

## Digital Literacy Competency of Primary School Teacher Education Department Student as the Demands of 21<sup>st</sup> Century Learning

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**Abstract:** The 21st century is the era that involves the use of digital devices. Thus, pre-service teachers demand to have many competencies, which in this case is digital literacy competency. There are four digital literacy competencies: digital skills, digital culture, digital ethics, and digital safety. This study employs a qualitative method of research design with a study case. The data were collected by conducting interviews. The analysis in this study was carried out by making a detailed description of the digital literacy competencies of primary school teacher education students and adding a detailed view of the aspects in the research. The participants in this study were 30 primary school teacher education students at a university in Sumedang Regency. The results reveal that mastering digital skills will help daily life work; mastering digital culture will help preserve culture and protect creation; mastering digital ethics will avoid many conflicts; and mastering digital safety can be aware of many crimes in the digital world. Students as prospective teachers are expected to know, and understand and master digital literacy for future teaching.

**Keywords:** literacy; digital literacy; pre-service teacher, primary school teacher; 21st century learning

### 1. Introduction

Teachers and pre-service teachers are the makers of the next generations that must have competencies. Competency is a cognitive structure that supports a teacher's behavior. Additionally, in operational meaning, competency is a various ability that makes the teacher behave in complex professional situations and make a change to find a solution (Toom et al., 2021). Those competencies include pedagogic, personality, social, and professional competencies. However, to keep up with the 21<sup>st</sup> century related to digital knowledge and involvement of digital media users, a teacher must not only master the four competencies but also know about digital media (Abrosimova, 2020). Because of that, a pre-service teacher needs to master various digital devices such as computers, literacy media, and so on (Anisimova, 2020; Aslan, 2020).

The ability to operate digital media is called digital literacy. Digital literacy is the ability to produce information with the help of digital technology (Yildiz, 2020). The meaning of digital literacy refers to cognitive abilities and skills (Mishra et al., 2017). Digital literacy can be called awareness, attitude, and ability to use digital devices, and identify, access, manage, integrate and make new information through metacognitive skills (Aslan, 2020). Moreover, digital literacy needs the ability to access, produce, and use a developing technology in the learning process.

#### 1.1. Problem Statement

People in the 21st Century live with digital technology. One of the fields involving developing technology is the education field and making behavioral changes in the modern social culture that shows in this field (Latorre-Coscolluela et al., 2021). It means that in the learning process, conventional methods do not apply anymore, but it must use digital technology recognized by people (Raja & Nagasubramani, 2018). Furthermore, according to Hadiyanto et al. (2021), digital technology involved in the learning process must need a teacher's skill to adopt,

increase, and instill digital activity in the learning process so that teacher can prepare and encourage the student to be ready for the future digital technology. One of the skills that teachers need is digital technology involved in the learning process, and also have to keep up with innovations and issues in the education field (Pa-alisbo, 2017). If this issue can be realized by the teachers then the learning process will be done well and the students can reach the goal of learning (Puangpunsi, 2021). Moreover, primary school teacher education department students as pre-service teachers will acquire and improve their digital literacy skills. Thus, it can be applied when a pre-service teacher is involved in real life learning process (Bedir, 2019b). A pre-service teacher will also have the quality to teach in the 21<sup>st</sup> century.

Based on the Ministry of Communications and Informatics, Siberkreasi & Deloitte, the digital literacy competency in this study uses four digital literacy competency areas, including Digital Skills, Digital Culture, Digital Ethics, and Digital Safety. In 2020, the Ministry of Communications and Informatics, Siberkreasi & Deloitte issued four digital literacy competency areas to help increase public understanding in the digital space to support digital transformation, which is a national digital literacy program for 2021-2024. Based on this, researchers have not found any research on digital literacy that examines the four areas of digital literacy competencies by the Ministry of Communications and Informatics, Siberkreasi & Deloitte to primary school teacher education students. Therefore, researchers want to know the extent to which students understand this (Hafeez, 2021).

## 1.2. Related Research

The research conducted by Gelmez Burakgazi et al. (2019) sought to identify the pre-service teachers for the 21<sup>st</sup>-century learning in Turkey. The result revealed that pre-service teachers in the 21<sup>st</sup> century had excellent competence levels, and proficiency in a foreign language had a significant effect. In other words, based on these criteria, the pre-service teachers can follow the digital technology in the learning process. In addition, the result shows that the pre-service teacher has the motivation to develop the knowledge and skills for digital technology adaptation in the modern world (Pozas & Letzel, 2021). In particular, digital literacy skills are needed to be used by digital technology in accordance with the applied rules.

Next, a study conducted by Hafeez (2021) shows the pre-service skills to 21<sup>st</sup> century learning in two levels, and the result gave suggestions for pre-service teachers to strengthen learning methods and read as well as understand the curriculum so that the learning is done well. If that happens, the school will create a great graduate and the learning outcomes will be reached (Rasmitadila et al., 2020).

Furthermore, the research conducted by Bedir (2019a) discussed the 21<sup>st</sup> learning and the readiness of pre-service teachers in teaching 4C (*critical thinking, creativity, communication, collaboration*) to students so they can follow the learning. The pre-service student has the perception that the national education curriculum is used to give the idea about material that will be given, and the teacher will integrate the 4C.

According to Häkkinen et al. (2020), in Finland, pre-service teachers have to develop their skills to fill the changes that happen now and in the future in the education field or work life. In reality, teachers are already involved in the education world, they have different styles of teaching, and the interpretation of "quality teacher" has similarities in every culture.

In previous studies, there has been no research on digital literacy competencies for primary school teacher education students, especially regarding the four areas of digital literacy competence by the Ministry of Communications and Informatics, Siberkreasi & Deloitte. Therefore, the researchers are interested in finding out how primary school teacher education students understand digital literacy. This digital literacy is a provision for students as prospective teachers in the future, which will involve many new challenges, especially in the digital world with ever-evolving technological advancements. Therefore, teacher candidates who have adequate competence are needed.

### 1.3. Research Objectives

This study focuses on four research questions: 1) How is the impact of digital literacy skills on primary school teacher education department students?; 2) How do primary school teacher education department students feel about the digital literacy culture?; 3) What is the digital literacy ethnic role from the perspective of a primary school teacher education department student?; and 4) How do primary school teacher education department students feel about the safety of digital literacy safety?

## 2. Theoretical Framework

According to Labudasari et al. (2022), 90% of teachers in primary schools were more familiar with WhatsApp group and Zoom apps as online learning media. Similar to research conducted by Petrus et al. (2022), several primary school educators in North Halmahera district did not yet have the skills to utilize online features used for online learning. As a result, the learning process seems less interesting and boring and drains a lot of energy.

Thus, according to Sabarua et al. (2020), this condition was triggered by the unpreparedness of educators in dealing with digital-based learning. Several educators thought that implementing digital-based learning was not easy to implement because they had to have special skills in digital technology.

In 2020, Kominfo, Siberkreasi & Deloitte offered four competencies, such as digital skill, digital culture, digital ethnicity, and digital safety. Digital skill include the ability to identify, understand and use computer hardware and software and the digital operational system (Monggilo et al., 2021). Digital culture has the ability to read, elaborate, normalize, check and build national insight, Pancasila values and Bhinneka Tunggal Ika on a daily basis (Astuti et al., 2021). Digital ethnicity is the ability to realize, exemplify, adapt, rationalize, consider and increase digital ethical governance on a daily basis (Kusumastuti et al., 2021). Digital safety is the ability to identify, pattern, apply, analyze and increase digital safety awareness on a daily basis (Adikara et al., 2021).

Every competency area has various competency indicators. Digital skills competency indicators are (1) basic knowledge about the digital landscape – internet and cyberspace, (2) basic knowledge about information search engines, their usage, and data sorting, (3) basic knowledge about conversation apps and social media, (4) basic knowledge about digital wallet app, marketplace, and digital transactions. Competency indicators for digital cultures are (1) basic knowledge about Pancasila values and Bhinneka Tunggal Ika as base digital skills in cultural, national, and patriotic life, (2) cultural digitalization through information and communication technology, (3) basic knowledge to support local product and other productive activity, (4) digital rights. Competency indicators for digital ethnics are (1) internet surfing ethics (netiquette), (2) basic knowledge to avoid hoaxes or fake news, hate speech, pornography, bullying, and other negative contents, (3) basic knowledge to interact, participate, and collaborate in digital space that fits the rules of digital ethics and policy, (4) basic knowledge about interaction and interaction in digital space according to the regulations that they apply (Adikara et al., 2021; Astuti et al., 2021; Kusumastuti et al., 2021; Monggilo et al., 2021).

Competency indicators for digital safety are (1) basic knowledge about hardware safety features, (2) basic knowledge about digital identity protection and personal information in a digital platform, (3) basic knowledge about digital fraud, (4) basic knowledge about digital media history (upload and download), (5) minor safety (catfishing) (Adikara et al., 2021; Astuti et al., 2021; Kusumastuti et al., 2021; Monggilo et al., 2021).

## 3. Method

### 3.1. Research Design

The research design used in this research is a case study with a qualitative approach. This design was chosen because the researchers intended to look more closely at the digital literacy competencies of primary school teacher education students. When the specific issue

needs to be discussed in detail and with full explanation, when the researcher would like to write in a flexible style, and when the researcher tries to understand the context or background of the participants, qualitative research is used because it is so appropriate to learn those specific issues (Creswell & Poth, 2016).

### 3.2. Participant

This study involved 30 college students who came from one of the universities in Sumedang, West Java in 2021. The participants were chosen because the researchers wanted to understand digital literacy in primary school teacher education students at one of the universities in Sumedang. This study used a data source method called "Purposive Sampling," which allows participants and research sites to be selected based on criteria. Participants will explain this topic (Creswell, 2007). Furthermore, the data sources were primary school teacher education department students as pre-service teachers, and the information about this study was necessary for the student as the data sources. The participants were 30 college students, which will be explained in Table 1.

**Table 1.** The Characteristic of Participant

Gender		Age		Years in Position				Origin of Residence	
Female	Male	18-20	21-23	2018	2019	2020	2021	Rural	Urban
22	8	23	7	4	13	5	8	18	12

In this study, the data shows the characteristics of participants. Out of 30 students, there were 22 female students and eight male students. The age range is from 18-20 to 21-23 years old. There were 23 students between the ages of 18 and 20, and seven students between the ages of 21 and 23. A total of four students were from the 2018 batch, 13 students were from the 2019 batch, five students were from the 2020 batch, and eight students were from the 2021 batch. There were 18 students from rural areas and 12 students from urban areas.

### 3.3. Data Collection

The data collection technique is a process used to get the data that fits the research topic (Sugiyono, 2013). The data were collected from a questionnaire through a *google form* and sent by the social media platform to the participants. The validity of the questionnaire was confirmed by expert assessment, which was used to ensure its validity. The participants were primary school teacher education department students as pre-service teachers in the future. The questionnaire was filled with open questions as well as closed questions in Likert scale form about four areas of digital literacy competency that need to be owned by the pre-service teacher. After explaining the research problems or the problems, the researchers asked some questions. This study was to collect various forms of data to open and interpret the data by organizing them with theme code or categorizing them with bigger dimensions (Creswell & Poth, 2016).

### 3.4. Data Analysis

The data were analyzed by organizing the data for analysis, then reducing the data into themes through the coding process using the NVivo software, and then presenting the data in the form of charts, tables, or discussions. In analyzing data, there are three stages, namely data reduction, data presentation, and conclusion.

## 4. Findings

This study was conducted to analyze the digital literacy competence of primary school teacher education students by involving 30 students at one of the universities in Sumedang. Based on the results, there are four themes: (1) the work is easier with mastering digital skills, (2) digital

culture as cultural preservation and work protection in a digital world, (3) digital ethics makes avoiding conflict, (4) beware of fraud with understanding digital safety.

#### 4.1. The Work is Easier with Mastering Digital Skills

Information about the digital skills of primary school teacher education students is as follows.

**Table 2.** Digital skills

Question	Not at all	Not really know	Know	Really know
Do you know and understand hardware (monitor, keyboard, speaker, CPU, and mouse) and software (WhatsApp, Zoom, Google Meet, and Google Classroom) in information and computer technology?	0	1	12	17
Do you know about this types of information search engines?	0	3	18	9
Do you know how to operate the information search engines?	0	0	19	11
Do you know how to collect the data from information search engines?	1	5	17	7
Do you know how to access and choose the data from information search engines?	0	2	20	8
Do you know about this kind of conversation app and social media?	0	0	14	16
Do you know how to access the conversation app and social media?	0	0	16	14
Do you know about the various features available on the conversation app and social media?	0	1	17	12
Do you know about the types of digital wallet apps (OVO, DANA, GOPAY, marketplace (Shopee, Tokopedia, Lazada), and digital transactions (Online transaction or cashless)?	0	2	12	16
Do you know how to access digital wallet apps, marketplace, and digital transactions?	1	6	12	11

From Table 2, the first question showed that most of the students, which was about 17 students (56.7%), knew and understood hardware (monitor, keyboard, speaker, CPU, and mouse) and software (WhatsApp, Zoom, Google Meet, and Google Classroom) in information and

computer technology. In the next question, 18 students (60%) knew the kind of automatic information search engines. In addition to knowing the types of automatic information search engines, 19 students (63.3%) knew how to operate them. Moreover, 17 students (56.7%) knew how to collect the data from it, and 20 students (66.7%) knew how to access and collect the data from it. Furthermore, the 16 students (53.3%) knew well about the types of digital wallet apps (OVO, DANA, GOPAY, marketplace (Shopee, Tokopedia, Lazada), and digital transactions (Online transaction or cashless).

In addition to knowing the types of digital wallet apps and digital transactions, 12 students (40%) knew how to access them. So, most of the students knew and understood hardware and software in information and computer technology, the types of information search engines and the types of digital wallet apps, marketplace, and digital transactions. Moreover, they understood the types of information search engines and the use and features available on digital wallet apps, marketplace, and digital transactions.

Besides that, the data indicated that most of the students knew and understood hardware and software in information and computer technology, knew the types of information search engines, knew how to collect and choose the data, and the various features available on the conversation apps and social media. In addition, they learned independently through social media, people, tutorial videos, or reading online articles. To get valid data, the following question was asked: "how do you know how to operate hardware and software in information and computer technology, know the types of information search engines, know how to collect and choose the data, and the various features that are available on the conversation apps and social media?" The student coded S3 said, "[I] know through people directly or through social media. To know how to operate, I usually watch a tutorial video on YouTube or try it until I can."

The student's answer indicated what they learned in tutorial videos from social media and reading online articles. Moreover, the data revealed that most of the students knew how to access and choose the data from the information search engines, how to access the conversation apps and social media, and access digital wallet apps, marketplace, and digital transactions by downloading them first, and accessing with an internet connection, read the guidelines, and learn them independently or ask someone else. To get valid data, the following question was asked: "How to access and choose the data from the information search engines, how to access the conversation app and social media and access the digital wallet apps, marketplace, and digital transactions?" The student coded S2 said, "To search and read the guidelines, in general, there is a tutorial, in the beginning, to see what features that available in the app."

Based on the answers, the students answered that they learned independently or asked someone for help. In addition to knowing it, they also need to understand the types of information search engines, and their use and the various features available on the apps, such as digital wallet apps, marketplace, and digital transactions.

Information regarding the types of information search engines is as follows.

**Table 3.** Types of information search engines

Question	Not at all	Not really understand	Understand	Really understand
Do you understand the types of information search engines and the use of them?	1	2	18	9
Do you understand the features that are available on digital wallet apps, marketplace, and digital transactions?	1	9	12	8

From Table 3, in the first question, 18 students (60%) understood the types of information search engines and how to use them. In addition, 12 students (40%) understood the features available on digital wallet apps, marketplace, and digital transactions.

Besides that, the data shows that most of the students understood it by learning independently and through tutorial videos or reading online articles. To get valid data, the following question was asked: "How do you access and understand the types of information search engines and the use of them and understand the features available on digital wallet apps, marketplace, and digital transactions?" The student coded S1 said, "[I] explore and learn through guidelines, usually. there is a tutorial, in the beginning, to see what features are available in the app."

Based on the answer, the student learned the types of information search engines and used them independently with the help of social media and someone else. With knowing and understanding all the things above, students will be greatly helped, and they will obtain the benefit from them. Based on the data, there was a benefit that they got from knowing and understanding hardware and software in information and computer technology and the types of information search engines, and how to operate and choose the data that can help the work.

To get valid data, the following question was asked "What do you think, what is the benefit of knowing and understanding hardware and software in information and computer technology and the types of information search engines, how to operate, and choose the data?" and the student coded S2 said, "I can use it as a tool in information and computer technology that can help me doing various activities such as working and in education became more effective, efficient, and more advanced."

Based on the data, the benefit obtained by the students is to make the work easy. Moreover, they need to know how important to access and choose data from information search engines and understand various features available on digital wallet apps, marketplace, and digital transactions. In addition, they know how to access and choose data in information search engines and understand various features available on digital wallet apps, marketplace, and digital transactions can make it easy to look for correct information and increase simple values.

#### 4.2. Digital Culture as Cultural Preservation and Work Protection in Digital World

Information about the values of Pancasila and Bhinneka Tunggal Ika is as follows

**Table 4.** Values of Pancasila and Bhinneka Tunggal Ika

Question	Not at All	Not really know	Know	Really know
Do you know about Pancasila and Bhinneka Tunggal Ika's values as the base of digital skills in cultural, national, and patriotic life?	0	3	19	26

In Table 4, 19 students (63.3%) expressed that they knew the values of Pancasila and Bhinneka Tunggal Ika as the base of digital skills in cultural, national, and patriotic life. In other words, most of the students knew Bhinneka Tunggal Ika as the base of digital skills in cultural, national, and patriotic life.

Since a follow-up response was needed, the question was asked to the students, "How do you implement Bhinneka Tunggal Ika as the base of digital skills in cultural, national, and patriotic life?" The student coded S1 said, "I appreciate/respect someone else's opinions on social media, argue normally with a good language ethic, and do not cause a thing or compare ethnicity and religion." In other words, the student's answer implied that he/she respected someone else opinions.

To get more data about digitization culture in information and computer technology, the following questions were asked "What do you know about digitization culture through information and computer technology benefit?" The student coded S2 said, "[it is] preserving culture in our area and introducing to netizen through platform such as YouTube, Facebook, Instagram, WhatsApp, and so on."

In addition, the data shows that most of the students know about digitization culture through computer technology benefit is surfing the internet, for instance, social media and articles, and learning in school. Because of that, to get valid data, the following questions are asked, "How do you apply digitization culture through computer technology benefit?" The student coded S2 said, "with advanced technology as a tool to preserve and spread culture so that I can recognize."

The student answered that preserving culture by spreading through digital platforms and accessing culture through technology. So, it can conclude that several students apply digitization culture through computer technology benefit is to preserve culture by spreading through digital platforms. As Indonesian, the students need to have patriotic behavior, and one of the things is to love the local product and have a productive activity. the following questions are asked "What do you know about behavior to love the local product and productive activity?" the student coded S3 said "Giving support to local product/services with prioritizing to buy the local product rather than products from outside the country."

The student's answers indicated that the students recognized behavior to love local products, and productive activity is through selling and buying local products.

Information regarding access problems in the digital world is as follows.

**Table 5.** The access problems in the digital word

Question	Not at all	Not really understand	Understand	Really understand
Do you understand access problems, freedom to express, protection for privacy, and the right to intellectual property in the digital world?	1	6	17	6

Table 5 shows that 17 students (56.7%) understood access problems, freedom to express, protection for privacy, and the right to intellectual property in the digital world. Besides that, the data show that most of the students understand access problems, freedom to express, protection for privacy, and the right to intellectual property in the digital world through internet surfing, such as social media and articles, through the Bill of Act on Electronic Information and Transaction, and seminar.

In order to get valid data, the following question was asked: "Where do you get the information about access problems, freedom to express, protection for privacy, and the right to intellectual property in the digital world?" The student coded S1 said, "From the internet, especially about the privacy and policy when surfing on the internet, seminars, information that I get from social media, Google, YouTube and Book."

The student's answers indicated that after understanding access problems, freedom to express, protection for privacy, and the right to intellectual property in the digital world, students would get more benefits.

In attempting to get more information related to the students' benefits of understanding aspects of the digital world, the following questions were asked, "What is the benefit you feel after knowing about access problems, freedom to express, protection for privacy, and the right to intellectual property in digital world?" The student coded S4 said, "I can realize that freedom

to express is crucial, but not many people apply it because they are too afraid to talk before they try it. Data privacy protection is also very important. However, some of us do not realize we share our personal privacy. Everyone will know about our personal privacy."

This student's answer indicated that the students become aware that there is a warranty of protection of their work so that they can create freely without worrying about the creation of private data.

#### 4.3. Digital Ethics Makes Avoiding Conflict

Information about the digital ethics of primary school teacher education students is as follows.

**Table 6.** Digital ethics

Question	Not at All	Not really know	Know	Really know
Do you know about the importance of applying ethics when internet surfing?	0	0	11	19

Table 6 shows that 19 students (63.3%) knew well about the importance of applying ethics when internet surfing, while no one participant did not know about the importance of applying ethics when internet surfing. Afterwards, to make it clear about that question, the following questions are asked, "Why do we need to apply the ethics of internet surfing?" The answer from the participants was:

*"Since the internet is not only used in one area, the coverage is worldwide. The ethics of internet surfing need to apply to respect ourselves and other people. Even if we do not know directly about the people we meet on the internet, the ethnics in speaking need to apply as the special treatment of our people."*

Information regarding the various communication standards is as follows:

**Table 7.** Various communication standards

Question	Not at all	Not really know	Know	Really know
Do you know about the various communication standards in every social media platform?	3	9	14	4

Table 7 shows that 14 students (46.7%) knew the various communication standards in every social media platform. Meanwhile, the three students (10%) did not know various communication standards on social media platforms. In an effort to make the question more understandable, the following questions were asked, "How do you know about the various communication standards in every social media platform?" The answer from the student coded S4, *"Through privacy policy standards and community guidelines that are usually on the platforms."*

Based on the participant's answer, he knew that various communication standards on social media platforms were to look for the internet and television. Besides that, he also answered that they knew about the variety of communication standards on social media platforms through the privacy policy and community guidelines on the platforms.

Information regarding the things about uploading something in the digital world is as follows.

**Table 8.** Things about uploading something in the digital world

Question	Not at all	Not really Understand	Understand	Really understand
Do you understand what you should and should not post when using social media and other digital devices?	0	1	15	14
Do you understand the impact of making and sharing information that contains hoaxes, hate speech, pornography, bullying, and other negative content?	0	0	10	20
Do you know the types of information that contain hoaxes, hate speech, pornography, bullying, and other negative content?	0	1	16	13

Based on the questions in Table 8, 15 students (50%) stated that they understood what they should and should not post when using social media and other digital devices. Meanwhile, 20 students (66.7%) fully understood the impact of making and sharing information that contains hoaxes, hate speech, pornography, bullying, and other negative content. Besides that, 16 students (53.3%) stated that they knew the types of information containing hoaxes, hate speech, pornography, bullying, and other negative content. The following question was asked to the participants in order to make it clear the previous question, "What do you think about what you should do to avoid the negative contents?" The student coded S1 said, "Make a graphic about the contents we should get through our browsing history. In general, on specific social media, the graphic content that we get is from browsing history. For instance, I love to watch food videos. However, the video that slowly shows up on my social media would be the same thing, such as *Mukbang*, cooking, food review, etc."

In other words, the participant's answer suggested that in order to avoid negative content, we must create graphic content. Sites that we frequently visit are used to create graphic content. As a result, we must decide what content we want to view.

Information regarding the interaction, participation and collaboration is as follows.

**Table 9.** How to interact, participate, and collaborate

Question	Not at all	Not really know	Know	Really know
Do you know how to interact, participate, and collaborate in a digital space that fits the rules of digital ethics and the rules that apply?	1	3	18	8

In Table 9, 18 students (60%) knew how to interact, participate, and collaborate in a digital space that fits the rules of digital ethics and the rules that apply. Meanwhile, one of the students (3.3%) did not know it. For further information, the following question was asked, "What do you think about how to interact, participate, and collaborate in a digital space that fits the rules of digital ethics and the rules that apply?" The student coded S2 said, "With a good typing, language used is understandable, do not interrupt when people talk on social media platforms, and appreciate when they turn off the microphone."

Information regarding the various of rules is as follows.

**Table 10.** Various of rules

Question	Not at all	Not really understand	Understand	Really understand
Do you understand the various rules that apply when you interact, participate, and collaborate in the digital space?	1	3	19	7

In Table 10, 19 students (63.3%) understood the various rules that apply when interacting, participating, and collaborating in the digital space. However, one of the students (3.3%) did not understand it. For further information, the following question was asked, "Why do you think we need to understand the various rules that apply when you interact, participate, and collaborate in the digital space?" The student coded S1 said, "To be good citizenship. Good communication can help a good friendship."

Based on the following question, it can be seen that participants understand the various rules that apply when you interact, participate, and collaborate in digital space to be good citizenship and make a good friendship.

Information regarding the types of electronic interaction and transaction is as follows.

**Table 11.** Types of electronic Interaction and transaction

Question	Not at all	Not really know	Know	Really know
What do you know about the types of electronic interaction and transactions that fit the rules?	1	6	20	3

Based on the answers, the participants stated that the benefit is keeping the harmony between the internet user and the user is not involving with crimes that spread through the users. Most of the students said that the benefit knowing the types of electronic interaction and transaction that fits the rules is to know the effectiveness on both sides and minimize fraud that happens a lot so that the digital user needs to be watched.

Information regarding how to do the electronic interaction and transaction as follows.

**Table 12.** How to Do the Electronic Interaction and Transaction

Question	Not at all	Not really understand	Understand	Really understand
Do you understand how to do electronic interaction and	0	5	18	7

transactions safely in the digital space?

In Table 12, 18 students (60%) stated that they understood how to do electronic interaction and transactions safely in digital space. Meanwhile, no one did not know interactions and transactions in the digital space. Then, to make it clear, the following questions are asked, "Why do we need to understand how to do electronic interactions and transactions safely in the digital space?" The student coded S4 said, "So we do not get fraud and has the purpose to use the electronic transaction." In other words, this answer indicated that the benefit of understand about electronic interactions and transactions is to avoid the fraud that happens a lot in electronic transaction.

#### 4.4. Beware of Fraud by Understanding Digital Safety

Information about the features of hardware protection is as follows.

**Table 13.** Features of hardware protection

Question	Not at all	Not really understand	Understand	Really understand
Do you know about hardware protection features?	6	11	11	2

Table 13 shows that there were 11 students (36.7%) in each category who answered that they knew and knew less about hardware protection features. To make it clear, the following question was asked, "What is the benefit you feel after knowing about hardware protection features?" The student coded S1 said, "[I] know exactly what digital platform that can access or not." In addition, most of the participants answered that they were able to feel safe, relief, and more selective in choosing what platform to use with the features.

Information regarding the digital identity protection is as follows.

**Table 14.** Digital identity protection

Question	Not at all	Not really understand	Understand	Really understand
Do you understand digital identity protection and personal data from digital platforms?	6	7	13	4

In Table 14, 13 students (43.3%) stated that they understood digital identity protection and personal data from digital platforms. In addition, six students (20%) stated that they did not understand digital identity protection and personal data from digital platforms. For further information, the following questions were asked: "What do you know about digital identity protection and personal data from digital platforms?" The student coded S5 said, "[I know them] like data privacy that is on the app like DANA. If you want to change to the premium version, you need an ID. However, it was guaranteed by DANA that it is safe to do."

This answer indicated that the participant knew digital identity protection and personal data from digital platform as the protection of someone's personal identity. Moreover, the participant coded S5 also said that the personal data on the transaction app requires the user to upload the user's ID in which the personal information is very secretive and guaranteed by the party. Most of the students knew that this was a protection that owned by app to keep their personal

identity. However, there were still some participants who did not know about digital identity protection and personal data from digital platforms.

The next question was asked, "What is the benefit that you feel after knowing digital identity protection and personal data from digital platform?" The student coded S4 said, "[I] can protect and prevent from the unwanted thing like fraud."

Several participants stated that this information is helpful to know about their identity on digital platforms, and avoid crimes because they are more aware and understand more about digital identity protection and personal data from digital platforms.

In attempting to seek further information about digital fraud that occurred in the digital space, the following questions are asked, "Do you know about digital fraud?" The student coded S3 said, "[It is an activity to] extort money with the motive that one of the family members got arrested, deceive the buyer by not giving the thing they buy but still take the money."

Next, the student coded S3 was asked, "Where do you get the information about digital fraud?" He replied, "The news from television that shows the characteristic of digital fraud or we can call it hoax."

The answers implied that the students obtained the information about digital fraud from the news on television, social media, and other trusted information media. Furthermore, the other participants agreed with these answers and obtained more information from people.

Information regarding the digital history is as follows,

**Table 15.** Digital history

Question	Not at all	Not really know	Know	Really know
Do you know about digital history (Download and upload)?	1	6	14	9

In Table 15, 14 students (46.7%) knew digital history, such as downloading and uploading content. To make it clear, the following questions were asked, "How do you know about digital history (Download and upload)?" The students coded S1, S3, S4, and S5 said, "[we know] through the internet, YouTube tutorial, the setting, the instruction that available, understand the policy and privacy guidelines."

Based on the answers, the participants knew the digital history, such as download and upload, was through YouTube channel and found it through internet, the setting available on the platforms, and understood the policy and privacy guidelines. In addition, most of the participants had similar answers, such as finding it on the platforms, surfing the internet, watching tutorials, and seeing the download history on a browser extension.

The next question was asked to the participants, "When do you download or upload?" The participants said, "When [we] post, upload (file, image, video, and so on), and download or when something available on the platforms."

The answers implied that the participants did it when they had to do something important, and they used the feature and shared their daily life on social media.

Information regarding the minor safety is as follows.

**Table 16.** Minor Safety

Question	Not at all	Not really understand	Understand	Really understand
Do you understand about minor safety (catfishing)?	18	10	2	0

In Table 16, 18 students (60%) stated that they did not understand what the minor safety or catfishing was. Meanwhile, two students (6.7%) stated that they knew about minor safety. Then, the further question was asked, "What do you know about minor safety (catfishing)?" The student coded S1 said, "It is impersonation fraud with the aim of deceiving/getting anything from the victim. Typically, it takes the form of a legal entity." The answers indicated that minor safety is like a fraud with aims of getting something from the victims, and most of the other participants also did not know what it was.

For further information, the following question was asked, "What is the benefit of understanding minor safety or catfishing?" The student coded S1, S2, and S3 answered, "*[It is] to protect ourselves from negative threats, keep the account or personal data, and minimize the video that needs to fit the age range.*" In other words, the students believed that by understanding minor safety, they could protect themselves from negative threats, keep the account or personal data, and minimize the video that needs to fit the age range.

## 5. Discussion

Based on previous findings, the majority of students understand the importance of digital skills in the present. This evidence is shown from the research results in which the students knew and understood the technical aspects of technological devices and the operation of information search engines and social media. In addition, this evidence is in line with Spante et al. (2018) in which they stated that the concepts of digital competency and digital literacy were used a lot a couple decades ago. They also added that digital competency also used to be the concept of national education digitization strategy (Spante et al., 2018).

With understanding digital devices can increase productivity so that the students can facilitate to finish their work quickly. This evidence is also supported by Caverly et al. (2019) who explained that college students need to use digital literacy and academics to communicate in university and as supplies in the work field in the future. If previously students needed to go to the library directly to borrow books, today they can access the online library from the smartphone wherever. It can make it more effective and with the extra time they can do another assignment.

Besides that, today, sources can be obtained from various platforms, not just books. Students can access by browsing on the Internet, learning video, and so on. Primary school teacher education department students as pre-service teachers need skills to operate digital media because it can be a supply to become a teacher in the 21st century that needs to know about the use of technology.

As technology advances, a value embraced by the state cannot be let go by its users. This research sought to find the values that students have as Indonesian citizens related to the base of digital skills in cultural, national, and patriotic life. They stated that they know their values based on Pancasila and Bhinneka Tunggal Ika as the fundamental values that they adhere to in developing their digital competences. In other words, they believed that speech acts, attitudes, and ways of presenting oneself in the digital world must be based on the values they hold, such as politeness, language ethics and high tolerance. This statement is also explained by Astuti et al. (2021) who stated that Indonesia has so many cultures. Every area has their special cultures. It is so important for us to understand the changes of media and culture of Indonesian, especially about Indonesian culture, that we value respect and protection in digital space. Because of that, preserving culture is necessary to keep the culture so it is not

gone. The student's role as the next generation is to preserve culture and protect our creation. Due to the research, many things that we can do to preserve culture, and one of the things is through digital platforms. Therefore, students know about behavior to love local products and productive activities through selling and buying local products. Students became aware that there is a warranty for protection of their work so that they can create freely.

By doing digital literacy, ethics is the most important thing. According to Wilson et al. (2018), values in digital ethics are necessary. This ethic is mostly used by Indonesian people in the education field. It includes technology tools such as the internet, computers, and software. Digital ethics is also about the use of language by showing politeness and respect for each other. It doesn't need to demean others when using language in social networks (de Faria Santos et al., 2021).

In addition to understanding digital literacy, digital safety is also necessary to be understood. Digital safety is used to measure knowledge level and skills from pre-service teachers (Tomczyk, 2019). In addition, it has a benefit to feel safe because digital literacy is also required to understand information and computer technology (Tomczyk, 2020). However, in reality, there are still a lot of people that do not know clearly about digital safety.

## 6. Conclusion

Based on the research results, mastering digital skills can facilitate work in the 21st century, dependent on technology. By mastering digital culture, the students will appreciate the diversity in Indonesia. Thus, they can help preserve culture and protect their works in the digital world. Then, mastering digital ethics will minimize conflicts and strengthen human relations. Furthermore, the students can be more careful in filtering information from the digital world by mastering digital skills.

## Limitation

Limitations of this study lie in the research process. The researchers realize that in a study, there must be many obstacles and problems. One of the factors that became obstacles and obstacles in this research was the participants who were willing to fill out fewer questionnaires than the number of students should be. It means that student participation in research like this is still less.

## Recommendation

Based on the study conducted, further research is still needed, both in terms of development and depth. Therefore, the recommendation for further researchers is that since this study was still limited in scope to primary school teacher education students in Sumedang Regency, it is still open for further research to be conducted by taking samples from students in other areas. because this literacy program is a national program. Therefore, everyone should know and understand it.

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## References

- Abrosimova, G. A. (2020). Digital Literacy and Digital Skills in University Study. *International Journal of Higher Education*, 9(8), 52–58. <https://doi.org/10.5430/ijhe.v9n8p52>
- Adikara, G. J., Kurnia, N., Adrianti, L., Astuty, S., Wijayanto, X. A., Desiana, F., & Astuti, S. I. (2021). *Aman Bermedia Digital [Safe Digital Media]*. Literasi Digital. <https://literasidigital.id/books/modul-aman-bermedia-digital/>

- Anisimova, E. S. (2020). Digital Literacy of Future Preschool Teachers. *Journal of Social Studies Education Research*, 11(1), 230–253.
- Aslan, S. (2020). Analysis of Digital Literacy Self-Efficacy Levels of Pre-service Teachers. *International Journal of Technology in Education*, 4(1), 57. <https://doi.org/10.46328/ijte.47>
- Astuti, S. I., Prananingrum, E. N., Rahmiaji, L. R., Nurhajati, L., Lotulung, L. J. H., & Kurnia, N. (2021). *Budaya Bermedia Digital [Digital Media Culture]*. Literasi Digital. <https://literasidigital.id/books/modul-budaya-bermedia-digital/>
- Bedir, H. (2019a). Developing a Framework for the Integration of 21st Century Learning and Innovation Skills into Pre-Service ELT Teachers' Practicum. *International Online Journal of Education and Teaching (IOJET)*, 6(4), 828–843. <http://iojet.org/index.php/IOJET/article/view/722>
- Bedir, H. (2019b). Pre-Service ELT Teachers' Beliefs and Perceptions on 21st Century Learning and Innovation Skills (4Cs). *Journal of Language and Linguistic Studies*, 15(1), 231–246. <https://doi.org/10.17263/jlls.547718>
- Caverly, D. C., Payne, E. M., Castillo, A. M., Sarker, A., Threadgill, E., & West, D. (2019). Identifying Digital Literacies to Build Academic Literacies. *Journal of College Reading and Learning*, 49(3), 170–205. <https://doi.org/10.1080/10790195.2019.1638218>
- Creswell, J. W. (2007). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. SAGE Publications.
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. SAGE Publications.
- de Faria Santos, H., Peña, C., & Coryell, J. E. (2021). A Fourfold Model for Addressing Organizational Digital Ethics Practices through HRD and Continuing Education. *Proceedings of the Adult Education in Global Times Conference/Actes de La Éducation Des Adults Dans Les Temps Globaux Conférence*.
- Gelmez Burakgazi, S., Karsantık, Y., Aktan, T., Ayaz, M. A., Büge, B. C., Karataş, F., Ödün, S., Varol Şanlı, Ş., Tarım, B., & Yavaşca, O. (2019). Equipped or Not? Investigating Pre-Service Teachers' 21st Century Skills. *Asia Pacific Journal of Education*, 39(4), 451–468. <https://doi.org/10.1080/02188791.2019.1671803>
- Hadiyanto, H., Failasofah, F., Armiwati, A., Abrar, M., & Thabran, Y. (2021). Students' practices of 21st century skills between conventional learning and blended learning. *Journal of University Teaching and Learning Practice*, 18(3). <https://doi.org/10.53761/1.18.3.7>
- Hafeez, M. (2021). Teaching-Learning Process And ICT Tools- A Review. *Indonesian Journal of Basic Education*, 4(1), 18–27. <https://www.e-jurnal.stkiprokania.ac.id/index.php/IJOBEB/article/view/371>
- Häkkinen, P., Virtanen, T., Virtanen, A., Näykki, P., Pöysä-Tarhonen, J., Niilo-Rämä, M., & Järvelä, S. (2020). Finnish Pre-Service Teachers' Perceptions of Their Strategic Learning Skills and Collaboration Dispositions. *Journal of Education for Teaching*, 46(1), 71–86. <https://doi.org/10.1080/02607476.2019.1708628>
- Kusumastuti, F., Astuti, S. I., Astuti, Y. D., Birowo, M. A., Hartanti, L. E. P., Amanda, N. M. R., & Kurnia, N. (2021). *Etis Bermedia Digital [Digital Media Ethics]*. Literasi Digital. <https://literasidigital.id/books/modul-etis-bermedia-digital/>
- Labudasari, E., Rochmah, E., & Hastuti, S. S. (2022). Pendampingan Penyusunan Media Pembelajaran Daring Berbasis Digital Bagi KKG Gugus 3 Kecamatan Harjamukti Kota Cirebon [Assistance in the Preparation of Digital-Based Online Learning Media for Group 3 KKG Harjamukti District, Cirebon City]. *Jurnal Pengabdian Pada Masyarakat*, 28(1), 9–15. <https://jurnal.unimed.ac.id/2012/index.php/jpkm/article/view/28015>
- Latorre-Cosculluela, C., Suárez, C., Quiroga, S., Sobradíel-Sierra, N., Lozano-Blasco, R., & Rodríguez-Martínez, A. (2021). Flipped Classroom Model before and during COVID-19:

- Using Technology to Develop 21st Century Skills. *Interactive Technology and Smart Education*, 18(2), 189–204. <https://doi.org/10.1108/ITSE-08-2020-0137>
- Mishra, K. E., Wilder, K., & Mishra, A. K. (2017). Digital Literacy in the Marketing Curriculum: Are Female College Students Prepared for Digital Jobs? *Industry and Higher Education*, 31(3), 204–211. <https://doi.org/10.1177/0950422217697838>
- Monggilo, Z. M. Z., Kurnia, N., Wirawanda, Y., Devi, Y. P., Sukmawati, A. I., Anwar, C. R., Wenerda, I., & Astuti, S. I. (2021). *Cakap Bermedia Digital [Capable of Digital Media]*. Literasi Digital2. <https://literasidigital.id/books/modul-cakap-bermedia-digital/>
- Pa-alisbo, M. A. C. (2017). The 21st Century Skills and Job Performance of Teachers. *Journal of Education and Practice*, 8(32), 7–12.
- Petrus, J., Wote, A. Y. V., Sabarua, J. O., & Patalatu, J. S. (2022). Melek Digital: Tantangan Guru Saat Pandemi COVID-19 [Digital Literacy: Teacher Challenges During the Covid-19 Pandemic]. *Jurnal Basicedu*, 6(2), 2477–2485. <https://doi.org/10.31004/basicedu.v6i2.2382>
- Pozas, M., & Letzel, V. (2021). "Do You Think You Have What it Takes?" – Exploring Predictors of Pre-Service Teachers' Prospective ICT Use. *Technology, Knowledge and Learning*. <https://doi.org/10.1007/s10758-021-09551-0>
- Puangpungsi, N. (2021). Learners' Perception towards Project-Based Learning in Encouraging English Skills Performance and 21st Century Skills. *THAITESOL*, 34(1), 1–24.
- Raja, R., & Nagasubramani, P. C. (2018). Impact of Modern Technology in Education. *Journal of Applied and Advanced Research*, 3(1), S33–S35. <https://doi.org/10.21839/jaar.2018.v3is1.165>
- Rasmitadila, Aliyah, R. R., Rachmadtullah, R., Samsudin, A., Syaodih, E., Nurtanto, M., & Tambunan, A. R. S. (2020). The Perceptions of Primary School Teachers of Online Learning during the COVID-19 Pandemic Period: A Case Study in Indonesia. *Journal of Ethnic and Cultural Studies*, 7(2), 90–109. <https://doi.org/10.29333/ejecs/388>
- Sabarua, J. O., Patalatu, J. S., & Besare, S. D. (2020). Pelatihan Pembelajaran Daring Bagi Guru-Guru Sekolah Dasar Guna Meningkatkan Literasi Digital di Masa Pandemi COVID-19 [Online Learning Training for Elementary School Teachers to Improve Digital Literacy during the COVID-19 Pandemic]. *Jurnal Abdimas Ilmiah Citra Bakti*, 1(2), 147–155. <https://doi.org/10.38048/jailcb.v1i2.122>
- Spante, M., Hashemi, S. S., Lundin, M., & Algiers, A. (2018). Digital Competence and Digital Literacy in Higher Education Research: Systematic Review of Concept Use. *Cogent Education*, 5(1), 1519143. <https://doi.org/10.1080/2331186X.2018.1519143>
- Sugiyono. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D [Educational Research Methods with Quantitative, Qualitative, and R&D Approaches]*. Alfabeta.
- Tomczyk, Ł. (2019). What Do Teachers Know About Digital Safety? *Computers in the Schools*, 36(3), 167–187. <https://doi.org/10.1080/07380569.2019.1642728>
- Tomczyk, Ł. (2020). Skills in the Area of Digital Safety as a Key Component of Digital Literacy among Teachers. *Education and Information Technologies*, 25(1), 471–486. <https://doi.org/10.1007/s10639-019-09980-6>
- Toom, A., Pyhäältö, K., Pietarinen, J., & Soini, T. (2021). Professional Agency for Learning as a Key for Developing Teachers' Competencies? In *Education Sciences* (Vol. 11, Issue 7). <https://doi.org/10.3390/educsci11070324>
- Wilson, C. B., Slade, C., Kirby, M. M., Downer, T., Fisher, M. B., & Nuessler, S. (2018). Digital Ethics and the use of ePortfolio: A Scoping Review of the Literature. *International Journal of ePortfolio*, 8(2), 115–126.
- Yildiz, E. P. (2020). Opinions of Academicians on Digital Literacy: A Phenomenology Study. *Cypriot Journal of Educational Sciences*, 15(3), 469–478.

**I. Isrok'atun et al.**, *Digital Literacy Competency of Primary School Teacher Education...*

<https://doi.org/10.18844/cjes.v15i3.4913>

Abrosimova, G. A. (2020). Digital Literacy and Digital Skills in University Study. *International Journal of Higher Education*, 9(8), 52–58. <https://doi.org/10.5430/ijhe.v9n8p52>