

A Portrait of Digital Literacy of Elementary School Students in Coastal Areas

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Abstract

Digital literacy theory has entered the school curriculum in various forms, both as standalone subjects and across the curriculum. Digital literacy become an essential learning objective in many school systems worldwide because the Internet is now a necessary part of children's daily lives. The school's geographical location has influenced the development of digital literacy in the learning process. A school environment with digital literacy will significantly impact the learning process. This study describes the level of digital literacy of elementary school students in coastal areas in the Purworejo district, Central Java, Indonesia, at the general level and per sub-indexed. This research used a quantitative descriptive approach. The data was collected using Google Forms. The 27-item questionnaire was adapted from the Kata Data Insight Center (KIC) under the Indonesian Ministry of Communication and Information (Kemenkominfo). Data analysis in this study used descriptive statistics. One hundred elementary school students (53 from third and 47 from fourth grades) participated in this study. The results showed that the digital literacy level of elementary school students in coastal areas was in the "medium" category with an index of 3.63 (from a scale of 1 to 5). All digital literacy sub-index shows the medium level with the highest average on technological capabilities (3,81) and the lowest on security (3,50). The sub-index of information and data literacy placed, on average, 3,60, while communication and collaboration on 3,72.

Keywords: Digital Literacy, Elementary School, Coastal Areas

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Introduction

Education can be defined as part of the experience of success or failure in developing unique reasoning capacities (Barrow & Woods, 1992). Values in education do not spontaneously exist objectively but grow from the social relationships in society (Bober, 2008). People's lives today cannot be separated from technology; even technology has revolutionized the world of education (Raja & Nagasubramani, 2018). Digital technology has changed education practice and encouraged education systems worldwide to integrate ICT into learning (Timotheou et al., 2022).

Integrating technology in learning activities requires digital literacy, which is the competence and skills needed to navigate the fragmented and complex information ecosystem (Tinmaz et al., 2022). Digital literacy is the recognition of information learners acquire through the internet, where they are exposed to computer networks and experience cognitive information processing (Park et al., 2020). Definitions of digital literacy abound in the educational literature. However, they all go back to the original definition suggested by Gilster (1997), who defined digital literacy as "the ability to understand and use information in multiple formats from multiple sources when that information is presented through a computer" (Gilster & Watson, 1999). Digital literacy is broader than ICT literacy as it comprises the acquisition and use of knowledge, techniques, attitudes, and personal qualities, as well as the ability to plan, execute, and evaluate digital actions in accomplishing life tasks and reflecting on one's digital literacy development (Sulak et al., 2022).

Digital literacy theory enters the school curriculum in various forms, both as standalone subjects and across the curriculum (Uršej, 2019). Digital competency has been an essential learning objective in many school systems worldwide, given that the Internet is now an essential part of children's daily lives (Botturi, 2021). The school's geographical location also influences the development of digital literacy in the learning process (Romadhianti et al., 2021). Various obstacles that may arise from the influence of geographical location are material constraints, human resources, and social constraints, which then hamper the digital-based learning process. A school environment with digital literacy will significantly impact the learning process (Masyhura & Ramadan, 2021).

This study describes the digital literacy portrait of elementary school students in coastal areas in the Purworejo district, Central Java, Indonesia. This study describes the level of digital literacy of elementary school students in general and the level of digital literacy per sub-index that includes information and data literacy, communication and collaboration, security, and digital skills. The questions in this study include:

Q1=What is the digital literacy level of elementary school students in coastal areas?

Q2=What is the level of digital literacy of elementary school students in each sub-index of information and data literacy, communication and collaboration, security, and digital capability?

Literature Review

Digital literacy, according to Wempen (2015) comes from the words digital and literacy. The word "digital" can be defined as computers' binary digits (1 and 0). When something is digital, it consists of numerical values and usually means computerized or related to electronics. The word "literacy" means communicating in a particular language. Digital literacy is a necessity to keep up with the ever-changing world. Digital literacy uses digital technologies,

communication tools, and networks to access, manage, integrate, evaluate, create, and communicate information (Cetf, 2008).

The rise of the digital society and e-business in recent decades has created a digital ecosystem (Grefen, 2021). Information and communication technology (ICT) supported by the Internet has impacted progress and growth in many fields, including education (Reddy et al., 2020). The education sector worldwide has also started integrating digital literacy into the curriculum. Digital literacy for today's students is very important to develop so that students can communicate and express their ideas effectively using digital media (Ray, 2018). Achieving minimum proficiency in digital literacy by the world's population is one of the UN Sustainable Development Goals (Laanpere, 2019).

The international framework "21st Century Competencies" emphasizes the importance of digital competencies as a pivot to improve other competencies (Martínez-Bravo et al., 2022). To develop digital literacy, several important elements must be considered, including (1) Understanding the culture associated with the diverse contexts in which users of the digital world operate; (2) Cognitive, or the capacity for cognitive capacity when evaluating the content; (3) Constructive communication, specifically awareness of networking and communication performance in the digital era, confidence to act responsibly, creativity, critical thinking about content, and social responsibility (Chung & Yoo, 2021).

Although today's students are considered digital natives, they do not yet possess the digital literacy needed to become competent and productive members of the digital society (Erwin & Mohammed, 2022). Low levels of digital literacy can be a major barrier to improving internet user information (Ali & Qazi, 2022). For teachers, the learning process should always involve digital devices because learning with digital devices can improve students' digital literacy skills (Perdana et al., 2019). The digital literacy-based learning process must be re-integrated into the current curriculum for policymakers.

The current implementation of digital literacy in elementary schools still needs to be improved (Masyhura & Ramadan, 2021). In addition, the buzz about digital literacy in the school environment still needs to be improved, so implementing digital literacy is only limited to understanding. Obstacles experienced include students needing help understanding the material and limited internet quota. In implementing learning, elementary school students still consider teachers as the only source of information (Kailani et al., 2021). Therefore, there is a need for collaboration between teachers, principals, and parents in integrating digital literacy into learning.

Indonesia is one of the countries with the largest number of internet users in the world, and the second largest internet users in Indonesia are elementary school-age students (Wulandari & Fajrin, 2022). On average, they spend five hours a day surfing the web. However, students of primary education age in Indonesia use the internet more often to play online games and open social media than to learn. It is a critical educational challenge, namely children's literacy for digital culture and digital citizenship (Vélez & Zuazua, 2017). Children's general use of ICT today has also expanded the context of interpersonal relationships.

Based on data from the Indonesian Internet Providers Association (APJII), the number of Internet users in Indonesia in 2022 reached 77.02%. This data shows that as many as 210 million Indonesians have access to digital media. The digital literacy index in Indonesia in 2022, released by the Ministry of Communication and Information Technology

(Kemenkominfo) and the Katadata Insight Center (KIC), was at a level of 3.54 points on a scale of 1-5. It means that Indonesian society's digital literacy level is at a moderate level. Digital literacy in Indonesia has been interpreted as the ability to understand and use information from various digital sources, which is related to literacy and the process of thinking and evaluating information from various digital sources. However, various issues are related to this, such as hoaxes, privacy violations, cyberbullying, violent content, and pornography (Nasionalita & Nugroho, 2020).

The digital literacy gap still exists in Indonesia, which is caused by several factors, namely geographical factors, skills and education, government policies, and economic and cultural systems (Marini et al., 2020). The research results show inequality between the younger and older generations in digital literacy competencies in Medan City (Sitepu & Rajagukguk, 2022). This imbalance occurs because of age differences and the culture and technology used in each era. To increase the understanding of digital literacy for the community or parents, one way that can be done is to carry out digital literacy training. The goal is that parents can control and supervise children using digital (Munir et al., 2022).

Based on research conducted on students in coastal areas, character education carried out in schools, homes, and community environments has made students friendly, hardworking, caring for parents, independent, and disciplined (Manaf et al., 2020). These values and characters are formed slowly but through a long process with challenging environmental conditions in coastal areas. The role of the family is very important in transmitting digital literacy, especially for children under the age of 12, because children at that age do not yet have adequate digital skills (Mubarok, 2019). In this era of digitalization, character education through digital literacy can be a strategy to create a capable generation.

Method

This research uses a quantitative descriptive approach with a survey method. Data analysis in this study used descriptive statistics. Descriptive statistics is a branch of statistics that provides recommendations on summarizing research data clearly and simply in tables, figures, charts, or graphs (Rendón-Macías et al., 2016). This study describes the digital literacy condition of elementary school students in coastal areas in Purworejo Regency, Central Java, Indonesia. Furthermore, the survey method or research takes a sample from one population and uses a questionnaire or questionnaire as a data collection tool. Researchers collected data using a questionnaire through Google Forms. The population in this study were 3rd and 4th-grade students from 10 public schools located in coastal areas. The sampling technique used purposive sampling with a total of 100 students. Furthermore, the instrument used to collect data in this study was modified from the digital literacy framework from Unesco (Law et al., 2018).

Respondents

Respondents for this study were 100 primary school students in coastal areas in the southern region of Purworejo Regency, Central Java, broken down by class, age, and gender characteristics, as shown in the table below.

Characteristics	Total number of respondents
Class	
III	53
IV	47
Age	
8	8
9	46
10	43
11	2
12	1
Gender	
Boys	57
Girls	43

Table 1: Respondent Characteristics

Instrument

The instrument used to measure the digital literacy of elementary school students in this study is a questionnaire adopted from the Kata Data Insight Center (KIC), which refers to the Global Framework for Digital Literacy (Law et al., 2018). This instrument was used to measure digital literacy in Indonesia in 2020. A total of 28 items were presented with Google Forms, and students were asked to select one of the answers on a scale of one to five, where one means strongly disagree, two means disagree, three is neutral, four agree, and five strongly agree. The 28 questions are outlined in the table below.

No.	Questions
Sub-index 1: Information and Data Literacy	
1	I can search and access information data and content in digital media as needed.
2	I can filter data, information, and content according to my needs in digital media.
3	I can direct/organize the search for data, information, and content according to my needs in digital media.
4	I can save data, information, and content in digital media
5	I am used to discovering whether the information I find on a website is true or false.
6	I am accustomed to finding out who the author of information is to find out their track record/credibility.
7	I am used to comparing different sources of information to decide if the information is correct.
8	When I talk to someone I meet online, I know how to check if their identity is confirmed.
Sub-index 2: Communication and Collaboration	
9	I can interact through various digital technology communication devices.
10	I can share data and information with others through appropriate digital technologies.
11	I always consider and adapt my communication to the person/people I am addressing.
12	I always consider and realize my friends' cultural, religious, and age diversity on social media when sharing messages/information.
13	I diversely write my opinions using polite language.
14	I am prepared for the consequence that what I write on the internet can be accessed by many people.
15	I always include/ask permission from the work's creator, whether it is writing, design, photo, or image.
16	I do not spread information that contains hate speech, hoaxes, and slander.
Sub-index 3: Security	
17	I can control who can see my posts (my timeline) on my social media accounts.
18	I know how to "report abuse" on social networks if posts contain harmful content or harm me.

No.	Questions
19	I can turn off the option to show my geographical position / GPS (e.g., on Facebook, mobile application)
20	I do not post personal data on social media
21	I use apps/software to find and remove viruses on my phone/computer
22	I can distinguish emails that contain spam/viruses/malware and those that do not
23	I am accustomed to creating secure passwords with a combination of numbers, letters, and punctuation marks
24	I back up or save data in several places, not just one
Sub-index 4: Technological Capability	
25	I can connect my device to a Wi-Fi network
26	I can download files/applications from the internet
27	I can upload files to the internet
28	I can install programs/applications on my device

Table 2: Digital Literacy Questionnaire

Before being distributed to the field, researchers tested the validity of the digital literacy questionnaire by distributing questionnaires via Google form to 30 respondents. After obtaining the answers, the item validity was analyzed using the product moment formula. The results of the validity test of the 28 items are shown in the table below.

Item Number	r-count	r-table	Validity
1	0.482	0.361	Valid
2	0.509	0.361	Valid
3	0.625	0.361	Valid
4	0.562	0.361	Valid
5	0.553	0.361	Valid
6	0.772	0.361	Valid
7	0.592	0.361	Valid
8	0.571	0.361	Valid
9	0.707	0.361	Valid
10	0.584	0.361	Valid
11	0.559	0.361	Valid
12	0.557	0.361	Valid
13	0.715	0.361	Valid
14	0.763	0.361	Valid
15	0.663	0.361	Valid
16	0.264	0.361	Not Valid
17	0.490	0.361	Valid
18	0.609	0.361	Valid
19	0.647	0.361	Valid
20	0.539	0.361	Valid
21	0.713	0.361	Valid
22	0.655	0.361	Valid
23	0.594	0.361	Valid
24	0.836	0.361	Valid
25	0.469	0.361	Valid
26	0.548	0.361	Valid
27	0.690	0.361	Valid
28	0.559	0.361	Valid

Table 3: Validity of the Digital Literacy Questionnaire

The basis for decision-making used to determine the items' validity is based on the value of r count and r table. If the calculated r value (Pearson Correlation) is greater than the r table value, it can be concluded that the item meets the validity criteria. Therefore, in the digital literacy questionnaire distributed to 100 respondents, item number 16 was not used, so the total number of items became 27. In addition to the validity test, a reliability test was also carried out with a benchmark. The questionnaire was declared reliable or consistent if the Cronbach's Alpha value > 0.60 . Based on the reliability test on 28 items, the Cronbach's Alpha value is 0.936, meaning the digital literacy questionnaire is reliable.

Findings

Digital Literacy Levels of Elementary School Students in Coastal Areas

Based on a survey conducted using a questionnaire on 100 grade III and grade IV students from 10 schools in coastal areas, an average digital literacy index of 3.63 (from a scale of 1 to 5) was obtained, which means that the level of digital literacy is in the moderate category. In general, the level of digital literacy of students in coastal areas can be seen in Figure 1 below.

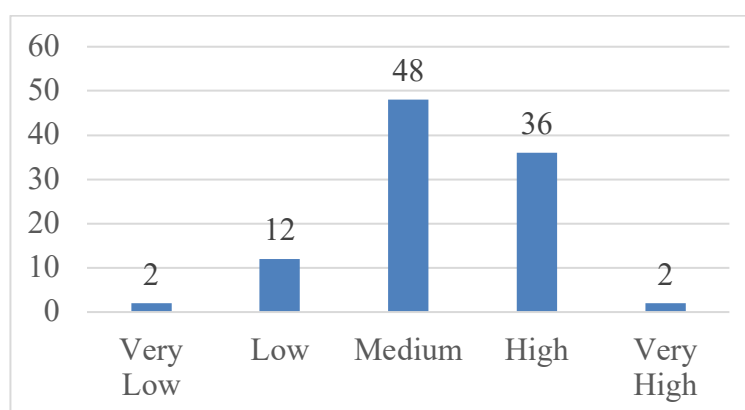


Figure 1: Digital Literacy of Elementary School Students

From the digital literacy diagram, it can be seen that out of a total of 100 students, there are two students in the very low category, 12 students in the low category, 48 students in the medium category, 36 students in the high category, and two students in the very high category.

The Digital Literacy Level of Elementary School Students per Sub-index

This digital literacy survey was also conducted on four sub-indices: information and data literacy, communication and collaboration, security, and technological capabilities. The level of students' digital literacy per sub-index can be seen in Figure 2 below.

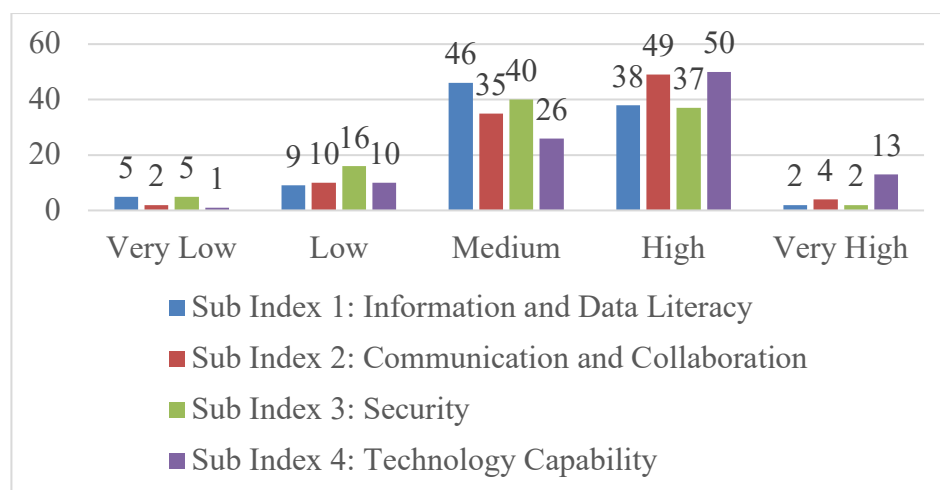


Figure 2: Digital Literacy of Elementary School Students per Sub-index

In sub-index 1 (information index and data literacy), five students were in the very low category, nine in the low category, 46 in the medium category, 38 in the high category, and 2 in the very high category. In sub-index 2 (communication and collaboration), there are two students in the very low category, ten students in the low category, 35 in the medium category, 49 in the high category, and 4 in the very high category. Sub-index 3 (security) places five students in the very low category, 16 in the low category, 40 in the medium category, 37 in the high category, and 2 in the very high category. Furthermore, in sub-index 4 (technological capability), the measurement results show only one student in the very low category, 10 in the low category, 26 in the medium category, 50 in the high category, and 13 in the very high category.

Discussion

Based on a survey conducted from March to April 2023 among 100 primary school students in coastal areas, the students' digital literacy index was 3.63 (on a scale of 1 to 5), meaning that the digital literacy level is in the medium category. The digital literacy index is 0.09 points higher than Indonesia's national digital literacy index in 2022. The digital literacy index released by the Ministry of Communication and Information Technology (Kemenkominfo) and the Katadata Insight Center (KIC) is 3.54 points. It means that the Indonesian people's digital literacy level is at a moderate level. The results of the digital literacy survey per sub-index, namely information and data literacy, communication and collaboration, security, and technological capabilities, produce the following averages.

Sub-Index	Average	Category
Information and data literacy	3,60	Medium
Communication and collaboration	3,72	Medium
Security	3,50	Medium
Technological capabilities	3,81	Medium

Table 4: Digital Literacy Average

Based on the table above, the technological capability sub-index shows the highest average with an index of 3.81 in the medium category. Security is the lowest of the four sub-indices, with an average of 3.50 in the moderate category.

Digital safety in elementary school students can concern teachers and parents. Issues related to digital safety, in this case, include problems accessing inappropriate content, inappropriate contact with others online, sharing personal information, lack of understanding of the dangers of the internet, problems related to cyberbullying behavior and digital footprints, and problems related to digital security and privacy (Martin et al., 2022). Some digital safety measures teachers can take include limiting internet use, monitoring student activities, providing education about digital safety, and support from guidance counselors. Teachers must realize that digital literacy is one of the main protective factors in digital safety (Tomczyk, 2020). Therefore, the development of digital literacy has become one of the main challenges schools face today.

Conclusion

Digital literacy of elementary school students in coastal areas is generally in the moderate category. All four sub-indices of digital literacy are in the moderate category. However, out of the four sub-indices of digital literacy, technological capability occupies the highest average, while security occupies the lowest position. Digital safety is very important for teachers and parents to pay attention to. To improve digital safety, teachers and parents can take steps to limit internet use, monitor student activities, provide education about digital safety, and find counselors for children. The limitation of this study is the small sample size, which is only 100 students from one district located in the southern coastal area of Central Java province. The sample size may not represent the total population of elementary school students in coastal areas in Indonesia.

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