Journal of Education Technology
Volume 7, Number 4, 2023, pp. 677-686
P-ISSN: 2549-4856 E-ISSN: 2549-8290
Open Access: https://ejournal.undiksha.ac.id/index.php/JET

Pre-Service Teachers' Perception of Digital Literacy

Putu Ayu Prabawati Sudana[1*], Made Hery Santosa[2], Ni Made Ratminingsih[3], Ni Nyoman Padmadewi[4], Luh Putu Sri Adnyani[5], Luh Putu Artini[6]
[1,2,3,4,5,6] Foreign Language Department, Universitas Pendidikan Ganesha, Singaraja, Indonesia

ARTICLE INFO

Article history:
Received July 10, 2023
Revised July 13, 2023
Accepted November 12, 2023
Available online November 25, 2023

Kata Kunci:
Calon Guru, Persepsi, Literasi Digital

Keywords:
Pre-Service Teachers, Perception, Digital Literacy

DOI:
https://doi.org/10.23887/jet.v7i4.68867

ABSTRAK

Literasi digital bagi guru, termasuk calon guru merupakan salah satu aspek kehidupan yang menonjol dan berpengaruh di abad ke-21. Mereka harus melek digital untuk terlibat dalam dunia digital ini dan mempersiapkan siswanya agar juga melek digital. Penelitian ini bertujuan untuk menilai tingkat literasi digital calon guru di salah satu universitas negeri di Bali, Indonesia. Penelitian ini menggunakan penelitian survei. Pesertanya melibatkan 158 guru prajabatan. Guru prajabatan adalah peserta didik pelatihan mengajar atau program studi kependidikan, yang dibekali muatan dan keterampilan pedagogik untuk mempersiapkan dirinya menjadi guru. Instrumen yang digunakan dalam pengumpulan data adalah kuesioner Likert 5 poin, triangulasi data dilakukan dengan wawancara semi terstruktur terhadap tujuh guru calon guru. Kuesioner dianalisis secara kuantitatif. Studi ini mengungkapkan bahwa sebagian besar calon guru melaporkan tingkat melek huruf yang tinggi di semua bidang. Hasil penelitian ini dapat bermanfaat sebagai refleksi literasi digital guru prajabatan sebagai bahan pertimbangan dalam peninjauan berkala lembaga terhadap kurikulum atau pelatihan bagi guru prajabatan.

ABSTRACT

Digital Literacy for teachers, including future teachers is one prominent and influential aspect of living in the 21st century. They need to be digitally literate to be engaged in this digital world and to prepare their students to be digitally literate too. This research aims to assess the level of the pre-service teachers' digital literacy in one public university in Bali, Indonesia. This study was using a survey study. The participants were involving 158 pre-service teachers. Pre-service teachers are students of teaching training or educational study programs, who are prepared with pedagogical content and skills to prepare them to become teachers. The instrument used in collecting the data was a 5-point-Likert-questionnaire, data triangulation a semi-structured interview with seven pre-service teachers was conducted. The questionnaires were analyzed quantitatively. The study revealed that most of the pre-service teachers reported high levels of literacy in all areas. The results of this study would be beneficial as reflections on the pre-service teachers' digital literacy as a consideration in the institution's regular review of the curriculum or training for the pre-service teachers.

1. INTRODUCTION

Digitalization in many aspects of life nowadays has led to the need for digital literacy. Digital literacy is defined as the competence to access, organize, comprehend, assess information in multimodal outlook with the assistance of digital technologies, and get engaged in the fast-growing channels of digital communication by interpreting, managing, sharing and creating meaning (Carrington & Robinson, 2009; Chan et al., 2017). Digital literacy also involves complex cognitive, emotional, social and motor skills, which are important to function effectively in digital environment (Eshet-Alkalai, 2004; Irhandayaningsih, 2020). To examine the skills included in digital literacy, we can refer to the seven domains of digital literacy proposed by previous study which include information collection, information evaluation, information management, information processing, teamwork, integrity awareness, and social responsibility (Peled, 2021). Schools, as formal educational setting, are expected to provide students with the skills they need to cope with digitalization. Teachers, as the ones who facilitate and teach knowledge and skills for students, not only have to be competent in their subject matter, but also have to equip their students with the skills needed in this digital era. This made their responsibility goes beyond merely teaching the subject matter. They need to have digital literacy to get engaged in this electronically connected world and it is a part of their complex duty to prepare the students to be digitally literate as well (Aslan, 2020; Prachagool et al., 2022; Rahmi et al., 2022). In doing so, they will first have to be aware of domains of digital literacy and practice them themselves, so that they can transfer the skills to their students. Previous study state that 21st century educators constantly stress the importance of ICT and computer literacy, and learn how to facilitate students' integration in today's society who is highly dependent on technology (Lau & Yuen, 2014). This literacy is also

** Corresponding Author: Putu Ayu Prabawati Sudana: prabawati.sudana@undiksha.ac.id*

perceived as a fundamental component in the setting of blended learning; the type of learning setting that takes place in educational institutions at the present, whose success is influenced by the digital practices of the teachers and learners (Castro, 2019; Tang & Chaw, 2016). In present classrooms, the use of technologies in educational institutions has become normal and even compulsory. In the past, the use of gadget and device in classrooms were prohibited, but nowadays, they are encouraged, as they can positively be used for learning (Avazmatova, 2020; Irawaty et al., 2021). Therefore, increasingly digital and multimodal communication, technology integration in class, the necessity of forming 21st century skills in education, including in that of teacher education makes exploration of the digital literacy of the pre-service teacher's timely essential research.

Several researches investigating pre-service teachers' digital literacies have been conducted. Previous study investigated pre-service teachers' self-efficacy levels at a public university in Turkey (Aslan, 2020). This research used Digital Literacy Self-Efficacy Scale, which was 5-point Likert type and had 25 items. The research results indicated that the self-efficacy level was different based on the student's gender, department, availability of internet connection and computer at their houses. Whereas, there was not significant difference found in terms of the students' university enrollment score, class level, and the objectives of utilizing technology. Other research investigating the digital literacy of pre-service teachers in Thailand in the Covid-19 time period, seen from five components, namely social responsibility, team-based learning, information management, processing and information presentation, and digital integrity (Prachagool et al., 2022). In Indonesia context, research related to pre-service teachers' digital literacy have been conducted in Padang (Rahmi et al., 2022), whose research output is prototype of blended learning's support system to improve the digital literacy of pre-service students; in Yogyakarta there is study which investigated the scale of the digital literacy of English pre-service teachers (Liza & Andriyanti, 2020); and in Tasikmalaya whose subjects are physics pre-service teachers (Rizal et al., 2022). There has not been any study investigating pre service students' digital literacy in Bali context. This study is done to fill in this gap.

This study tries to assess the digital literacy perception of pre-service teachers in one public university in North Bali, Indonesia. This study is significant to fill in the gap in the literature regarding the assessment of the digital literacy of pre-service students in Bali. In addition, knowing to what extent the students perceive that they are literate digitally is essential for the policymakers as a reflection for further improvement of the curriculum or training program for the pre-service teachers.

2. METHOD

This study was a survey study that investigated the perception of pre-service teachers on digital literacy in one public university in North Bali, Indonesia (Bolanakis, 2019). The participants were 158 pre-service teachers. Pre-service teachers are students of teaching training or educational study programs, who are prepared with pedagogical content and skills to prepare them to become teachers. These 158 pre-service teachers did their practice teaching in the first semester of the academic year 2021/2022, when they were in the third and fourth years of their study. They studied in teacher training study programs in seven different faculties in the university, namely Faculty of Languages and Arts, Faculty of Vocational Studies and Engineering, Faculty of Mathematics and Natural Sciences, Faculty of Educational Sciences, Faculty of Law and Social Sciences, Faculty of Economics, Faculty of Sports and Health.

One student as a representative of each faculty was then interviewed for the data triangulation. The instrument used in collecting the data was a 5-point-Likert-questionnaire which adopted the questionnaire (Peled, 2021). The questionnaire consisted of two sections and seven clusters and the responses were among the scales of 1) strongly agree, 2) somewhat agree, 3) neither agree nor disagree, 4) somewhat disagree, and 5) strongly disagree. Section 1 required the pre-service teachers to input their email addresses and genders, and section 2 was the statements. They were divided into seven clusters: cluster 1 was on data collection consisting of 12 statements; cluster 2 was on evaluation data consisting of five statements; cluster 3 was on data management consisting of three statements; cluster 4 was on data processing consisting of eight statements; cluster 5 was on teamwork consisting of 8 statements, cluster 6 was on integrity awareness consisting of 15 statements, and cluster 7 was on social responsibility, consisting of three statements.

This questionnaire had been through validity and reliability test in two phases in the making. Phase 1 was done through pre-validation review and comments by six expert researchers and seven ICT graduate students, which resulted in 64 items, and phase 2 was conducted by administering it to 1889 students, and the ones with low compatibility are excluded accordingly. The final result of this last phase, which had 54 statements, was the questionnaire adopted for this study. Additionally, as data triangulation, a semi-structured interview with seven pre-service teachers was conducted. There were representatives of each faculty involved in the survey. After data collection, the responses to the questionnaires were analyzed quantitatively by counting the percentages of each response. The percentages indicate the pre-service teachers' perception on their digital literacy. The results of the interview were transcribed to obtain more information about their responses.

3. RESULT AND DISCUSSION

Result

The research aims at assessing the pre-service teachers' perception of digital literacy in seven domains: data collection, evaluation of data, data management, data processing, teamwork, integrity awareness, and social responsibility. The findings are presented in Table 1.

Table 1. Data Collection

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree Nor Disagree (%)	Somewhat Agree (%)	Strongly Agree (%)
1	I know when I need to look for information	5.1	1.9	1.3	39.2	55.1
2	I am able to identify information for research	1.3	2.5	7.6	43	47.5
3	I am able to collect information from the web	1.9	3.2	3.8	37.3	55.1
4	I can define objective of the research	3.2	2.5	5.7	34.8	55.1
5	I can articulate what information I need	2.5	1.9	10.1	45.6	41.1
6	I know how to research effectively	2.5	1.3	10.1	45.6	43
7	I can define research terms	1.9	4.4	11.4	48.7	35.4
8	I can distinguish between types of research	1.3	3.8	19	46.8	30.4
9	I can retrieve information from various sources	2.5	1.3	5.7	50	41.8
10	I am able to collect information from databases	1.3	4.4	14.6	47.5	32.9
11	I am able to re-locate information	3.2	1.3	5.7	48.7	41.1
12	I can re-locate a specific web page	3.2	1.3	7	44.3	44.9

Base on Table 1 there are 12 statements in this cluster or domain. From Table 1, it can be seen that the students perceived that they knew when they needed to look for information (94.3%). Specifically, 55.1% strongly agree and 39.2% somewhat agree. The students also perceived that they could identify research information 47.5% strongly agree and 43% somewhat agree. Regarding the third statement, the students perceived that they could collect web information; 55.1% of them strongly agreed and 37.3% somewhat agreed. The students were able to define the objective of the research; 55.1% strongly agreed and 34.8% somewhat agreed. Regarding whether they were able to articulate what information they need, 41.1% strongly agreed and 45.6% somewhat agreed. The students also knew how to research effectively with 43% strongly agreed and 45.6% somewhat agreed. Students felt that they were able to define research terms with 35.4% strongly agreed and 48.7% somewhat agreed. The students also perceived that they could distinguish between types of research with 30.4% strongly agreed and 46.8% somewhat agreed. The students felt that they could retrieve information from various sources with 41.8% strongly agreed and 50% somewhat agreed. Most of the students perceived that they managed to collect information from databases; with 32.9% strongly agreed and 47.5% somewhat agreed. The students also believed that they were able to re-locate information with 41.1% strongly agreed and 48.7% somewhat agreed. Lastly, the students could re-locate a specific web page with 44.9% strongly agreed and 44.3% somewhat agreed.

The students' statements in the interview also supported their responses to the questionnaires. In defining the objectives of the research on the internet, they perceived that they did not face major difficulty. In terms of effectively conducting research, they perceived that they were able to do it effectively. They mentioned that they normally took note of the needed information, and that would guide them to research effectively. The students also perceived that they managed to distinguish different types of searches and retrieve information from different sources. The statements of the students during the interview supported this conclusion. In terms of capability to collect information from database and relocate specific webpages, the students perceived that they managed to do so. The students applied several strategies to relocate information in the internet, such as pinning the websites, saving the links and pasting them on MS word, as well as clicking the history button when they accidentally closed a website. To conclude, most of the students perceived that they could collect numerous online sources of information available, as well as relocate them. This second domain assessed the students' abilities in evaluating the data or information acquired from the internet. The evaluation of data is show in Table 2.

Table 2. Evaluation of Data

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree nor Disagree %	Somewhat Agree (%)	Strongly Agree (%)
13	I am able to judge the degree to which information is practical or satisfies the needs of the task	1.9	3.2	12	45.6	39.2
14	I am able to determine the information required for a specific task	2.5	0.6	7	46.2	46.8
15	I am able to assess the accuracy of information	1.9	3.2	17.7	51.3	27.2
16	I am able to assess the credibility of information	2.5	2.5	15.2	56.3	23.4
17	I am aware of the differences in credibility of information from various sources	3.2	1.3	17.7	53.8	25.3

As we can see from Table 2, most of the students perceived that they were able to decide the degree to which the information satisfied the needs of the task, with 39.2% strongly agreed and 45.6% somewhat agreed. The students also believed that they were also able to determine the information needed for a certain task, with 46.8% strongly agreed and 46.2% somewhat agreed. In addition, they also perceived that they could assess the accuracy of information, with 27.2% strongly agreed and 51.3% somewhat agreed. In terms of ability to assess the credibility of the information, 23.4% strongly agreed and 56.3% somewhat agreed. The students also perceived that they were aware of the differences in credibility of information from different sources, with 25.3% strongly agreed and 53.8% somewhat agreed. The responses of some students during the interview supported this conclusion. In terms of assessing whether the information they obtained from the internet was accurate and credible or not, the students explained they believed they were able to evaluate from the sources. The third domain was assessing the students' perception of data management. The findings are presented in Table 3.

Table 3. Data Management

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree Nor Disagree %	Somewhat Agree (%)	Strongly Agree (%)
18	When I store a file, I give it a specific name	3.2	0.6	8.9	29.7	57.6
19	I store my files in designated folders	1.9	1.3	3.2	29.1	64.6
20	I tag my information	3.2	3.8	12	32.9	48.1

As we could see from Table 3, most of the students gave specific name to store a file; 57.6 of the students strongly agreed and 29.7% somewhat agreed. Furthermore, 64.6 of the students strongly agreed and 29.1% somewhat agreed they stored their files in designated folder. In addition, most of the students tagged the information that they acquired from the internet. To be precise, on this statement, 48.1% strongly agreed and 32.9% somewhat agreed. The responses the students gave in the interview supported these findings. The fourth domain assessed the students' perception in terms of data processing. The findings are presented in Table 4.

Table 4. Data Processing

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree Nor Disagree %	Somewhat Agree (%)	Strongly Agree (%)
21	I am able to interpret information from multiple sources	2.5	1.3	16.5	55.7	29.1
22	I am able to analyze information from multiple sources	3.8	1.3	10.1	57.6	31
23	I am able to synthesize information from multiple sources	1.9	2.5	15.8	59.5	22.2
24	I am able to write an appropriate response to a post	2.5	1.9	12	54.4	31
25	I am able to use ICT to design or create new information from information already acquired	1.3	2.5	17.1	55.7	24.7

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree Nor Disagree %	Somewhat Agree (%)	Strongly Agree (%)
26	I am able to visually organize data for learning purposes	1.9	3.2	13.9	54.4	28.5
27	I can represent knowledge in a variety of ways such as PPT, website, blogs, etc.	1.3	3.2	9.5	45.6	42.4
28	I am aware of the differences in written, graphic, or video representations	1.9	3.2	10.1	53.2	32.3

As can be seen from Table 4, the students perceived that they were able to interpret information from different sources; 29.1% of them strongly agreed and 55.7% somewhat agreed. They also believed that they were able to analyze information from different sources, where 31% of them strongly agreed and 57.6% somewhat agreed. In addition, they also perceived they were able to synthesize information from different sources; with 22.2% strongly agreed and 59.5% somewhat agreed. In terms of writing an appropriate response to a post, 31% of them strongly agreed and 54.4% somewhat agreed. Regarding ICT utilization ability to design or create new information from acquired information, most of them showed that they agreed, where 24.7% strongly agreed and 55.7% somewhat agreed. In terms of the ability to organize learning data visually, most of them also agreed, where 28.5% strongly agreed and 54.4% somewhat agreed. Regarding the ability to present knowledge in a number of ways, 42.4% of the students strongly agreed and 45.6% somewhat agreed. Lastly, in terms of being aware of the differences in written, graphic, or video representations, most of them also agreed, where 32.3% strongly agreed and 53.2% somewhat agreed. The percentages of the responses of the students indicated that they perceived that they were able to process data properly. The responses of the students during the interview support this conclusion. Additionally, they mentioned also the roles of discussing the material with a partner and the strategy of highlighting important points and copying them to MS word as some ways to understand the materials. The fifth domain assess the students' abilities to work in a team. The result is show in Table 5.

Table 5. Teamwork

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree Nor Disagree %	Somewhat Agree (%)	Strongly Agree (%)
29	During the preparation of a joint task, I know how to fit in among team members	1.9	1.9	6.3	54.4	36.7
30	During the preparation of a joint task, I share my thoughts and insights with my peers	1.9	2.5	8.2	49.4	39.2
31	During the preparation of a joint task, I know that I have an influence on the work process	1.9	1.3	5.7	43	50.6
32	During the preparation of a joint task, I know what is expected of me	2.5	1.3	7.6	44.9	44.4
33	While performing a joint task I feel that my contribution to the team is meaningful	2.5	1.9	7.6	50	39.2
34	My peers are aware of my abilities and of what I can contribute	1.9	2.5	8.9	48.7	38
35	I have no reservation regarding joint tasks	6.3	3.8	10.8	38.6	42.4
36	I like to work with my peers on a joint task	3.8	3.2	13.3	43.7	37.3

As presented in Table 5 most students perceived that during the joint task preparation, they knew how to fit in among team members; 36.7% strongly agreed and 54.4% somewhat agreed. In terms of sharing their thoughts and insights with peers, most of them also agreed; 39.2% strongly agreed and 49.4% somewhat agreed. Regarding the statement that they knew that they had an influence on the work process, 50.6% strongly agreed and 43% somewhat agreed. In terms of whether they knew what was expected from them, 44.4% strongly agreed and 44.9% somewhat agreed. Most of them also felt that their contribution to the team was meaningful; 39.2% strongly agreed

and 50% somewhat agreed. Most of the students were also aware of their abilities and of what they could contribute; 38% strongly agreed and 48.7% somewhat agreed. They also perceived that they had no reservation regarding joint tasks; 42.4% strongly agreed and 38.6% somewhat agreed. Lastly, they perceived that they liked to collaborate with their peers on a joint task; 43.7% strongly agreed and 37.3% somewhat agreed. To conclude, most of the students perceived that they managed to work in a team. They also believed that they did not feel reluctant to share their thoughts and ideas with their teammates. Additionally, the students also perceived that they could be in a team with anybody and that group works made work easier to do. The statements in the sixth domain assessed students' integrity awareness, as show in Table 6.

Table 6. Integrity Awareness

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree Nor Disagree %	Somewhat Agree (%)	Strongly Agree (%)
37	I understand the ethical consequences of the use of technology	3.2	2.5	6.3	50.6	38.6
38	I understand the social consequences of the use of technology	3.2	0.6	5.7	49.4	41.8
39	I do not acquire digital information, files, programs, databases, etc., via illegal means	3.8	5.1	22.2	39.9	31
40	I do not use technology for purposes that are intimidating or threatening	3.2	1.3	3.2	34.8	58.9
41	I am aware of the prohibition of illegal file download	2.5	0.6	7	42.4	48.1
42	I am aware of copyright issues	3.2	0.6	6.3	36.1	55.1
43	I am aware of appropriate acknowledgement of sources I use	2.5	1.9	9.5	41.1	46.8
44	I am aware of the danger of being online to their data	3.2	1.3	8.2	41.8	48.1
45	I am aware of cyberbullying issues	2.5	1.3	5.1	38	54.4
46	I am aware of identity theft issues	1.9	1.9	7.6	36.1	55.1
47	I am aware of e-theft issues	3.8	7	22.2	38.6	31
48	I am aware of the danger from my online activities	1.3	2.5	13.9	43	40.5
49	I am aware of the influence my online data has	1.9	3.2	10.1	48.7	36.7
50	I am able to identify/avoid online fraud or identity theft situation	1.9	3.8	14.6	40.5	41.8
51	I am able to protect myself from online predators	2.5	2.5	11.4	43.7	41.8

As presented in Table 6, most of the students reported that they agreed with the statements. Most students perceived that they understood the ethical consequences of using technology; 38.6% strongly agreed and 50.6% somewhat agreed. Nearly all students believed that they understood the social consequences of using technology (91.2%); 41.8% strongly agreed and 49.4% somewhat agreed. Most students also perceived that they did not obtain digital information, files, progress, databases, etc., via illegal means; 31% strongly agreed and 39.9% somewhat agreed. The students also perceived that they did not use technology for purposes that are intimidating or threatening; 58.9% strongly agree and 34.8% somewhat agree. Most of the students perceived that they were aware of the prohibition of illegal file downloads; 48.1% strongly agreed and 42.4% somewhat agreed. Regarding whether they were aware of copyright issues; 55.1% of them strongly agreed and 36.1% somewhat agreed. The students also perceived that they were aware of appropriate acknowledgment of sources, where 46.8% strongly agreed and 41.1% somewhat agreed. The students were aware of the danger of being online to their data; 48.1% strongly agreed and 41.8% somewhat agreed. Regarding cyberbullying, identity theft, and e-theft issues, most of them perceived that they were aware of them, though with different percentages. The students also perceived that they were aware of the danger of their online activities; with 48.1% strongly agreed and 41.8% somewhat agreed. The students also perceived that they were aware of the influence their online data has; with 36.7% strongly agreed and 48.7% somewhat agreed. In terms of online fraud or identity theft situations, 41.8% of them strongly agreed and 40.5% somewhat agreed that they could identify/avoid them. Most students also perceived that they were able to protect themselves from online predators; 41.8% strongly agreed and 43.7% somewhat agreed. To conclude,

most students believed that they were aware of integrity awareness. Domain seven assesses students' social responsibility is show in Table 7.

Table 7. Social Responsibility

No	Statement	Strongly Disagree (%)	Somewhat Disagree (%)	Neither Agree Nor Disagree %	Somewhat Agree (%)	Strongly Agree (%)
52	I adhere to the rules of discourse and proper behavior in social networks	3.8	0	3.2	37.3	57.6
53	I make sure not to reveal information about organizations without consent	2.5	1.9	6.3	39.2	52.5
54	I make sure not to hurt others-people and organizations-online	1.9	1.3	2.5	33.5	61.4

Table 7 presents the findings. Regarding whether the students adhered to the rules of proper manner in social networks, 57.6% of them strongly agreed and 37.3% somewhat agreed. In terms of whether they were sure not to display information about organizations without consent; 52.5% of them strongly agreed and 39.2% somewhat agreed. Regarding the statement of not to hurt others-people and organizations-online; 61.4% strongly agreed and 33.5% somewhat agreed. In conclusion, most of the students reported positive responses on the statements.

Discussion

Findings from the questionnaire and interview in this study confirmed that students reported good digital literacy skills. In data collection, students knew what to look for and how to look for information in the internet. According to previous study a person is said to have digital literacy skills when he/she can use the internet to find sources of information that suit his/her needs (Haluk Sivrikaya, 2020). A study done by other study also confirmed that students with good digital literacy skill are able to search and use the information collected from internet (Rahman et al., 2020). In the interview, students mentioned that they have no difficulties in searching information and where to search the information.

Regarding data evaluation, the students were aware of the credibility of information and aware that not all information in the internet was factually correct. Other study states that in internet, all information is mixed up. This mixed-up information sometimes provides trusted and untrusted information (Haider, 2008). Students need to be equipped with skills of digital literacy thus they are able to choose information on the internet that is credible and trustworthy (Leliana et al., 2021; Maureen et al., 2018). Previous study found that there were still many students who were not aware of the credibility of the information on the internet (Caverly et al., 2019). Most of them have not made a selection on the information they take from the internet. In the interview, the students mentioned that they know some site that provides grey information such as blog so they try to avoid searching for information from blog.

In managing the information, students gave a specific name, tagged and put them in a specific folder. The reason they did that because they wanted to arrange the information and to make it easier to find. One of the digital literacy components is the ability to store information (Prachagool et al., 2022; Tang & Chaw, 2016). By storing information, the students will have no difficulties in finding the information when they need it. To process the data or information collected from the internet, the students did several things. The first is interpreting, analyzing and synthesizing. The concept of digital literacy includes a person's ability to process information (Blevins, 2018; Spires et al., 2018). In this process, there are several important stages, one of which is the information evaluation process. This evaluation is carried out to see if the information obtained may contain negative and manipulative information or not. In addition, the information evaluation process is also carried out to see the accuracy and relevance of the information obtained (Leu et al., 2014; Sutiman et al., 2022). In the interview, the students stated that they could utilize ICT as well to process the information by using slides and graphic.

Digital literacy skills also emphasize collaboration. The results of the questionnaire indicated that the students understood their role in group work and the contribution they could make if they worked in a team. According to previous study the demands of mastering digital literacy have changed the way a person works in a team work (Saputro & Setyawan, 2020). People need team work because they need to deal with emerging information and develop ways to avoid overloaded information. Other study also found that students do collaboration in understanding and processing information (Caverly et al., 2019). In the interview, the students said that they would like to work collaboratively to make the task easier to finish.

Digital literacy skills require students to have integrity in using information on the internet. From the results of the questionnaire, the students are aware of matters regarding the obligation to include sources of information, use information as needed and understand copyright issues. In the digital era, many people used

information to carry out unethical activities such as plagiarism. In using information, students need to be told that they need to give credit to authors or sources of information (Evering & Moorman, 2012; Gullifer & Tyson, 2010). This is a form of instilling the values of integrity in students. Students in the interview mentioned that they were aware of other issues in online world such as e-theft and cyberbullying. Previous study found that students with high digital literacy skill will be able to tackle cyberbullying issues and aware how to deal with them (Rusdy & Fauzi, 2020).

The last dimension of literacy skill in this study was social responsibility. The students were aware of their behavior and attitude when they are engaged in online world. They were also aware not to reveal any private information and hurt other people. This was in line with a study conducted by study found that students with higher digital literacy skill tended to have better attitude compared to those who have low digital literacy skill (Jan, 2017). Other study also stressed that digital literacy always correlated with attitude which further affects students' self-efficacy (Prior et al., 2016). In the interview students stressed that they would always put good behavior and be positive especially when using social media. The results of this study were similar to the study results by previous study in Thailand, which reported that the pre-service teachers had high digital literacy seen from five aspects, namely social responsibility, team-based learning, information management, processing and information presentation, and digital integrity (Prachagool et al., 2022). Thus, the research concluded that the students were ready to deal with technology for education. It is also suggested that more training and professional development should be provided for the students for them to be more ready to become in-service teachers. Another similar result was also shown by other study who investigated digital literacy scale of English pre-service teachers in Yogyakarta, Central Java, and their readiness towards digital technologies application (Liza & Andriyanti, 2020). The instrument applied was online questionnaire which had 15 items measuring the digital literacy of the respondents. The research concluded that based on the mean scores of the responses of the respondents, the respondents had high literacy scale and perceived that they were ready toward the application of digital technology into their English teaching and learning. There is also study conducted in analyzing pre-service teachers' digital literacy self-efficacy in terms of a few variables (Aslan, 2020). The results of the research indicated that the digital literacy self-efficacy of the teachers is different across their gender, department, and the availability of computers and internet connection at their homes. Whereas, there was no significant difference of the digital literacy self-efficacy in terms of their class level, university entrance score and objectives of utilizing technology.

The implications of this research can provide a valuable contribution in developing teacher education curricula, by highlighting aspects of digital literacy as an important part in the preparation of prospective teachers. The results of the research can help teacher training institutions to design more effective training programs, focusing on improving understanding and digital literacy skills for prospective teachers. Teachers who understand the importance of digital literacy may be more inclined to integrate technology in their teaching, bringing innovation to learning methods. However, this research has the limitation that this research was conducted in a specific context or with a limited sample, so the results may not be directly applicable in general to teacher populations or other educational contexts. This research relies on prospective teachers' subjective perceptions of digital literacy, which can be influenced by individual factors such as personal experience and educational background. Perceptions of digital literacy can change over time as technology develops. Research results may become outdated as new technologies emerge or changes in digital literacy trends.

4. CONCLUSION

This survey research aimed to assess the pre-service teachers' digital literacy level in one public university in Bali, Indonesia. These pre-service teachers conducted their teaching practice program in 2021. The study revealed that most of the pre-service teachers reported high levels of literacy in all domains, indicated by their responses which agreed with most of the statements in the questionnaire. However, some students chose to disagree or chose neither agree nor disagree on the statements. This indicates that they perceived that they did not have the skills assessed in those statements. The results of this study are beneficial to report the pre-service teachers' digital literacy as consideration in the institution's regular review on the curriculum or training for the pre-service teachers.

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