



How is The Digital Literacy Profile of Students in The Era of Digitalization?

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Abstract. The surge of internet use in this digitalization era must be accompanied by the increase of digital literacy skills. Schools need to teach digital literacy skills to support digital-based learning. Digital literacy in schools must not only teach how to use digital media in the learning process, but also how to use digital media safely and productively. Developing this ability requires support from the family, government and school for certain. This research involved 392 junior high school students in Madiun City. This study uses the descriptive quantitative type with the instrument used in the form of a digital literacy questionnaire. This research found that the digital literacy skills of students were in the good category, as indicated by the following data: ability to use media with an average score of 3.93; ability to operate learning platforms with an average score of 3.66; ability to use advanced media with an average score of 3.55; and ability regarding ethics and security in using digital media with a score of 3.82. The students possess these four skills in the good category. Nonetheless, this score still requires improvement as a basis for implementing online/digital-based learning safely and productively.

Keywords: digital literacy, digital citizenship, civic education

1 Introduction

Our lives are encircled by the digital world. The use of digital technology is part of personal life, study at school, and office work. Such activities consist of: using digital applications and services, communicating via social networks and interacting with digital content. Nearly all of our activities can be done digitally, including: watching, reading or listening, sharing, discussing. We can perform these in one device. In line with what Ribble said, technological developments are changing interactions in families, schools and society[1]. Indirectly, according to White, these interactions can increase knowledge, develop skills and self-confidence [2]. Nevertheless, we must understand interactions in the digital world or it will lead to unintentional violations of the law. Such an example of a violation of the law is giving false information on purpose in order to cause problems.

In the field of education, numerous people have brought the digital world into the classroom with the aim to improve learning and teaching, engaging students and helping the acquisition of new skills. According to White, in this digital era, many are questioning traditional learning in the digital era and they are trying to turn the digital world into a classroom[2]. The existence of online courses and the use of digital content as learning resources are prime examples. On the other hand, debates still persist regarding the implementation of good pedagogy and the role of teachers in digital learning.

1.1 The Urgency of Increasing Digital Literacy

Paul proposed the idea of digital literacy for the first time in 1997, which is the abilities possessed by a person including knowledge of digital tools, critical thinking and social involvement. Likewise, Fraser stated a similar concept regarding digital literacy skills, namely abilities that cover all aspects, which are the development of knowledge, skills, competencies, self-confidence and abilities necessary to interact, communicate, learn, work and create with digital technology. The number of internet users in Indonesia increases every year. According to a survey conducted by the Indonesian Internet Service Providers Association (APJII), the internet penetration rate in Indonesia in 2018 was 64.80%; then in 2019-2020 it was 73.70%; and as of 2021-2022 it had increased to 77.02% [3]. Consistent with APJII, the number of Indonesians connected to the internet in 2021-2022 is 210,026,769 people. Based on APJII research, internet users classified based on their age include 62.43% of aged 5-12, 99.16% of aged 13-18, 98.64% of aged 19-34, 87.30% of aged 35-54, as well as aged 55 and over is 51.73% [3]. The large amount of internet usage among children and teenagers creates an urgent need to increase digital literacy. The development of digital literacy is able to be carried out through the National Literacy Movement (GLN), which has been executed by the Ministry of Education and Culture since 2016. The development of digital literacy hopefully can equip children and teenagers to maximize meaningful use of the internet.

A survey in rural areas of Canada discovered that the frequency of activities using digital technology has the potential both in the classroom and outside the classroom [4]. This growing use of digital technology requires the role of digital literacy. This is in accordance with Shopova's research results which state that developing literacy levels of students and their digital competencies is very important to increase the effectiveness and efficiency of the learning process as well as students' adaptation to dynamic market needs[5]. Shopova's findings in the research revealed that the majority of students already possess the skills to access the internet, including accessing social media, e-mail, Skype and other applications, but their knowledge and competence in using technology for learning is still relatively low [5]. With digital literacy, we are able to learn to use digital technology in productive, creative, critical, safe and ethical ways.

1.2 Digital Literacy and Digital Citizenship

Hui Zhang and Chang Zhu divided digital literacy into four components, namely:

1. Technical skills, in this aspect, individuals are expected to have the skills to operate technology such as managing data and words;
2. Critical understanding, individuals in this part are able to think critically, namely assessing the quality appropriately in digital-based media content;
3. Communication and creation, individuals can communicate and socialize properly. In the aspect of digital citizenship, these skills must be possessed to motivate participation in the digital media space with a sense of responsibility in accordance with applicable regulations;
4. Citizenship participation, in the aspect of citizens, the emphasis is on social participation in digital media [6]

To form good digital citizenship, individuals must have technical skills, be able to communicate and be creative, have critical understanding, and be able to participate as well. Hence, in order for these digital literacy skills to be able to be acquired by students, teachers can carry out digital-based learning.

In her research, Anne revealed that schools have an important role in introducing digital technology in hopes of developing digital literacy of students[7]. In line with Setyaningsih's research which states that the use of e-learning can increase digital literacy of students [8]. Furthermore, Desi's research results added that in schools, there is a necessity to develop a digital literacy movement in integrated learning in the curriculum with the aim to develop the creativity and innovation of the younger generation[9]. Thus, school curricula must prioritize the responsible use and sharing of information, identify trusted sources of information and protect students during online activities as well. Teaching materials are required to adapt to certain age groups at school and involve parents to guide and support their children in online learning activities[10]. Online learning activities require a decent level of digital literacy. Students must have digital literacy skills. Digital literacy skills are divided into 4 aspects, which are: 1) ability to use media; 2) ability to manage digital learning platforms; 3) using advanced digital media; 4) ethics and security in the use of digital media [11].

Learning process at school covers all areas, one of which is learning Civic Education. According to Branson (1995), there are three main components in civic education, namely civic knowledge, civic skills and civic character/disposition. Based on the aforementioned statement, civic education is one of the subjects that is able to develop students' character. According to Benaziria, shaping the character/personality of citizens can be performed through direct instruction and indirect teaching [12]. Direct instruction is direct character development, while indirect teaching is indirect teaching in shaping the character of citizens, including exemplary, habituation and school culture by focusing on the characteristics of subjects and the conditions of students. In this method, teachers use indirect teaching to develop the digital skills of students with the objective that they can build digital citizenship. Digital citizenship is a characteristic of citizenship that includes digital literacy, which is individuals who are sensible and responsible in using digital media and the internet [1]. Digital citi-

zanship possesses 9 elements which are the basis for the use of technology, those are digital access, digital commerce, digital communication, digital literacy, digital etiquette, digital law and digital rights and responsibilities[1]. Therefore, in shaping the student character in the school environment, teachers can integrate digital citizenship in learning.

2 Method

This research uses the quantitative descriptive method to determine the level of literacy skills of junior high school students in Madiun City. We distributed questionnaires to 392 students using Google Form. The questionnaire items are arranged based on 4 indicator components, namely: 1) ability to use media; 2) ability to manage digital learning platforms; 3) using advanced digital media; 4) ethics and security in the use of digital media [11]. The assessment of this questionnaire score uses a 1-5 Likert scale. The answer choices for each statement item are: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD). The following is a table of criteria for digital literacy components which have been categorized using the 1-5 Likert scale.

3 Results and Discussion

This data of digital literacy skills was obtained from the results of a questionnaire distributed in five junior high schools in Madiun City, which are SMPN 1 Madiun, SMPN 13 Madiun, SMPN 11 Madiun, SMPN 12 Madiun and SMPN 7 Madiun. Researchers chose respondents in Madiun City Middle Schools due to the assistance of Chromebook facilities from the Government of Madiun City for State Middle Schools throughout the area. There were 392 respondents who filled out the questionnaire. The questionnaire was used to see an overview of the digital literacy skills of junior high school students in Madiun City.

Table 1. Digital Literacy Component Criteria

No	Average	Category
1	4,2 – 5,0	Very good
2	3,3 – 4,1	Good
3	2,4 – 3,2	Moderate
4	1,4 – 2,3	Not good
5	0,5 – 1,3	Bad

The scaling method used in this scale is the summated ratings (Likert) method with five response options, which are VS (Very Suitable), S (Suitable), MS (Moderately Suitable), U (Unsuitable), and VU (Very Unsuitable). Digital literacy skills consist of several predetermined indicators, including: 1) The ability to use media; 2) Managing digital learning platforms; 3) Using advanced digital media; 4) Ethics and

security in the use of digital media. The authors created 50 items in accordance with the established indicators, namely 13 items for the ability to use media; 9 items for managing digital learning platforms; 13 items for using advanced digital media, and 15 items for ethics and security in the use of digital media. The authors presented these four aspects with averages and percentages for each question item. The percentage results which describe the ability to use media are as follows. As visible in Table 2 on the ability to use media, there are 13 items filled in by students. These 13 items concern the use of media in classroom learning. All 13 indicators are based on 1) students' ability to operate digital devices (cellphones, iPads, tablets, laptops, or PCs) to access platforms in online learning and in digital-based classes; 2) students' ability to use social media to access learning materials; 3) students' ability to operate learning platforms (Google Classroom, Google Docs, Zoom Meeting, Google Meeting, etc.) in digital classes. Based on the table above, the calculation results show that the average student has the ability to use media, namely 24.27% answered Very Suitable; 48.18% chose Suitable; 24.41 opted for Neutral. A total of 2.77% and 0.37% opted for Unsuitable and Very Unsuitable. Thereafter, the researchers calculated the average value for the ability to use media which obtained the number of 3.93. After getting the average score, the researchers proceeded to convert the scores using the assessment categories in Table 1. A score of 3.93 in the assessment is within the good category. According to these results, it can be concluded that students have good abilities in using media. This data shows that students are ready to carry out technology-based learning.

Table 2. Ability to use media

No	Indicator	Result%				
		Very Suitable (VS)	Suitable (S)	Neutral (N)	Unsuitable (U)	Very Unsuitable (VU)
1	I can access digital learning platforms for online learning using a mobile phone.	23.98	50.77	23.47	1.79	0.00
2	I can use WhatsApp to access materials.	29.59	53.32	16.33	0.51	0.26
3	I can create an email and Google Classroom account.	25.00	42.35	25.00	6.63	1.02
4	I can use Google Classroom for online learning.	28.32	48.47	19.90	2.81	0.51
5	I can use the Google Document application well.	16.07	48.21	29.59	5.10	1.02
6	I can use Google Forms well.	22.70	56.63	18.11	2.30	0.26
7	I can join Zoom meetings or Google Meet for online video conference learning.	22.70	46.68	27.04	3.06	0.51
8	I can comment, ask, answer, and provide suggestions during online classes using Google Classroom and other online learning platforms.	13.78	41.84	40.82	3.32	0.26
9	I can fully participate in the online classes through zoom meeting, google meet, and google classroom.	22.96	47.96	25.26	3.57	0.26

No	Indicator	Result%				
		Very Suitable (VS)	Suitable (S)	Neutral (N)	Unsuitable (U)	Very Unsuitable (VU)
10	I can utilize youtube to watch learning videos.	27.30	50.00	20.92	1.79	0.00
11	I know how to mute/ unmute the microphone on the zoom meeting/google meet during online video conference classes.	27.81	46.43	23.98	1.28	0.51
12	I know how to search for learning material on Google.	32.91	48.72	16.84	1.28	0.26
13	I can operate various digital communication devices (mobile phones, pads, tablets, laptops, and PCs).	22.45	44.90	30.10	2.55	0.00
Average		24.27	48.18	24.41	2.77	0.37

Table 3. Ability to manage digital learning platforms

No	Indicator	Result%				
		Very Suitable (VS)	Suitable (S)	Neutral (N)	Unsuitable (U)	Very Unsuitable (VU)
1	I can upload various types of files such as doc, pdf, ppt, audio, and video on Google Classroom and other digital learning platforms.	16.33	40.05	36.48	6.12	1.02
2	I can make an introductory sentence in the body of an email.	10.46	32.14	47.19	9.44	0.77
3	I can make instructional sentences when uploading files on Google Classroom or other digital learning platforms.	10.71	37.24	46.17	5.36	0.51
4	I can shift digital learning platforms during the running of online classes.	9.95	34.44	46.17	8.16	1.28
5	I can use various digital learning platforms simultaneously, such as Google Meet/Zoom and Google Classroom/Moodle at the same time.	12.76	39.03	36.22	10.71	1.28
6	I can create digital content such as presentation videos related to assignments given by the teacher.	15.82	41.58	35.46	5.61	1.53
7	I can upload and submit assignments such as doc, pdf, ppt, and video presentations on google classroom and other digital learning platforms.	16.58	44.39	32.91	5.87	0.26
8	I can submit assignments via WhatsApp.	40.05	43.11	15.05	0.77	1.02
9	I can download files of learning material via Google Classroom.	21.94	48.47	26.53	2.30	0.77
Average		17.18	40.05	35.80	6.04	0.94

It can be seen in Table 3 regarding digital learning platform management capabilities, there are 9 items filled in by students. These 9 items concern managing the digital learning platform. All 9 indicators are based on 1) students' ability to upload assignment files to Google Classroom or other learning platforms; 2) students' ability to make an introduction when sending an email or uploading files to a digital learning platform; 3) students' ability to use various applications that support the implementation of digital learning. Based on the table above, the highest average number result for students answering Suitable is 40.05%. Students answered Very Suitable at 17.18%. Meanwhile, 35.80% of students answered Neutral. This neutral answer does not tend to be suitable or inappropriate, meaning that the student is doubtful about his abilities. Next, students who answered Unsuitable and Very Unsuitable were 6.04% and 0.94%. After gaining these numbers, the researchers calculated the average score for the ability to manage digital learning platforms which obtained the score was 3.66. Subsequently, the researchers then converted the scores using the assessment categories in Table 1. A score of 3.66 in the assessment is within the good category. Based on these results, it is determined that students have good abilities in managing digital learning platforms. From this score, it can be concluded that students already have the ability to manage digital

Table 4. Ability to use advanced digital media

No	Indicator	Result%				
		Very Suitable (VS)	Suitable (S)	Neutral (N)	Unsuitable (U)	Very Unsuitable (VU)
1	I can publish various digital content, such as videos, files (doc, pdf, and ppt), articles, and blogs/websites articles on various online media platforms.	12.50	34.44	43.11	8.67	1.28
2	I can host online discussions via Zoom or Google Meet, organize and give permission to participants to enter and leave the room.	10.71	28.57	44.39	14.03	2.30
3	I can host, moderate, and mute all participants to run online discussions smoothly via Zoom or Google Meet.	9.95	29.08	45.66	13.52	1.79
4	I can choose the appropriate keywords when searching for specific learning materials on Google.	12.50	39.29	42.86	4.34	1.02
5	I can find the appropriate and safe website to support the learning material.	16.84	44.90	34.69	2.55	1.02
6	I can search and access data, information, and content on digital media according to what I need.	15.56	49.74	31.12	2.55	1.02
7	I can store data, information, and content in digital media.	15.31	48.72	32.14	3.57	0.26
8	I can avoid appearing "ads spam" (pop up) when using Google	14.03	40.05	36.48	8.67	0.77

No	Indicator	Result%				
		Very Suitable (VS)	Suitable (S)	Neutral (N)	Unsuitable (U)	Very Unsuitable (VU)
	search.					
9	I can do a survey using Google forms.	11.48	39.54	40.56	7.65	0.77
10	I can create "links" to share digital content.	9.44	37.24	44.90	6.38	2.04
11	I can rename the "title/link name" I created.	11.48	40.31	37.76	9.95	0.51
12	I can share learning materials and articles on social media like WhatsApp and other digital platforms to support online classes.	9.69	36.99	43.11	8.93	1.28
13	I can create suitable hashtags in social media captions according to the purpose of the uploaded content.	16.58	43.37	35.71	4.34	0.00
Average		12.77	39.40	39.42	7.32	1.08

As visible in Table 4 on the ability to use advanced digital media, there are 13 items filled in by students. These 13 items concern about using advanced digital media. All these 13 indicators are based on 1) students' ability to manage online media platforms; 2) students' ability to become managers in digital classes using online learning platforms; 3) students' ability to avoid advertising spam that appears. Based on the table above, the highest average number result for students answering neutral was 39.42%. Next, students who answered Suitable and Very Suitable at 12.77% and 39.40%. Looking at these figures, it is found that there are 52.18% of students who are confident that they have the ability to use advanced digital media. Thereafter, the researchers calculated the average score for the ability to use advanced digital media which obtained the score of 3.55. After getting the average score, the researchers then converted the scores using the assessment categories in table 1. A score of 3.55 in the assessment is within the good category. According to these results, it is concluded that students have good abilities in using advanced digital media. It can be concluded that students already have these abilities, thus students are ready to use learning platforms as media in their digital classes. Without a doubt, this number will increase if students frequently access and use digital media in class.

As shown in Table 5 on ethics and security in using digital media, students must not only be able to use or operate digital media and digital learning platforms, but also be able to use them properly regarding the ethics and security of data belonging to students and other people. In terms of ethics and security in using the digital media, there are 15 items filled in by students. These 15 items concern ethics and security in the use digital media. All 15 indicators are based on 1) students' ability to communicate via digital media; 2) students' ability to manage privacy; 3) students' ability to process information properly and according to their needs; 4) students' ability to maintain device security from viruses. According to the table above, the highest average score result for students answering Suitable is 44.64%. Next, the students who answered Very Suitable were 20.95%. The number of students who answered Neutral

was quite large, namely 30.12%. Looking at these figures, it can be concluded that there are 65.60% of students who have used digital media properly in terms of ethics and security. Afterwards, the researchers calculated the average value of ethics and security in the use of digital media, which obtained a score of 3.82. Subsequently, the researchers proceeded to convert the scores using the assessment categories in Table 1. A score of 3.82 in the assessment is within the good category. Based on these results, students have the ability to be ethical and use digital media safely. It can be concluded that the majority of students have these abilities, hence students are ready to use learning platforms as media in their digital classes.

Table 5. Ethics and security in the use of digital media

No	Indicator	Result%				
		Very Suitable (VS)	Suitable (S)	Neutral (N)	Unsuitable (U)	Very Unsuitable (VU)
1	I can communicate well with the teacher by using messages via WhatsApp.	31.89	44.13	22.19	0.77	1.02
2	I always maintain the procedure for speaking to the teacher when the online video conference classes are running.	30.36	44.13	23.47	1.53	0.51
3	I always read the privacy statement (rights and obligations) before using online learning platforms.	15.31	50.00	30.61	3.83	0.26
4	I understand my rights and obligations when using Google Classroom or other digital learning platforms.	16.84	47.19	33.16	2.04	0.77
5	I always filter data, information, and content according to what I need.	15.05	49.23	32.91	2.30	0.51
6	I do not share information containing hate speech, hoaxes, and slander.	25.00	47.45	25.26	1.53	0.77
7	I constantly adjust the way I communicate according to whom I talk to.	21.43	53.57	22.45	2.04	0.51
8	I can control who can see my posts.	25.00	47.70	24.49	2.55	0.26
9	I know how to report harmful content that occurs on social media posts.	20.66	39.80	34.95	4.08	0.51
10	I can turn on the location/GPS option to share my position.	21.17	43.11	30.36	4.34	1.02
11	I do not upload personal data on social media.	22.70	40.56	29.85	5.61	1.28
12	I can set a password on my mobile phone or laptop.	25.26	45.66	25.00	3.06	1.02
13	I constantly change passwords on my digital devices (mobile phones, tablets, laptops, and PCs).	12.24	33.93	41.58	10.71	1.53

No	Indicator	Result%				
		Very Suitable (VS)	Suitable (S)	Neutral (N)	Unsuitable (U)	Very Unsuitable (VU)
14	I can download and install antivirus on my device (mobile or laptop).	11.48	37.50	45.15	5.36	0.51
15	I always compare information from various sources to check the clarity of the information before sharing it with others.	19.90	45.66	30.36	3.32	0.77
Average		20.95	44.64	30.12	3.54	0.75

Building on the data above, the four components of digital literacy abilities of students show a good category. Students possess the highest average score for the ability in using digital media. In terms of digital media skills, students on average are able to access cellphones to access digital learning materials and platforms. In this case, students are able to take lessons online using Google Classroom, Zoom Meeting or Google Meet. With these aforementioned skills, online learning or digital-based classroom learning will be more effective and efficient, which equals to students having proper use of technology. This is harmonious with Ribble who stated that digital literacy is the process of teaching and learning about technology and the appropriate use of technology[1].

The second highest average score is ethics and security components in the use of digital media, which is 3.82 in the good category. Ideally, schools must not only teach about how to use technology, but also how to use technology appropriately, that is digital citizenship. However, many schools are in fact still focused on studying technology itself, not teaching how to use digital technology appropriately and productively[1]. Herewith, digital citizenship has not been integrated into the school curriculum, despite the fact that digital citizenship is highly crucial to be integrated into the curriculum in schools. Digital citizenship is an effort from school to help students and parents or other adults understand technological developments and it has to emphasize what is beneficial and what is not [13]. This includes protecting students from the negative impacts of digital technology, which are cyberbullying, plagiarism or stealing other people's work, identity theft, accessing pornography, etc. Digital citizenship includes appropriate, responsible behavior in the use of technology including digital literacy which covers the ability to access, analyze, interpret and stay safe in the use of digital technology [13], [14]. Security in digital technology is not only security regarding personal data, but security in interactions with other people in the digital world, such as uploading images, text or videos that do not disturb or offend other people [1], [13].

The lowest average score is on the students' ability to use advanced media, which is 3.55 in the good category. On the other hand, the ability to manage the learning platform has an average score of 3.66 in the good category. It can be inferred that these four abilities are categorized as good. To improve digital literacy skills, students must get used to and continue to use digital access in the learning process.

Furthermore, it is imperative for all schools to integrate digital citizenship in learning, especially in the field of Civic Education studies.

4 Conclusion

According to this research, it can be concluded that the digital literacy profile of middle school students of Madiun City has a good category, namely in terms of ability to use digital media, ability to manage learning platforms, ability to use advanced digital media and regarding ethics and security in using digital media. This good category may be advantageous in carrying out digital-based learning. Nonetheless, in an effort to increase digital access and digital literacy skills, teachers must integrate digital citizenship in the curriculum as well, especially in the field of Civic Education studies.

5 Authors' Contributions

Yuni Harmawati: Conceptualization, Methodology, investigation, Writing – review & editing; Sapriya: Conceptualization, Resources, Writing-Review and editing; Aim Abdulkarim: Investigation, Resources, Data curation; Prayoga Bestari: investigation, Resources, Formal analysis, Validation; Yuendzi Santa Aurell: Conceptualization, , Writing; Kevin Aldoni Hartono: investigation, Resources, Writing.

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