

The Level of Pre-service Teachers' Digital Literacy during the COVID-19 Pandemic

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ABSTRACT

The COVID-19 pandemic changed the way in which things were done in schools and colleges. This study aims to find out how well pre-service teachers at a private university in Riau, Indonesia, know how to use technology based on their age, gender, and term. After two years of the COVID-19 pandemic, it was time to find out how well pre-service teachers knew how to use technology. In this study, 722 students made up the whole group. This research is a detailed quantitative study that looks into how well teachers-to-be know how to use technology. The tool is a valid and trustworthy Google form with an inquiry. Technology, Mobile/Smartphone, Social Media, Online Safety, and E-learning are the digital literacy factors that are looked into. The results of the studies show that younger pre-service teachers are better at using technology, and female students are slightly better at using technology. It fits into the set group for the semester level. Study programmes were used to find out what the average level of digital literacy was. During the COVID-19 outbreak, most pre-service teachers were at an established level of digital literacy. The results of this study show that using technology for online learning during the COVID-19 pandemic makes pre-service teachers better at using technology.

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1. INTRODUCTION

The COVID-19 pandemic changed the order of education implementation at both the school and college levels. Various regulations set by the Ministry of Education and Culture regarding the performance of education, ranging from the implementation of online learning to face-to-face learning,

are limited. Online learning is carried out by educators synchronously and asynchronously using various digital learning platforms. The performance of learning with an online system and limited face-to-face that has been carried out for more than two years during the pandemic leaves the question of whether learning like this affects students' ability to master digital technology (digital literacy).

Digital Literacy is the ability to use digital technology by understanding information presented through digital sources (Jones, R. H. & Hafner, 2012). A person's digital literacy ability is determined by the ability to adapt mentally, socially, emotionally, and technically through technology (Ng, 2012). The concept of digital literacy has been widely used in education. Digital literacy includes the ability to process information, educational technology, and communication and provides knowledge of digital tools needed in all aspects of formal or non-formal learning (Meyers et al., 2013).

During the Covid pandemic, digital literacy skills are important for learning because most learning is done online, and for blended learning, students need to know how to use digital tools and other technologies. During the COVID-19 pandemic, how well you learn can depend on how well you know how to use technology. This study is important and worth doing so that students can learn how to do well during the COVID-19 pandemic.

Several studies on digital literacy skills during the COVID-19 pandemic have been carried out and obtained varying results. Karagul et al. (2021) found significant differences in digital literacy ability based on age level and level of education, but gender did not affect digital literacy ability. Other studies have revealed that gender and semester level affect digital literacy for pre-service kindergarten teachers Öngören (2021). Furthermore, Yu (2022) found that students' digital literacy levels vary and need improvement even though, in general, students' digital literacy in online learning during COVID-19 has changed. Research about the level of digital literacy for pre-service teachers from various study program did not find during the COVID-19 pandemic. Therefore, researchers are interested in investigating the level of digital literacy of pre-service teachers at the Faculty of Teacher Training and Education in a private University in Riau-Indonesia. The Faculty of Teacher Training and Education consists of nine study programs, namely the Elementary School Teacher Education (PGSD) program, Mathematics Education program, Biology Education program, Chemistry Education program, Accounting Education program, Indonesian Education program, English Language Education program, Dance and Music Dramatic Arts education program, and Health and Recreation Education program. The novelty of this research is that it present information about the level of digital literacy of pre-service teachers from different backgrounds. This presents the level of digital literacy of pre-service teachers from various study programs based on semester level, age, and gender. The research question in this article: "How did the level of digital literacy of pre-service teachers base on semester level, age, and gender?"

2. METHODS

This research is a quantitative descriptive research that aims to map the digital literacy skills of pre-service teachers. The instrument is in the form of a questionnaire of valid and reliable digital literacy capabilities. Valid and reliable questionnaires can be used to measure what should be measured (A. Febliza, Z. Afdal, 2021; Febliza & Oktariani, 2020). The questionnaire is arranged in the form of questions in the Google form. Questionnaire questions use a rating scale of 1-4, where a scale of 1 shows low ability, and 4 shows high capacity. The questionnaire is presented in a Google form and distributed to students. The digital literacy questionnaire indicators are presented in Table 1.

Table 1. Digital literacy questionnaire indicators

Indicators	Statement numbers
Technology	1, 2, 3, 4, 5, 6
Mobile phone/ Smartphone	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
Social Media	21, 22, 23, 24, 25, 26
Online Safety	27, 28
E-Learning	29, 30, 31, 32, 33, 34
Total	34

The data is processed by calculating the results of the questionnaire with the formula (Febliza, A., Afdal, 2015):

$$\text{Score} = \frac{\text{Total of respondents choice}}{\text{Maximum Score}} \times 4$$

The processed data is then interpreted according to categories, as shown in Table 2 (Azwar, 2012).

Table 2. Interpretation of digital literacy Skills

Scoring	Digital literacy level
1,0-1,9	Emerged
2,0-2,9	Developed
3,0-4,0	Established

The population in this study is all students of the Faculty of Teacher Training and Education in a private University in Riau-Indonesia from 9 study programs: Indonesian study program, English, Mathematics Education, Penjaskesrek, Biology Education, Sendratasik, Accounting Education, PGSD, and Chemistry Education. The samples in this study were 3rd, 5th, and 7th-semester students, totalling 722 students. The sampling technique used a purposive sampling technique where sampling was based on the consideration that students in semesters 3, 5, and 7 experienced learning during the COVID-19 pandemic. The data collection process was carried out 2 years after the COVID-19 pandemic. The number of teacher candidates by criteria is presented in Table 3.

Table 3. The number of pre-service teachers based on criteria

Age (year)						Gender		Semester		
18	19	20	21	22	23	Male	Female	3	5	7
23	184	217	202	73	23	202	520	258	230	234

3. FINDINGS AND DISCUSSION

This study investigated the level of digital literacy of pre-service teachers during online learning and blended learning during the COVID-19 pandemic. Digital literacy levels were identified using online digital literacy questionnaires. The questionnaire link was shared with pre-service teachers via WhatsApp message. The data obtained are grouped by age, gender and semester level. The digital literacy indicators measured include technology, Mobile phone / Smartphone, social media, online safety and E-learning.

3.1. Digital literacy of pre-service teachers by age

Respondents were students aged 18 to 23 years. The results of the respondents' answers are presented in Table 4.

Table 4. Digital literacy of pre-service teachers by age

Indicators	Age (Year)					
	18	19	20	21	22	23
Technology			3,21		3,30	3,04
Mobile phone/ Smartphone	3,44	3,48	3,45	3,47	3,46	3,30
Social Media	2,57	2,78	2,76	2,75	2,76	2,54
Online Safety	3,35	3,41	3,37	3,36	3,39	3,46
E-Learning	2,64	2,64	2,63	3,65	2,68	2,61
Average	3,02	3,12	3,08	3,30	3,12	2,99
Category	Established	Established	Established	Established	Established	Developed

Table 4 shows that almost all pre-service teachers at each age level have an intermediate level of digital literacy in the established class. However, at 23 years, pre-service teachers' average digital literacy rate is in the developed category. This finding is in line with research conducted by Bracher (2013), which revealed that younger teachers use the Internet more often than older teachers. Students are also confident in using technology (Cote & Milliner, 2017). In addition, Yu (2022) demonstrated that after the COVID-19 pandemic, students' digital literacy was significantly improved. This increase occurred because, during the COVID-19 pandemic, students were forced to participate in online learning (Chawłowska et al., 2021) and used various kinds of media such as interactive video and interactive web (Febaliza et al., 2023), e-book, interactive e-book and virtual laboratory (Febaliza et al., 2022). Furthermore, turning to indicators shows that the average student on technology indicators, mobile phones/smartphones, social media, and online safety obtains a level of digital literacy on established criteria. In contrast, in e-learning indicators, it is classified as developed. Based on the observations, it is known that lecturers who teach during the pandemic still use a number of e-resources and online platforms in limited quantities that have not varied.

Adults under the age of 25 are considered "young adults." Seventy-five percent of all youth, more than any other age group, are online, according to the Online Publishers Association (OPA). Teens and twenty-somethings simply can't get enough time online. They can't wait to access the internet from any location at any time. The vast majority of respondents (82%), said they enjoy using modern gadgets. Compared to the general population, young individuals are more likely to own many electronic devices. There was little difference between male and female internet users in this age group. According to research (Nawaila et al., 2019), These teens have an extensive internet presence and are proficient with modern technologies.

Prospective teachers in this group are Generation Z, where Generation Z uses digital technology and social networks for social interaction. The members of Generation Z spend a lot of time alone, reading about current events and communicating with others via digital devices. Their learning process is often intrapersonal. They independently acquire new knowledge through various types of digital technologies. Generation Z students cannot remember as much information from previous generations and find it more important to know how to find specific information in the vast ocean of data available on the Internet. As a result, they are skilled at filtering and sorting the information they

need, which makes them a new generation of learners (Stjepić, Ana-Marija; Vukšić, Marija & Suša Vugec, 2019).

3.2. Digital literacy of pre-service teachers based on gender

The digital literacy of pre-service teachers by gender is presented in figure 1.

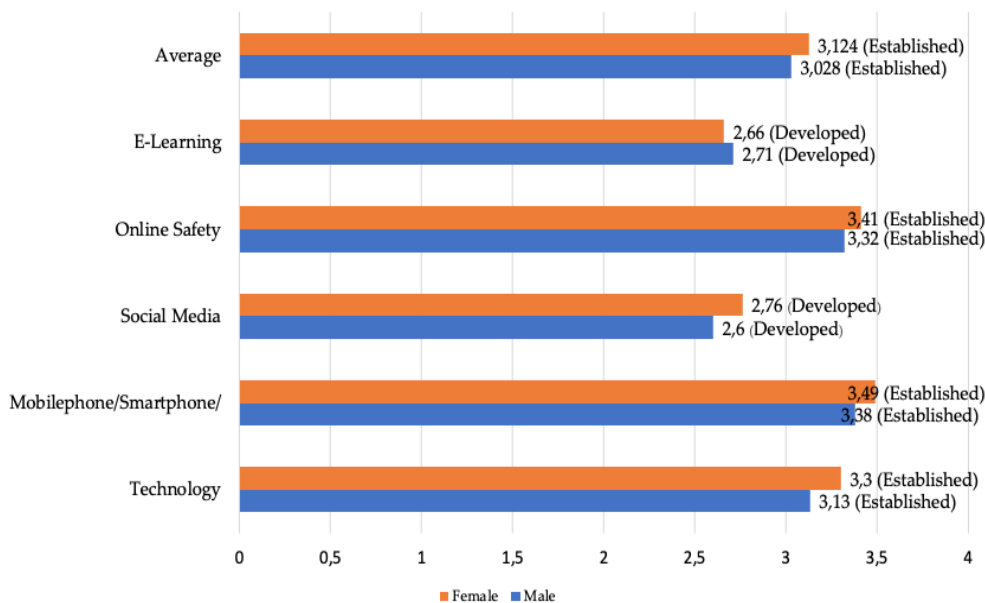


Figure 1. Digital literacy of pre-service teachers based on gender

Figure 1 shows that the digital literacy rate of female students is slightly higher than that of male students in almost all indicators. Yu (2022) found, contrary to this study’s finding, who found that males prefer to learn to use technology. Upon further investigation, this difference in digital literacy is not too big. This not-so-big difference occurs because the number of male teacher candidates is half the number of female students. However, in the e-learning indicator, male students have a greater digital literacy of 0.11 compared to female students. Figure 1 also shows that students’ digital literacy on technical indicators, mobile phones/smartphones, and online safety is on established criteria, while social media and e-learning indicators are at the developed level. The findings show the digital literacy of pre-service teachers during the pandemic has been established, and some literacy has developed.

3.3. Digital literacy of pre-service teachers by semester

The digital literacy of pre-service teachers by semester is presented in table 5.

Table 5. Digital literacy of pre-service teachers by semester

Indicators	Semester		
	3 rd	5 th	7 th
Technology	3,21	3,23	3,3
Mobile phone/ Smartphone	3,46	3,42	3,49
Social Media	2,73	2,76	3,76
Online Safety	3,4	3,39	3,37
E-Learning	2,63	2,62	2,68
Average	3,09	3,08	3,32
Category	Established	Established	Established

Table 5 shows that the average digital literacy of pre-service teachers at the semester level is already classified as established. 7th-semester students have the highest average digital literacy of 3.32. Pre-service teachers have been undergoing online learning activities in college for 2 years, which

has caused students to have been able to adjust to online learning activities. Several studies have revealed that technology assistance contributes positively to learning achievement during the COVID-19 pandemic and can increase engagement and enrich academic activities (Asniza et al., 2021; Helsper & Smahel, 2020).

3.4. Digital literacy of pre-service teachers by study programs

This study proposed the level of pre-service teachers' digital literacy from various study programs, namely: namely the Elementary School Teacher Education (PGSD) program, Mathematics Education program, Biology Education program, Chemistry Education program, Accounting Education program, Indonesian Education program, English Language Education program, Dance and Music Dramatic Arts education program, and Physical Education program. The level of digital literacy of nine study programs can be seen in Figure 2.

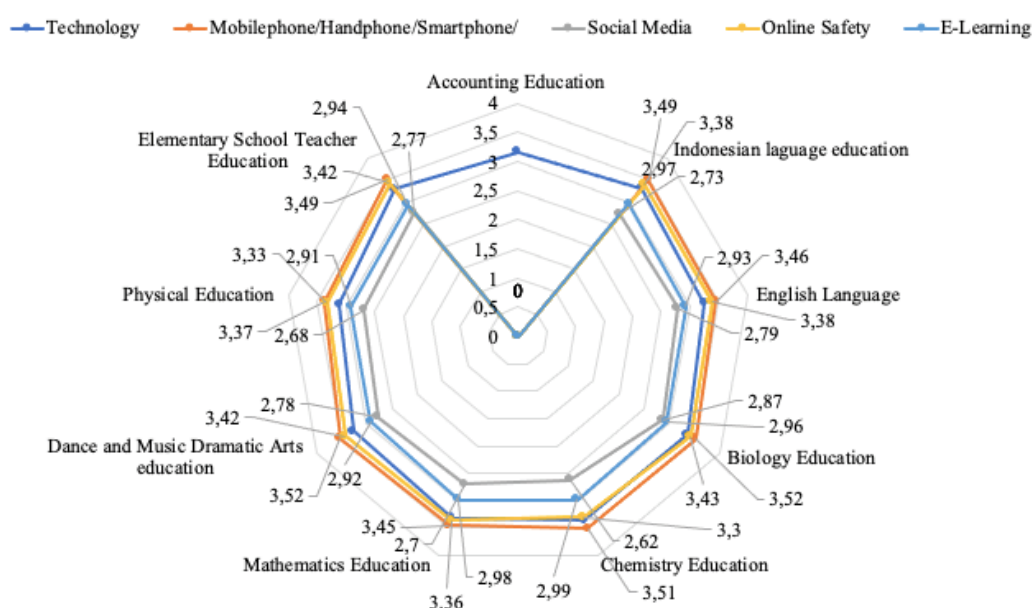


Figure 2. Digital literacy of pre-service teachers based on study programs

Figure 2 informed that the level of pre-service teachers from each study program was in a developed level for social media and e-learning aspects. On the other hand, the level of digital literacy for technology, mobile phone and online safety were established. These findings indicated no correlation between the background of major and the level of digital literacy. Pre-service teachers in this study were Z generation who were literate with technology. Generation Z and the Millennial generation do well in terms of figuring out how to benefit from YouTube, the development of mobile apps, and other technical and practical endeavours. In the digital age, members of Generation Z place a strong focus on using mobile devices (Carter, 2018).

The impact of technology used in the COVID-19 pandemic had a positive impact, but it also noticed a negative influence. Quick access to information distracts pre-service teachers from creativity which causes individuals to become lazy because everything is available. The reliability of information in a digital environment increased plagiarism (Baker, 2000; Moorman et al., 2009). It is seen that it is important to develop digital literacy skills in order to make good use of digitalization. Student-teacher communication in the educational process is at the forefront of transforming digitalization in the educational process into positive and beneficial digital literacy skills.

4. CONCLUSION

Conclusions drawn from the results and discussion point to younger pre-service teachers as having higher levels of digital literacy. In addition, female students outperform male students on practically every measure of digital literacy. Furthermore, students' digital literacy is considered established on a semester-by-semester basis. The level of digital literacy among future educators was measured during the COVID-19 epidemic. This study found that pre-service teachers' digital literacy improved as a result of their participation in online learning during the COVID-19 epidemic. This study helped professors better utilise technology in the creation of educational materials. Additionally, this article included data on how well-versed in technology prospective educators came from various demographics.

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