

## ANALYSIS OF INFORMATION PROCESSING CAPABILITIES AND DIGITAL DATA ON DIGITAL LITERACY SKILLS OF ELEMENTARY SCHOOL STUDENTS

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**Arnelia Dwi Yasa\*<sup>1</sup>, Farida Nur Kumala<sup>2</sup>, Kiki  
Fauziah Andriani<sup>3</sup>**  
arnelia@unikama.ac.id<sup>1</sup>, faridankumala27@yahoo.com<sup>2</sup>,  
kfauziahandriani@gmail.com<sup>3</sup>  
PGSD, Faculty of Education, PGRI Kanjuruhan  
University Malang

\*Corresponding Author

**Abstract:** Analysis of information processing capabilities and digital data on digital literacy skills of elementary school students. This study used a descriptive quantitative approach with a survey method. The data collected is data on students' information processing abilities and digital data. Data was collected by distributing online questionnaires and case study test questions to a sample of 151 high grades elementary school students. The data analysis technique used in this research is descriptive statistical technique. The results of the measurement of information processing capabilities and digital data using a questionnaire resulted in an average score of 2.98 with a sufficient category of a maximum score of 5.0. Meanwhile, the results of measuring the ability to process information and digital data using test questions resulted in an average score of 2.65 with a sufficient category of a maximum score of 5.0. Based on these results, it shows that the ability to process information and digital data on digital literacy skills of students from 4 elementary schools in East Java is still in the sufficient category, so it still needs to be improved again.

**Keywords:** Digital Literacy; Information Processing and Digital Data; Digital Technology.

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### PRELIMINARY

Digital technology is a part of student's lives, so education is expected to be able to equip students to have 21st-century skills. 21st-century skills contain 4 components, they are digital literacy, thinking inventively, communicating effectively, and having a high level of productivity according to NCREL (Mr. Soh et al., 2010). An inseparable characteristic in today's era is digital literacy. Digital literacy can be interpreted as the

ability to understand and use information in various forms and sources that are very broad and can be accessed through computer devices, this is stated by Paul Gilster (Hanik, 2020). These abilities are expected to be able to support students in operating technology effectively for learning through digital media. Digital media currently presents content in the form of audio, visual, audiovisual, and contextual so that it becomes something that cannot be separated in students' lives (Setiansah et al., 2019). Digital literacy is important for students, they are to understand, have creativity, have confidence, and have a critical attitude in consuming information or news, so that students can avoid incorrect information. (Setiansah et al., 2019) . Students must be able to choose the digital media that will be used, so information processing skills and digital data are needed. Digital information and data processing is one of digital literacy abilities or skills. Digital information and data processing is an ability to collect, organize, filter, and evaluate digital information and data by utilizing digital media such as the internet on laptops and mobile phones to obtain information effectively (Sumiaty & Sumiaty, 2014).

The concept of digital information and data processing capabilities emphasizes critical thinking processes and logical analysis when dealing with digital media as core skills in digital literacy. Digital literacy is a skill possessed by a person in accessing, operating, understanding, integrating, informing, and assessing information safely and appropriately through digital technology to carry out a learning activity (Law, N., Woo, D., de la Torre). , J., & Wong, 2018). Digital literacy has a positive impact on achieving education through the process of implementing learning. The positive impact of digital literacy is that it can help carry out the learning process, be able to explore and analyze from many learning sources but get valuable and useful things as well as provide opportunities to be productive and creative in creating and developing digital media, especially for students (Ahman et al., 2019).

Based on the results of interviews that have been conducted on December 10, 2021 at SDN Tambaksari III, showed that the literacy level of students in elementary school is still minimal, this is due to the constraints of several factors, including the network that is less supportive so that students have difficulty accessing information on various digital platforms, another obstacle experienced by students is the absence of computer

or laptop facilities so that students are not accustomed to accessing software, resulting in a lack of digital literacy skills in processing digital information and data.

Based on previous research studies conducted at Sleman Regency Elementary School, it was stated that digital literacy had not been implemented optimally at school (Kurniawan & Pambudi, 2018). The results showed that 75% of respondents said that schools forbid students from bringing smartphones to school even in the context of learning. However, in reality, smartphones can now be used as digital media to improve the digital literacy skills of elementary school students (Marty et al., 2013). In line with previous research by (Ulum et al., 2019) which stated that digital literacy is needed to develop insight into improving students' digital literacy skills in processing digital information and data. In the previous study, researchers only studied digital literacy in general, but in this study, the focus is more on indicators of information processing capabilities and digital data.

The importance of digital literacy skills in processing digital information and data is to provide convenience in terms of finding appropriate and needed information, data, and content (Riski et al., 2018). In addition, digital literacy is important for students to have confidence and a critical attitude in consuming information that can be justified (Silvana & Darmawan, 2018). Digital information and data processing is one of important skills in developing the ability to operate digital devices and explore digital data and information to get appropriate results (Ilham & Marlina, 2019). In addition, now the world of education is faced with many sources of information that are scattered and accepted by students, but this makes students confused in filtering the information and data obtained because not all the information that is spread can be trusted and is appropriate with the needs. Therefore, the ability to process information and digital data is very important for everyone, especially students. So it is very important to educate and develop the level of cognitive, skills and awareness in using appropriate, safe, and responsible digital technology tools for students (Fred Rogers Center, 2012). Thus, the purpose of this study was to determine the level of understanding and digital literacy skills of students, especially on digital information and data processing indicators.

## **METHOD**

This type of research used a descriptive quantitative approach. Descriptive quantitative research is a type of research used to analyze data by describing data collected

according to field conditions in the form of numbers (Fauziah, 2018). This type of research used a survey method, with data collection techniques using questionnaires, interviews, or questionnaires obtained from samples in the form of people by collecting data using research instruments that have been made (Islamy, 2019).

This research was conducted in 4 elementary schools in East Java, including SDN 2 Jarakan (Tulungagung Regency), SDN Gempolan (Kediri Regency), SDN 5 Ngreco (Pacitan Regency) and SDN Tambaksari 3 (Pasuruan Regency). The population in this study was high-grade students of elementary school (grades IV, V, and VI) in East Java. Respondents were high-grade students and were randomly selected from various elementary schools in East Java. The respondents were selected through simple random sampling to obtain as many as 151 students.

The subjects of this study were elementary school students in grades IV, V, and VI from 4 elementary schools in East Java, including SDN 2 Distance (Tulungagung Regency), SDN Gempolan (Kediri Regency), SDN 5 Ngreco (Pacitan Regency) and SDN Tambaksari 3 (Pasuruan Regency) totaling 151 students. Sampling for research subjects using purposive sampling with a simple random sampling technique. The instrument used in this study is a non-test instrument in the form of a questionnaire and a test in the form of case study questions that have been tested for validity and reliability tests. Data collection technique used was the distribution of questionnaires and case study questions to selected respondents. Data collection is done online via google form with data measurement using a linkert scale of 1 – 5.

The instrument grid of digital information and data processing capabilities includes a) physical operation of digital devices, b) identifying software to operate digital devices, c) browsing, searching, and filtering digital data, information, and content, d) Evaluating data, information, and digital content, and e) managing digital data, information, and content (Law, N., Woo, D., de la Torre, J., & Wong, 2018). The data analysis used in this study is descriptive statistics, so the data collected is analyzed using the average value of variables. The value range will range from 1.0 – 5.0, so based on how to calculate the average score, the following qualification provisions will be used:

**Table 1 Qualification Average Result Analysis**

No	Score	Information
1	1.0 - 1.79	Very Low

2	1.80 – 2.59	Low
3	2.60 – 3.39	Enough
4	3.40 – 4.19	Tall
5	4.20 – 5.00	Very High

Source : Developed (Sugiyono, 2013)

## RESULTS

Based on the results distributing digital literacy questionnaires to students in grades IV, V, and VI from 4 elementary schools in East Java with a total of 18 statement questionnaire items and 7 case study test questions. Data from questionnaires and case studies of information processing capabilities and digital data are presented in table 3 and table 4 below:

**Table 2 Results Analysis Questionnaire and Test Ability Processing Information and Digital Data 4 Schools Basic in Java East**

Instrument	Sub Indicator	School Name				Average School	Category
		SDN 2 Distance Trenggalek	SDN 5 Ngrecon	SDN Tambaksari III Pasuruan	SDN Gempolan Kediri		
Questionnaire	1	3.56	3.47	3.51	2.73	3.07	Enough
	2	2.98	3.17	3.02	2.35		
	3	3.81	3.23	3.52	2.78		
	4	3.39	3.18	3.10	2.43		
	5	3.03	3.12	2.91	2.27		
<b>Average</b>		<b>3.35</b>	<b>3.23</b>	<b>3.21</b>	<b>2.51</b>		
<b>Category</b>		<b>Enough</b>	<b>Enough</b>	<b>Enough</b>	<b>Low</b>		
Test	1	4.79	3.68	4.41	2.77	2.88	Enough
	2	3.85	2.50	2.94	1.55		
	3	5.00	3.68	4.85	2.84		
	4	2.08	0.79	1.47	0.61		
	5	3.65	1.84	2.87	1.45		
<b>Average</b>		<b>3.87</b>	<b>2.50</b>	<b>3.31</b>	<b>1.84</b>		
<b>Category</b>		<b>Tall</b>	<b>Low</b>	<b>Enough</b>	<b>Low</b>		

Source: Research data processing

Based on table 2, when viewed from the aspect of digital information and data processing capabilities, it can be explained that 5 sub-indicators are measured including the following: 1) physical operation of digital devices, 2) identifying software to operate

digital devices 3) browsing, searching and filtering digital data, information, and content, 4) evaluating digital data, information, and content, and 5) managing digital data, information and content.

Based on table 2, of 5 sub-indicators of the digital data and information processing capability aspect of SDN 2 Jarakan in questionnaire results, it got an average score of 3.35 in the sufficient category and an average score of 3.87 with a high category on the test results. SDN 5 Ngreco on the questionnaire results got an average score of 3.23 in the sufficient category and got an average score of 2.50 with a low category on the test results. SDN Tambaksari III on the questionnaire results got an average score of 3.21 with sufficient category and got an average score of 3.31 with sufficient category on test results. SDN Gempolan on the questionnaire results got an average score of 2.51 in the low category and got an average score of 1.84 in the low category on the test results.

## DISCUSSION

The level of digital literacy skills of elementary school students is a person's ability to search for information on the internet using digital media and perform several activities in it using *search engines* (Kharisma, 2016). Someone who has ability of digital literacy is expected capable to look for strategies in utilizing *search engines* to find appropriate information based on needs (Silvana & Darmawan, 2018). Digital literacy has important benefits for students in learning and allows obtaining the latest and wider knowledge using technology from digital literacy (Maulana, 2015).

This research focuses on digital literacy indicators, which are information processing and digital data. These competencies include the physical operation of digital devices, identifying software to operate digital devices, browsing, searching and filtering digital data information, evaluating digital data information, and managing digital information and content. (Sumiaty & Sumiaty, 2014) . The analyzed data is the result of distributing research questionnaires that have previously been tested for validity and reliability on each item in the questionnaire and test questions.

Based on the data obtained, the level of digital data and information processing capability in physical operation of digital devices can be seen from the average score of data analysis results. The results of digital literacy levels are broadly related to how a

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person's ability to utilize and think critically utilizes digital media for their purposes (Jones & Hafner, 2021). The data obtained stated that the average score of information processing indicators and digital data of elementary school students in East Java from filling out the questionnaire with an average score of 3.07 in the sufficient category, and from the test results with an average score of 2.88 in the sufficient category. The score results indicate that students' abilities in processing digital information and data are quite good but need to be improved, some students can physically operate digital devices, identify software, explore and search and filter information and digital content, evaluate digital information data and manage digital information data. However, some students get low results because students do not understand how to operate digital technology devices and use technology to find information and data. In addition, the lack of digital technology facilities provided, both by parents and schools. This is shown when filling out the questionnaire, students choose answers hesitantly and disagree, then on the test questions students answer questions based on experience using digital technology that is lacking.

From the data analysis on the level of students' abilities related to information processing indicators and digital data, the results are quite good, but it is necessary to increase the ability of each student from various grade levels. The results of the analysis of information processing capabilities and digital data in high grades (IV, V, and VI) have different scores, where the scores from class VI are higher than those of class IV and V. This is in line with Jean Piaget's theory related to child development cognition, it shows that children have different stages of understanding and development at different ages, children's knowledge will be able to be formed through continuous experience so that the quality of abilities will increase with age (Syah et al. al., 2013). Thus, age and class also affect students' understanding ability, the higher age/class will be the higher quality of students' knowledge.

Along with the rapid and increasingly sophisticated technological developments, individual abilities are also needed in dealing with developments and utilizing digital technology (Sulianta, 2019). Things that affect the low results of students' abilities in processing digital information and data such as lack of facilities and experience in using digital technology are expected to be improved. In addition, digital literacy components

such as communicative, confident, creative, and critical also need to be instilled and developed in students from an early age. (Kemendikbud, 2017) . So that there is a need for guidance, attention, fulfillment of technological facilities, and understanding related to digital literacy in education digital information and data processing. The results of digital literacy skills on the ability to process information and digital data of students from 4 elementary schools in East Java are quite good, but in the future, it is still necessary to develop and improve students' abilities to obtain information, so that students are more critical of information content found on the internet to ensure its truth in the rapidly growing digital era.

## CONCLUSION

Based on the results of data analysis and research results, it can be concluded that the level of digital data and information processing ability on digital literacy skills of students from 4 elementary schools in East Java from information processing and digital data indicators measured as a whole using a questionnaire resulted in an average score of 3,07 with a sufficient category of a maximum score of 5.0. Meanwhile, the results of measuring the ability to process information and digital data using test questions resulted in an average score of 2.88 with a sufficient category from a maximum score of 5.0, so that the information processing ability and digital data of elementary school students must be improved again.

Based on these conclusions, it is expected that the role of principals and teachers is to develop, supervise and launch digital literacy-based activities in schools, and this research can be used as a reference to be developed in further research.

## REFERENCES

- Ahman, Mujiyanto, J., Bharati, Dwi Anggani Linggarnggeraini, Y., & Faridi, A. (2019). Literasi digital: Dampak dan tantangan dalam pembelajaran bahasa. *Seminar Nasional Pascasarjana UNNES*, 386–389. <https://proceeding.unnes.ac.id/index.php/snpasca/article/download/313/342/>
- Fauziah, A. A. (2018). *Hubungan antara budaya sekolah dengan mutu sekolah di SMA Muhammadiyah 18 Sunggal*. 2015, 1–30.
- Fred Rogers Center. (2012). Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth through Age 8. *Children*,



January, 1–15. <http://www.naeyc.org/positionstatements>

- Hanik, E. U. (2020). Self Directed Learning Berbasis Literasi Digital Pada Masa Pandemi Covid-19 Di Madrasah Ibtidaiyah. *Elementary Islamic Teacher Journal*, 8(1), 183–208.
- Ilham, M., & Marlina, M. (2019). Pembuatan Komik Literasi Informasi Untuk Meningkatkan Literasi Siswa di Perpustakaan SMA Negeri 1 Padang. *Ilmu Informasi Perpustakaan Dan Kearsipan*, 8(1), 204. <https://doi.org/10.24036/107327-0934>
- Islamy, I. (2019). Penelitian Survei dalam Pembelajaran & Pengajaran Bahasa Inggris. *Pasca Sarjana Pendidikan Bahasa Inggris*, August, 1–9. [https://www.researchgate.net/publication/335223420\\_Penelitian\\_Survei\\_dalam\\_Pembelajaran\\_Pengajaran\\_Bahasa\\_Ingggris](https://www.researchgate.net/publication/335223420_Penelitian_Survei_dalam_Pembelajaran_Pengajaran_Bahasa_Ingggris)
- Jones, R. ., & Hafner, C. . (2021). *Understanding Digital Literacies : A Practical Introduction* (2nd Editio). Routledge. <https://doi.org/https://doi.org/10.4324/9781003177647>
- Kemendikbud, K. P. dan K. R. I. (2017). *Materi Pendukung Literasi Digital*. Tim GLN Kemendikbud.
- Kharisma, H. V. (2016). Literasi Digital di Kalangan Guru SMA di Kota Surabaya. *Ocean Modelling*, 22(3), 1361–1369. <http://dx.doi.org/10.1016/j.ocemod.2013.04.010><http://dx.doi.org/10.1016/j.ocemod.2011.06.003><http://dx.doi.org/10.1016/j.ocemod.2008.12.004><http://dx.doi.org/10.1016/j.ocemod.2014.08.008><http://dx.doi.org/10.1016/j.jcp.2009.08.006><http://dx.doi.org/10.1016/j.jcp.2009.08.006>
- Kurniawan, M. R., & Pambudi, D. I. (2018). Literasi Dalam Pembelajaran di Sekolah Dasar (Pentingnya Pendidikan Karakter Bagi Generasi Digital Native). *Seminar Nasional Pendidikan Dasar*, 386–393.
- Law, N., Woo, D., de la Torre, J., & Wong, G. (2018). A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2. *UNESCO Institute for Statistics*, 51, 146.
- Marty, P. F., Alemanne, N. D., Mendenhall, A., Southerland, S. A., Sampson, V., Douglas, I., Kazmer, M. M., Clark, A., & Schellinger, J. (2013). *Scientific inquiry , digital literacy , and mobile computing in informal learning environments*.

- February 2015, 37–41. <https://doi.org/10.1080/17439884.2013.783596>
- Maulana, M. (2015). *Definisi , Manfaat dan Elemen Penting Literasi Digital*. 1(2), 1–12. <https://www.muradmaulana.com/2015/12/definisi-manfaat-dan-elemen-penting-literasi-digital.html>
- Riski, Ligia, Winoto, Yunus, Rohman, S., & Asep. (2018). *BIBLIOTIKA : Jurnal Kajian Perpustakaan dan Informasi LITERASI INFORMASI SISWA SEKOLAH MENENGAH PERTAMA DALAM Pengerjaan Tugas Sekolah*. 2, 132–140.
- Setiansah, M., Novianti, W., & Istiyanto, S. B. (2019). Literasi Media Digital Berbasis Individual Competence Framework Pada Keluarga Buruh Migran Anggota Paguyuban Seruni Kabupaten Banyumas. *Journal Acta Diurna*, 15(1), 17. <https://doi.org/10.20884/1.actadiurna.2019.15.1.1572>
- Silvana, H., & Darmawan, C. (2018). Pendidikan Literasi Digital Di Kalangan Usia Muda Di Kota Bandung. *Pedagogia*, 16(2), 146. <https://doi.org/10.17509/pdgia.v16i2.11327>
- Sugiyono. (2013). *Metode Penelitian Kuantitatif Kualitatif dan R&D* (19th ed.). ALFABETA.
- Sulianta, F. (2019). *Literasi Digital, Riset, Perkembangannya & Perspektif Social Studies*.
- Sumiaty, N., & Sumiaty, N. (2014). Literasi Internet pada Siswa Sekolah Menengah Pertama. *Jurnal Penelitian Komunikasi*, 17(1), 77–88. <https://doi.org/10.20422/jpk.v17i1.8>
- Syah, M., Rosdakarya, R., Sumantri, M., & Didik, P. P. (2013). *Teori Perkembangan Kogitif Jean Piaget*. 6(1), 89–99.
- Tuan Soh, T. M., Arsada, N. M., & Osman, K. (2010). The relationship of 21st century skills on students' attitude and perception towards physics. *Procedia - Social and Behavioral Sciences*, 7(C), 546–554. <https://doi.org/10.1016/j.sbspro.2010.10.073>
- Ulum, B., Fantiro, F. A., & Rifa'i, M. N. (2019). Pemanfaatan Google Apps di Era Literasi Digital Pada Siswa Sekolah Dasar. *Lentera: Jurnal Pendidikan*, 14(2), 22–31. <https://doi.org/10.33654/jpl.v14i2.843>