuous training and professional development. Nevertheless, students' enthusiasm and teachers' initiatives to utilize available resources such as contextual approaches and unplugged methods demonstrate a strong potential for creatively and adaptively fostering digital literacy.

Therefore, enhancing digital literacy in severely underdeveloped schools requires a comprehensive approach, including: (1) gradual provision of supporting facilities and infrastructure, (2) capacity building for teachers through relevant and locally adapted training programs, and (3) development of innovative and contextual learning strategies. Collaboration among the government, educational institutions, and digital communities is crucial to ensure equitable access to digital literacy for students in 3T (frontier, outermost, and disadvantaged) regions, enabling them to be well-prepared to participate in a complex digital society that demands high levels of competence.

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

REFERENCE

Adila, S., & Rodiyah, I. (2024). Memajukan Pendidikan Melalui Program Digitalisasi yang Efektif di Indonesia. Indonesian Journal of Public Administration Review, 1(3), 16. https://doi.org/10.47134/par.v1i3.2524

Antoniuk, L., & Zasiadivko, V. (2023). DIGITAL LITERACY AND TECHNOLOGIES FOR EDUCATION: PRINCIPLES AND TOOLS. ГРААЛЬ НАУКИ, 26, 249. https://doi.org/10.36074/grail-of-science.14.04.2023.044

Anwas, O. M. (2013). Pembudayaan Teknologi Informasi Dan Komunikasi Di Sekolah. Jurnal Teknodik, 75. https://doi.org/10.32550/teknodik.v0i0.90

Arkiang, F., & Adwiah, R. (2021). Photos of Learning During Pandemic Covid-19 on Frontier, Outermost, and Disadvantaged Areas East Nusa Tenggara. Edukasi, 15(1), 29. https://doi.org/10.15294/edukasi.v15i1.30048

Arnanda, A. N., Dafik, D., Oktavianingtyas, E., Harmi, H., & Firmani, I. (2021). Analisis Penerapan Media Pembelajaran Geogebra dalam Mengembangkan Kemampuan Komunikasi Matematis Siswa Pokok Bahasan Sistem Persamaan Linier Dua Variabel. Journal of Mathematics Education and Learning, 1(1), 38. https://doi.org/10.19184/jomeal.v1i1.24374

Asfiana, A., Fitriyani, F., & Rokhimawan, M. A. (2024). Analisis Tantangan dan Kelebihan Pembelajaran Berbasis Teknologi Informasi dan Komunikasi pada Kurikulum Merdeka di Sekolah Dasar. Ideguru Jurnal Karya Ilmiah Guru, 10(1), 187. https://doi.org/10.51169/ideguru.v10i1.1215

Aziz, R. M., Syam'aeni, M. A., Sya'baniyah, N., & Fatihah, I. C. (2020). Peningkatan Kemampuan Literasi Digital bagi Siswa Kelas 4 dan 5 SDN Tanjakan 3, Kabupaten Tangerang. Jurnal Pengabdian Pada Masyarakat, 5(1), 141. https://doi.org/10.30653/002.202051.267

Chaudhary, K. (2020). Digital Literacy: A Review of Literature. https://www.igi-global.com/gateway/article/258971

Habibah, M. (2022). PENGEMBANGAN KOMPETENSI DIGITAL GURU PENDIDIKAN AGAMA ISLAM SEKOLAH DASAR DALAM KERANGKA KURIKULUM MERDEKA. SITTAH Journal of Primary Education, 3(1), 76. https://doi.org/10.30762/sittah/v3i1.11

Havizul, H. (2022). DESAIN PEMBELAJARAN ONLINE BERBASIS GOOGLE CLASSROOM UNTUK MATA PELAJARAN IPS SMP/MTS MENGGUNAKAN MODEL ASSURE. Deleted Journal, 9(1), 106. https://doi.org/10.31571/sosial.v9i1.3677

Herawati, A., Siregar, A., Yusrizal, Y., Rahma, A. A., Sari, A. L., & Irwandi, I. (2022). Utilization of E-Learning as Media in Indonesian Language Courses in Higher Education Post COVID-19

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Pandemic. AL-ISHLAH Jurnal Pendidikan, 13(3), 2757. https://doi.org/10.35445/alishlah.v13i3.1455

Herdyana, N., Suprapto, P. K., & Ali, M. (2022). Pengaruh Media Sekolah Pintar Indonesia (SPI) Terhadap Literasi Digital Dan Hasil Belajar Pada Materi Keanekaragaman Hayati. Diklabio Jurnal Pendidikan Dan Pembelajaran Biologi, 6(1), 47. https://doi.org/10.33369/diklabio.6.1.47-55

Hidayat, E. Y., Affandy, A., & Pertiwi, A. (2020). Pembelajaran Computational Thinking untuk Siswa SMA Institut Indonesia Semarang. ABDIMASKU JURNAL PENGABDIAN MASYARAKAT, 3(3), 93. https://doi.org/10.33633/ja.v3i3.104

Huda, N., & Rohaeti, E. (2024). Computational Thinking Skill Level of Senior High School Students Majoring in Natural Science. International Journal of Learning Teaching and Educational Research, 23(1), 339. https://doi.org/10.26803/ijlter.23.1.17

Irwanto, I., & Irwansyah, I. (2020). Pendekatan Social Construction of Technology untuk Teknologi Pendidikan di Indonesia. Media Komunikasi FPIPS, 19(1), 28. https://doi.org/10.23887/mkfis.v19i1.24184

Kowiyah, S., Riyanto, Y., & Harmanto, H. (2021). CONTEXTUALIZATION AND CONNECTIVITY OF DIGITAL LITERACY IN PRIMARY SCHOOL SOCIAL STUDIES DURING THE COVID-19 PANDEMIC. JURNAL PAJAR (Pendidikan Dan Pengajaran), 5(3). https://doi.org/10.33578/pjr.v5i3.8312

Lestari, N., Yusuf, St. M., Ihwan, I., Mahfud, M., Ernawati, E. E., & Jannah, N. (2020). Training of literacy-oriented teaching material development in MTs Al Ikhlas Soe, East Nusa Tenggara. Journal of Community Service and Empowerment, 1(2). https://doi.org/10.22219/jcse.v1i2.12312

Masyhura, N., & Ramadan, Z. H. (2021). Implementation of Digital Literacy in Elementary Schools. International Journal of Elementary Education, 5(4), 639. https://doi.org/10.23887/ijee.v5i4.39480

Maximova, M., & Kim, Y. H. (2021). The Effective Diffusion of Educational Robotics in Rural Areas: A Case Study in the Sakha Republic of Russia. European Journal of Educational Research, 145. https://doi.org/10.12973/eu-jer.10.1.145

Mukhlisin, M., Gani, H. A., & Purnamawati, P. (2022). The Overview of Needs Analysis for Development Learning Model Based on Digital in Vocational Education. Proceedings of the 1st World Conference on Social and Humanities Research (W-SHARE 2021), 654, 105–108. https://doi.org/10.2991/assehr.k.220402.023

Mukhlisin, Tasri Ponta, & Muhammad Syafar. (2023). Aplikasi Pembelajaran Mata Kuliah

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Embedded System Berbasis Mobile Augmented Reality (Mar). In Instek (Vol. 8, pp. 46–55).

Nasrawati, N., Qadrianti, L., Nurjannah, N., Ningsih, D. A., & Islamiah, N. (2022). Penguatan Literasi Digital melalui Hybrid Learning di Prodi PGMI. Prosiding Seminar Nasional Fakultas Tarbiyah Dan Ilmu Keguruan IAIM Sinjai, 1, 27. https://doi.org/10.47435/sentikjar.v1i0.834

Ngongo, V. L., Hidayat, T., & Wiyanto, W. (2019). PENDIDIKAN DI ERA DIGITAL. PROSIDING SEMINAR NASIONAL PROGRAM PASCASARJANA UNIVERSITAS PGRI PALEMBANG. https://jurnal.univpgri-palembang.ac.id/index.php/Prosidingpps/article/download/3093/2912

Ningsih, S., Kuntarto, E., & Kurniawan, A. (2020). TEACHERS' PROBLEMS IN USING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND ITS IMPLICATIONS IN ELEMENTARY SCHOOLS. JURNAL PAJAR (Pendidikan Dan Pengajaran), 4(3), 518. https://doi.org/10.33578/pjr.v4i3.7964

Nugroho, W., Setiawan, A., & Romadhoni, B. N. (2021). Optimalisasi Blended Learning Berbantuan Google Classroom untuk Meningkatkan Kualitas Pembelajaran di Sekolah Dasar. Jurnal Inovasi Penelitian Dan Pengabdian Masyarakat, 1(2), 141. https://doi.org/10.53621/jippmas.v1i2.64

Owen, S., White, G. T., Palekahelu, D. T., Sumakul, D. T. Y. G., & Sediyono, E. (2020). Integrating Online Learning in Schools: Issues and Ways Forward for Developing Countries. Journal of Information Technology Education Research, 19, 571. https://doi.org/10.28945/4625

Purnasari, P. D., & Sadewo, Y. D. (2020). Pemanfaatan Teknologi Dalam Pembelajaran Sebagai Upaya Peningkatan Kompetesnsi Pedagogik. Publikasi Pendidikan, 10(3), 189. https://doi.org/10.26858/publikan.v10i3.15275

Putri, D. A., & Pratiwi, V. (2022). Pengembangan Multimedia Interaktif DIGITAX (Digital Tax Administration Media) Berbasis Web Menggunakan Google Sites pada Mata Pelajaran Administrasi Pajak Kelas XI SMK. Jurnal Pendidikan Akuntansi (JPAK), 10(2), 94. https://doi.org/10.26740/jpak.v10n2.p94-105

Qashlim, A., Asis, Abd., & Andriani, A. (2021). INTERNET MASUK DESA: SEBUAH UPAYA LITERASI DIGITAL UNTUK MENCIPTAKAN MASYARAKAT MELEK TEKNOLOGI PADA DESA PIRIANG KECAMATAN TUTAR. SIPISSANGNGI Jurnal Pengabdian Kepada Masyarakat, 1(1), 61. https://doi.org/10.35329/sipissangngi.v1i1.1986

Setiawan, R., Tata, M. E., Siedik, N. K. A., Sundari, A., Yulistiani, S., Nursifa, F. S., Nurhidayanti, S., Rohayani, S., Azwardhi, M. Y., Buchori, N., Rifaldi, M., Saifurrahman, S., Putra, R.,

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.

Ardiansyah, R., Hakim, L. L., Ibrahim, M. F. J., Nugraha, D., Nurhidayati, S. St. E., Agustin, N. Y., & Ireland, N. A. (2023). Literasi Digital Sebagai Peningkatan Pemahaman Masyarakat Dengan Door To Door dan Seminar. Jurnal PkM MIFTEK, 4(1), 18. https://doi.org/10.33364/miftek/v.4-1.1321

Suardi, S., Muhajir, M., Mutiara, I. A., Ramlan, H., & Atmaja, T. S. (2023). Pemberdayaan Forum Guru Muhammadiyah (FGM) Melalui Literasi Digital QR Code Generator dengan Barcode. Dinamisia Jurnal Pengabdian Kepada Masyarakat, 7(3), 665. https://doi.org/10.31849/dinamisia.v7i3.14617

Subroto, D. E., Supriandi, Wirawan, R., & Rukmana, A. Y. (2023). Implementasi Teknologi dalam Pembelajaran di Era Digital: Tantangan dan Peluang bagi Dunia Pendidikan di Indonesia. Jurnal Pendidikan West Science, 1(7), 473. https://doi.org/10.58812/jpdws.v1i07.542

Supardi, S., & Hakim, M. V. F. (2021). Investigation the Digital Competence of Madrasah Teachers During the Covid-19 Pandemic. AL-ISHLAH Jurnal Pendidikan, 13(3), 2335. https://doi.org/10.35445/alishlah.v13i3.1246

Suparya, I. K., Suastra, I. W., & Arnyana, I. B. P. (2022). RENDAHNYA LITERASI SAINS: FAKTOR PENYEBAB DAN ALTERNATIF SOLUSINYA. Jurnal Ilmiah Pendidikan Citra Bakti, 9(1), 153. https://doi.org/10.38048/jipcb.v9i1.580

Sutisna, I., & Safitri, R. (2022). Adaptasi Guru di Era Pendidikan Berbasis Digital. Jurnal Ilmiah Profesi Guru (JIPG), 3(1), 68. https://doi.org/10.30738/jipg.vol3.no1.a11906

Zou, Y. L., Kuek, F., Feng, W. Z., & Cheng, X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. Frontiers in Education, 10. https://doi.org/10.3389/feduc.2025.1562391

Copyright to the author of some rights reserved This work is licensed under aCreative Commons Attribution-ShareAlike 4.0 International License.