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Analysis of Digital Literacy Profile of Elementary School Students at SDN Jayamekar Padalarang in Technology-Based Learning

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Abstract. Digital literacy has become an essential 21st-century skill that students must possess to face the digital era. This study aims to analyze the digital literacy profile of elementary school students in the context of technology-based learning using a descriptive quantitative research design. The research sample consisted of 40 fifth-grade students from SDN Jayamekar, Padalarang District. The instrument used was a closed questionnaire with a Likert scale of 1-4 designed to measure 7 domains of digital literacy based on the UNESCO framework, including: access, manage, understand, integrate, evaluate, create, and communicate. The research results show that students overall digital literacy level reached 73%. Technical-operational domains demonstrated significant dominance with the access domain (access) obtaining the highest percentage of 78.95%, indicating that students already possess good abilities in accessing and operating digital devices. Conversely, creative-productive domains remain less dominant, as evidenced by the create domain (digital content creation) obtaining the lowest percentage of 64.58%, indicating that skills in producing digital content still need improvement. This gap between technical and creative abilities constitutes the main finding of the research, showing that although elementary school students are competent in using technology, their ability to create and produce digital content requires more attention in learning. The relevance of this research lies in identifying the gap in students digital literacy competencies, enabling teachers to create learning processes that encourage digital creativity to comprehensively balance digital literacy competencies in accordance with 21st-century skills demands.

Keywords: Digital Literacy, Elementary School Students, Technology-Based Learning, UNESCO Domain

INTRODUCTION

The rapid development of technology in the present era has influenced many aspects of human life. Not only adults, but elementary school-aged children nowadays grow and develop in an environment filled with the role of digital technology. Internet penetration among elementary school-aged children (under 13 years old) in Indonesia reaches 79.73% of the total 229 million internet users in 2025 (APJII, 2025). This phenomenon presents both a challenge and an opportunity; on one hand, elementary school-aged children are already familiar with digital devices and the internet, but on the other hand, their digital literacy remains a challenge that requires attention. According to UNESCO, digital literacy encompasses seven aspects: access, manage, understand, integrate, evaluate, create, and communicate (Law et al., 2018). Children should possess these skills so that their use of digital technology and the internet is accompanied by adequate digital competencies. Adequate skills in digital literacy can influence the learning process and create effective learning experiences.

Indonesia's digital literacy index has increased from 3.49 points in 2021 to 3.54 in 2022 (Komdigi, 2024). Despite this increase, the data indicates that the digital literacy of Indonesian

society remains in the moderate category. These findings become more complex when linked to the reality in elementary school education. The high level of digital or internet access possessed by elementary school-age children is not accompanied by an increase in reading interest. This aligns with Yuliana et al., (2023), who stated that students under 25 years of age have lower reading interest levels than the working class. This is supported by other research showing that elementary school students digital literacy skills remain low due to several factors, such as technology use being dominated by entertainment purposes like playing games, which results in low ability to evaluate information and awareness regarding digital security (Naimah et al., 2024). Digital literacy skills need to be developed by elementary school students because they have a close relationship with academic achievement.

Elementary school students are expected to possess digital literacy competencies that encompass 7 main aspects to support more effective technology-based learning. Nevertheless, technology-based learning to enhance learning effectiveness still faces constraints due to students limited understanding of digital literacy. In line with Devi Widiyantti et al., (2024) who affirm that although the learning process is increasingly integrated with digital technology, elementary school students understanding of productive, safe, and responsible technology use remains minimal as they tend to use the internet to access entertainment content rather than constructive learning. Beyond these issues, the gap in infrastructure and the lack of systematic and structured digital literacy curriculum at the primary education level also hinder learning effectiveness. Therefore, this study aims to analyze the digital literacy profile of elementary school students to map the actual conditions, so that it can subsequently be used to identify what needs to be intervened to develop the potential of digital technology for elementary school students in relation to 21st century skills.

This study presents novelty that has been developed from previous research related to digital literacy profile analysis. Previous studies, such as those conducted by Judijanto (2024) who investigated the influence of teachers and students digital literacy levels on learning quality, Atmojo et al. (2022) who examined the relationship between digital literacy and increasing reading interest, and Purwanti (2022) who highlighted the implementation of e-learning in strengthening digital literacy, generally only focused on digital literacy as a whole without providing a holistic picture of each domain involved. This study offers novelty through the use of UNESCO's seven aspects of digital literacy as a reference in analyzing digital literacy profiles. Furthermore, this research involves participants at the elementary school level, an age group that is still rarely made the focus for mapping national digital literacy profiles. The survey instrument used has also been adapted linguistically and pedagogically to suit the

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characteristics of elementary school students so that it can be more easily understood. Thus, this research is not only descriptive but also oriented toward discovering strategic information that can serve as a basis for formulating policies and educational practices aimed at addressing gaps in students digital literacy skills so that all domains of digital literacy can develop proportionally without significant disparities.

METHODOLOGY

Research Method

This study employs a descriptive quantitative method to analyze the digital literacy profile of elementary school students in technology-based learning. The quantitative method provides researchers with the opportunity to assess variables objectively using standardized instruments, so that the data can be processed statistically and the results can be generalized to draw conclusions (Creswell W. J. and Creswell J. D., 2014). The descriptive research design was chosen because it aims to describe and map actual, factual, and accurate conditions (Sugiyono, 2019).

The descriptive quantitative approach enables researchers to measure students digital literacy levels systematically and measurably. According to Newman & Gough (2020), quantitative methods are highly effective in assessing students digital competencies as they can generate numerical data that facilitate the identification of patterns and trends in broader populations. In the context of digital education, the descriptive quantitative approach has been widely used to measure aspects of digital literacy. Hatlevik et al. (2022) revealed that the use of quantitative survey methods is effective in identifying digital literacy gaps among students and can be used to provide data-based recommendations to enhance education more effectively according to needs.

Research Participant

The participants of this study are fifth-grade students at SDN Jayamekar Padalarang. The selection of fifth grade was based on the consideration that upper-grade students are deemed to have had intensive experience in learning and operating digital technology, and they are also considered to have developed the ability to read and understand the research instruments.

Fifth-grade students (ages 10-11 years) are at the concrete operational stage transitioning to formal operations, beginning to think abstractly and logically (Piaget in Santrock et al., 2022). At this stage, students possess adequate metacognitive abilities to reflect on their experiences using digital technology, enabling them to provide more accurate responses to research

instruments (Flavell, 2023). From a methodological perspective, fifth-grade students have adequate reading and writing literacy skills to understand instructions and statements in research questionnaires. This aims to minimize the risk of misinterpretation by student research subjects of questionnaire items that could affect research data quality.

Research Instrument

This study utilized a structured closed-ended questionnaire instrument developed based on UNESCO's digital literacy framework consisting of 7 digital literacy domains: access, manage, understand, integrate, evaluate, create, and communicate. Each domain was measured through specific statements relevant to elementary school students profiles. The questionnaire employed a Likert scale with 4 response options: strongly disagree (SD), disagree (D), agree (A), and strongly agree (SA). The questionnaire was designed using a 4-point even scale, eliminating the neutral midpoint option to avoid respondents' tendency to choose middle answers. According to Chyung et al. (2022), a 4-point scale forces respondents to determine a clear attitude toward statements, thus generating more informative data and reducing ambiguity in result interpretation. Eliminating the middle option is also crucial in research with child subjects as they tend to choose the middle option when experiencing difficulty and are uncertain about their answers. This instrument consisted of 23 statements distributed across 7 domains and adapted to students cognitive levels. This aligns with Azwar (2016), who suggested that research instruments should be designed using simple language appropriate to children's cognitive developmental level.

Data Collection and Analysis Techniques

Data collection technique in this study utilized a questionnaire instrument completed by students as research subjects. The data collected were quantitative, based on the 7 domains of digital literacy proposed by UNESCO. The instrument used was tested for validity and reliability to ensure that the data were valid and consistent for measuring the data to be collected and processed.

Table 1. Validity Test Result

No	r-value	r-table	interpretation
1.	0.377	0.312	Valid
2.	0.481	0.312	Valid

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3 .	0.535	0.312	Valid
4.	0.346	0.312	Valid
5.	0.547	0.312	Valid
6.	0.385	0.312	Valid
7.	0.365	0.312	Valid
8.	0.452	0.312	Valid
9.	0.399	0.312	Valid
10.	0.323	0.312	Valid
11.	0.428	0.312	Valid
12.	0.547	0.312	Valid
13.	0.372	0.312	Valid
14.	0.398	0.312	Valid
15.	0.487	0.312	Valid
16.	0.318	0.312	Valid
17.	0.372	0.312	Valid
18.	0.370	0.312	Valid
19.	0.417	0.312	Valid
20.	0.355	0.312	Valid
21.	0.500	0.312	Valid
22.	0.447	0.312	Valid
23.	0.375	0.312	Valid

After the data were declared valid, a reliability test was then conducted. The following are the results of the reliability test that was carried out.

Table 2. Reliability Statistics

Cronbach's Alpha	N of Items
.691	23

After the data were obtained, they were then analyzed using descriptive statistical analysis. Descriptive statistical analysis is a method for summarizing, describing, and interpreting quantitative data to provide a clear picture of the characteristics of the collected data (Gravetter & Wallnau, 2022). The data were then processed by calculating the percentage of each domain, the overall percentage, and categorizing them according to the students digital literacy percentage. The results of the analysis were then interpreted into categories of very low, low, moderate, high, and very high.

Table 3. Student Digital Literacy Criteria

Percentage Range (%)	Category
81% – 100%	Very High
61% – 80%	High
41% – 60%	Moderate
21% – 40%	Low
0% – 20%	Very Low

Source: Adapted from (Arikunto,2018)

RESULTS AND DISCUSSION

Result

This study involved 40 fifth-grade students from SDN Jayamekar Padalarang as participants. Data were collected using a questionnaire based on UNESCO's 7 domains of digital literacy. Of the 40 distributed data instruments, the data were then analyzed to draw conclusions.

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Based on the data analysis conducted, the results of the digital literacy profile of fifth-grade students at SDN Jayamekar Padalarang in each domain are as follows:

Table 4. Student Digital Literacy Criteria

No.	Domain of Digital Literacy	Percentage (%)	Category
1.	Using technology (access)	78.95%	High
2.	Managing file (manage)	75.41%	High
3.	Understanding digital information (understand)	67.08%	High
4.	Using technology for learning (integrate)	73.43%	High
5.	Sorting information (evaluate)	68.95%	High
6.	Creating digital works (Create)	64.58%	High
7.	Communicating securely (communicate)	71.71%	High

Source: Data analysis result

Based on these data, the overall analysis reveals that the students' digital literacy profile falls within the high category across all domains, with an overall percentage of 73%. This indicates that students possess adequate competencies in utilizing digital technology for learning activities, though improvements in certain domains are still required. To provide a clearer and more informative understanding of the variation in achievement across each domain, the data will be presented in a radar chart. This visualization can illustrate the relative strengths and weaknesses of each digital literacy domain, thereby facilitating the identification of which domains are more dominant and which domains require improvement.

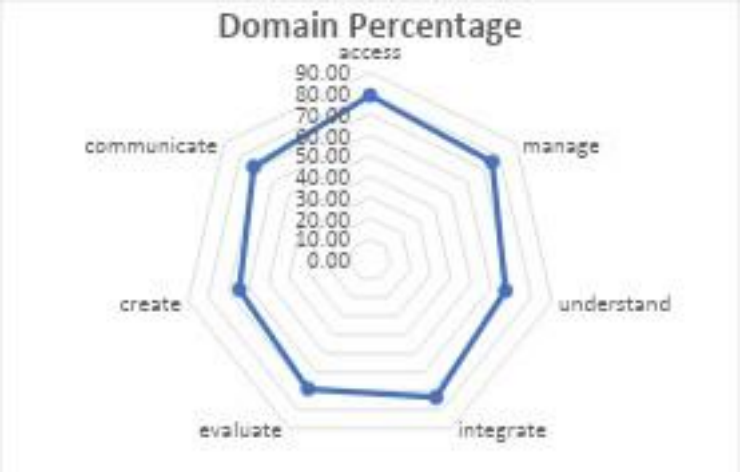

Figure 5. Picture of Domain Percentage

The domain of using technology (access) obtained the highest percentage at 78.95%, indicating that students have good capabilities in accessing technology such as using digital devices, browsing the internet, and accessing various digital learning resources. This aligns with the current generation's tendency to be familiar with and live alongside technology from an early age.

The file managing domain (manage) is also in the high category with a percentage of 75.41%, indicating that students are able to manage files and digital data effectively, such as saving files, retrieving them, and creating folders to store these files on digital devices or online storage. Thus, students basic understanding and skills for learning activities related to file processing can be considered good.

The domain of understanding digital information (understand) obtained a percentage of 67.08%, indicating that students are moderately capable of comprehending and evaluating the digital information they acquire online. Students are confident that they can understand how the applications they use work to search for and comprehend information obtained through the internet, and can explain this information again. Nevertheless, these abilities still need to be enhanced with critical thinking skills regarding the validity and credibility of the information obtained.

The domain of using technology for learning (integrate) is a domain related to how students utilize technology in their learning. This domain obtained a percentage of 73.43%, indicating that students have been able to and possess the basic ability to utilize technology that can

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support the learning process, such as the use of online learning resources, educational applications, or digital learning platforms.

The domain of sorting information (evaluate) obtained a percentage of 68.95%, which indicates students good ability to sort relevant and accurate information from various digital sources. Nevertheless, enhancement of critical literacy is still needed by students to be more selective in receiving and processing information they obtain from the internet or digital devices.

The digital works domain (create) obtained a percentage of 64.58, which is the smallest percentage among other domains. Although it is still categorized as high criteria, this percentage indicates that students ability to create digital works such as making documents for assignments, editing photos or videos for assignments, and creating creative works using digital applications is not yet optimal and needs to be facilitated and continuously developed in learning, for example through digital project-based learning.

The final domain regarding communicating securely (communicate) with a percentage of 71.71% indicates that students have understood the ethics of communicating in cyberspace. Furthermore, students also possess a basic understanding of the importance of maintaining personal data and security in cyberspace.

Discussion

Based on the analysis conducted, it is known that the digital literacy profile of students at SDN Jayamekar Padalarang is generally at a high category across all measured domains. This reflects that students have been accustomed to interacting with technology in their daily lives, in line with the increasing digital literacy index of Indonesian society, which continues to rise annually and reached 44.53 points, an increase of 1.91 points from the previous year (KOMDIGI, 2025). Nevertheless, there are still variations in percentages across domains. This requires more in-depth attention in the learning context.

The domain of technology use (access) obtained the highest percentage at 78.95%, confirming that the ability to access technology is not a barrier for students. This capability reflects the characteristics of the digital native generation who have grown up alongside technology (Demanggasa et al., 2023). However, it should be noted that the abilities possessed by these students do not automatically guarantee comprehensive digital literacy quality, as there are other domains that also need to be considered. These findings align with the digital competency framework theory, which explains that access skills represent the first

level of digital literacy, thus making it possible to achieve a high percentage, also supported by the current generation's exposure to technology, making access not the primary barrier. Nevertheless, high access does not automatically guarantee digital literacy skills in other domains. In education, the access domain needs to be optimized through meaningful learning that emphasizes the use of digital devices not merely as consumption tools. Teachers can integrate digital devices as tools for students to conduct scientific exploration rather than simply as instruments for receiving raw information.

The file management domain with a percentage of 75.41% indicates that students have adequate technical competence in managing files. This ability is crucial to support students skills related to 21st-century learning innovation, in line with Sari & Munir (2024) who emphasize that file management capability is a fundamental skill to support efficiency in learning activities. This competence serves as an important prerequisite for effectively integrating technology into learning innovation. To develop skills in this domain, teachers can teach students about more systematic file management strategies and incorporate data security practices into the learning process, thereby enhancing students skills related to the management domain.

An interesting finding was observed in the understanding digital information (understand) domain, which obtained a percentage of 67.08%. Although students demonstrated confidence in understanding information and using applications, their skills in this domain still require special attention for improvement as it relates to students critical thinking abilities. Digital literacy has been proven to have a positive influence on critical thinking abilities with a percentage of 40.8%, which can be interpreted that the higher the level of digital literacy, the higher the students critical thinking abilities (Hidayati et al., 2024). UNESCO research in 2023-2024 indicates that young generations tend to easily trust visually convincing information without first verifying its credibility. This represents a weakness in students skills related to the digital information comprehension domain, necessitating training in source analysis and habituation in source verification. Teachers can employ media bias analysis strategies and critical discussions of digital content frequently encountered by students.

The domain of using technology for learning (integrate) with a percentage of 73.43% indicates that students have established a foundational capacity to utilize technology to support the learning process. The utilization of digital technology in learning has been proven to enhance student participation, facilitate access to information, and support collaborative project-based learning to develop students critical thinking skills and creativity (Sari & Munir, 2024). This

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capability can be directed toward developing students more complex digital literacy skills through the integration of technology in learning. According to the TPACK (Technological Pedagogical Content Knowledge) theory, technology utilization is effective when teachers understand the relationship between technology, pedagogy, and the content material to be learned. Therefore, teachers need to create a learning process that requires students to search for, process, and apply information through technology, which can foster students critical thinking abilities.

The evaluate domain, with a percentage of 68.95%, indicates that students evaluative abilities regarding the digital information they obtain still need to be improved. Digital literacy skills can contribute significantly to shaping students thinking patterns, particularly in receiving and analyzing information, evaluating online content, and adopting a reflective attitude when confronting disinformation (Nimah, 2023). Evaluation skills are becoming increasingly crucial as time progresses due to the significant challenges in anticipating the spread of hoaxes. Research findings from UNESCO and OECD in 2024 demonstrate that school-age children often struggle to distinguish between facts, opinions, and misinformation. This issue is influenced by the scarcity of media literacy training in elementary schools as well as excessively rapid digital consumption patterns. Education plays a vital role in enhancing students evaluation capabilities through learning approaches that utilize hoax case studies to foster critical awareness.

The most crucial finding of this study emerged in the digital creation (create) domain, which obtained the lowest percentage at 64.58%. Although still categorized as high, this domain requires special attention for development in students. This disparity among domains indicates an imbalance between students consumptive abilities in accessing and using technology and their productive abilities in creating works. This phenomenon poses a serious challenge because comprehensive digital literacy should not only shape consumptive character but also productive character. Several factors may contribute to students low performance in the create domain, including insufficient time and opportunities to practice creating digital products, as well as teachers who have not yet been able to facilitate students in creating multimedia projects. To develop students skills related to creating works, teachers can employ transformative learning approaches. For instance, Project-Based Learning (PjBL) encourages students to identify problems, collect supporting data, and create works that can enhance students creative, analytical, and evaluative abilities (Darwis et al., 2025). Additionally, comprehensive student assessment rubrics should also be utilized to evaluate the quality of content, creativity, and originality of the projects undertaken.

The last domain, communicating safely (communicate) obtained a percentage of 71.71%, which demonstrates that students have reasonably good awareness regarding digital communication ethics and personal data security. This competency is significantly influenced by digital ethics education. This competency is essential in the context of protecting oneself from various cyber threats such as cyberbullying, online fraud, and privacy breaches (Nimah, 2023). This aligns with the child policy and online privacy report, which emphasizes that students understanding of cybersecurity must be instilled as early as possible at the elementary school level. However, this awareness still needs to be continuously improved given the increasingly diverse contemporary developments that enable the growing complexity of digital threats.

Although all domains achieved high categories, there remains a significant gap between technical domains (Access & Manage) and higher-order thinking domains (Understand, Evaluate, and Create). This can be examined through pedagogical and socio-cultural factors. In the analysis of pedagogical factors, the Understand and Evaluate domains scored lower because school-based learning still emphasizes usage rather than analytical processes. Teachers tend to only teach how to use technology rather than how to think critically about digitally obtained information. Meanwhile, the pedagogical factor influencing the lower Create domain is the lack of project-based digital learning; teachers more frequently integrate digital technology with learning that is merely consumptive in nature, such as watching videos, rather than productive tasks like creating videos or developing digital reports. This is further exacerbated by assessment practices that still focus on outcomes rather than process-oriented assessment that emphasizes students creative aspects.

In addition to pedagogical factors, socio-cultural factors also contribute to making the understand, evaluate, and create domains lower than other consumptive domains. This is because socio-culturally, children are more exposed to digital consumption culture than to a culture that supports children in producing digital works. Children typically use consumer-centric media, which accustoms them to watching rather than creating. In terms of evaluation, socio-cultural factors are also influenced by the still-limited media literacy within families, resulting in children not yet having the ability to discuss fake news, hoaxes, and digital ethics.

Overall, the findings of this study reveal that students ability to access technology is not directly proportional to their evaluative and creative abilities in the digital context. This gap indicates that digital literacy cannot be viewed merely as a technical skill, but as a comprehensive competency encompassing cognitive, ethical, and creative dimensions. To enhance digital

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literacy, teachers can employ systematic and continuous learning approaches. These skills are essential as they can shape students thinking patterns and attitudes related to 21st-century skills.

CONCLUSION

Based on the results of the analysis and discussion, it can be concluded that the digital literacy profile of students at SDN Jayamekar Padalarang is overall in the high category with an average percentage of 73% across all measured domains. This indicates that students possess adequate competence in utilizing digital technology for learning activities, although several domain aspects still require further development. This development need can be identified from the percentage gaps achieved in each domain. The technology usage (access) domain obtained the highest percentage (78.95%), demonstrating that students have good ability in accessing technology and do not experience technical barriers. The file management domain (75.41%) and safe communication (71.71%) also show good competence. The digital creation (create) domain obtained the lowest percentage (64.58%), indicating that students ability to create digital works is not yet optimal. The digital information comprehension domain (67.08%) and information evaluation (68.95%) still require special attention, particularly regarding the development of students critical thinking skills. These data reveal that students ability to access technology is not directly proportional to their evaluative and creative abilities in the digital context. To develop students digital literacy holistically, transformative learning approaches such as Project-Based Learning are needed to develop students productive aspects in addition to their consumptive abilities. Digital literacy skills need to be possessed and developed by students to face the challenges of 21st-century learning.

Despite the findings in this study providing an overview of the digital literacy profile of elementary school students at SDN Jayamekar Padalarang, there are several limitations that need to be acknowledged, namely the limited and relatively small sample size as it was only drawn from one institution, which may reduce the generalizability of the findings to the broader elementary school student population. The data collection method using this research instrument may also have limitations in measuring all aspects of digital literacy in depth, such as practical and creative skills aspects that require direct observation or portfolios of students digital works. In addition, this study has not yet explored in depth the various supporting and inhibiting factors that may affect students digital literacy levels.

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