

# Digital Literacy as a Daily Activity: Preferences of the Main Functions of Technology

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**Abstract** Digital literacy plays an essential role in the development of the digital era - for example, the importance of technology for learning and work. The first objective of the study was to examine the preferences of pre-service science teachers in the ability to use technology and its relationship with the use of technology in learning. The second is to explore the main functions of technology. The third objective is to examine whether the preference for mastery of technology differs clearly from the area of origin of pre-service science teachers. A quantitative methods approach was adopted to complete the questionnaire. These findings can serve as a basis for understanding participants in their ability to use technology. Participants were 400 pre-service science teachers spread across Indonesia. Based on the notion of digital literacy, participants consider themselves to be in the category of being quite capable of using technology. The most popular devices are smartphones, laptops, notebooks, and printers. The most widely owned technology application accounts are Email, Facebook, and Instagram. The surprising finding is that only a few have a YouTube account, but learning new technologies through YouTube tutorials is the most popular way among other methods such as training/courses, trial, and error, ask friends/technicians.

**Keywords** Natural Pre-Service Teachers, Questionnaire, Digital Competence, Learning Technology

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## 1. Introduction

The ability to use the latest technology plays an essential role in everyday life in the disruption era. Technology has penetrated all aspects of life and various circles. Usually, emerging adolescents gain new technological abilities at an impressive pace [1], [2].

Likewise, the educational aspects are increasingly more and easier to access learning resources [3]. The development of technology dramatically benefits the education world both from the side of the support and the source of learning. But this is not as easy as it is forecast. New emerging technologies have original specifications and characters that demand new skills and knowledge in the Master [4], [5].

Speaking of digital technology in this modern world is no longer about a tool but rather a living environment that opens new opportunities for how to learn comfortably at all times and how to continue education to a higher level [6]. The latest trends have even led to modern technologies capable of making the learning process more measurable and finding innovative learning spaces [7]. A real example of smartphone and Internet access that continues to increase every day proves that our social and professional lives are increasingly happening in cyberspace [6], [8].

The use of technology in education and learning is a challenge for a teacher [3]. Thorough integration of technology is required both from the use of technology as a learning plan, implementation, or application of learning to how technology is capable of assessment/evaluation of learning [9]–[13].

Modern technology that develops in the digital age today either directly or indirectly should be taught to the succeeding generations as part of 21<sup>st</sup>-century skills with the form of digital competence. Digital competence, or often called digital literacy, was born as the impact of the Industrial Revolution of 4.0 [1], [14]. Digital literacy is closely related to tools or ways of using and utilizing technology [15].

Based on what has been described above, this article will talk about digital literacy from pre-service science teachers in the 21<sup>st</sup>-century, which is outlined in the following questions: First, how do science teachers learn new technologies? Second, what digital technology

devices are owned by pre-service science teachers, and what functions are often used? Thirdly, what digital technology account does the prospective science teacher have, and what function is the most dominant?

## 1.1. Literature Review

### 1.1.1. Digital Literacy

The use of digital technology becomes wider throughout the Community, where more people who use technology for different purposes and Times. Further usability is derived from the digitization of society universal because many of the activities people do have digital components. As a digital society, competencies are needed to become diverse.

For this reason, digital literacy is defined strictly with several types of literacy [16]; among others: Information and communication technology, Internet literacy, media literacy, and information literacy. Analyzing the types of competencies associated with digital domains requires an understanding of the underlying aspects. Information and communication technology literacy commonly is understood as a literacy computer and refers to the ability to effectively use the computer (hardware and software) and related technologies [16].

Internet literacy refers to proficient in using the internet, understanding information, media, and communicating over the internet. Internet literacy is associated with the connectivity, security, communication, and development of web pages [8], [17]. Media literacy is the ability to analyze media messages and media environments. Usually, this literacy will involve consumption and creation of media products such as television, radio, newspaper, film, and also has internet. Educational media is generally with regards to the critical evaluation of what we read, listen, and look through the media, with audience analysis and understanding of the development of message media. That condition will involve communication and thinking competencies very critically [14], [17]. Even if information literacy has a lot in universal with media literacy, it is very relevant for internet use. Information literacy originated from the librarian tradition and began as the ability to retrieve information and understand it [12], [17].

## 2. Materials and Methods

### 2.1. Participant

Participants are 255 pre-service science teachers from the village (116 men, 139 women) and 145 pre-service science teachers from the city (52 men, 93 women). All

participation is registered in public universities located in the province of Central Java-Indonesia. They were listed as first semester students in the 2018/2019 academic year under the Faculty of Teacher Training and education sciences.

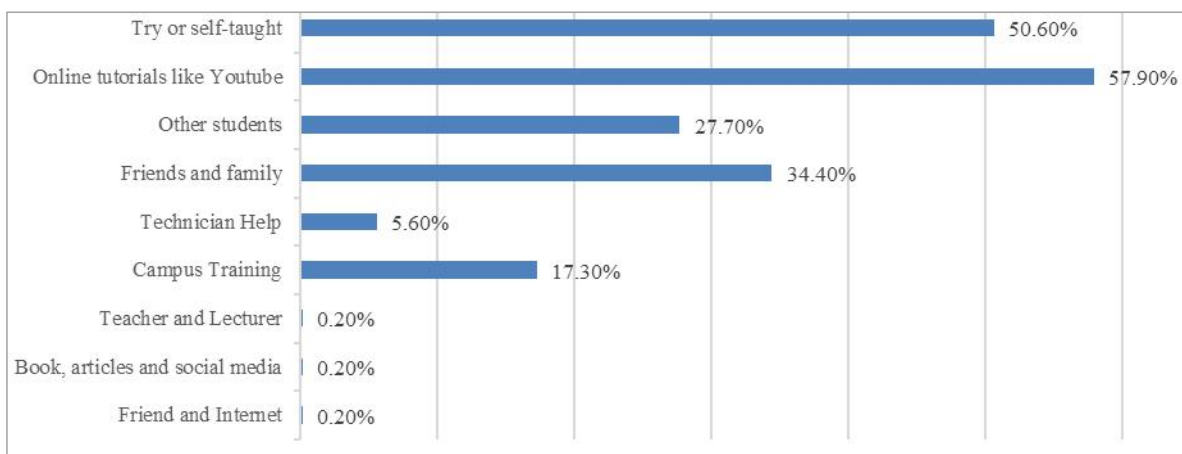
### 2.2. Procedure

All participants were tested in large groups in the classrooms and at each campus by one of the research assistants, in this case, lecturer of general biology courses. They were asked to fill a three-page survey of "Digital Literacy" specifically designed for this research. This Survey is done online so that the filling can use the smartphone. To ensure that each participant fills each survey item, the researcher designs each page has a command, and briefing with the survey item must be answered to proceed and submit each answer.

The surveillance takes approximately 10 minutes and consists of three critical questions in addition to self-identity. Question 1 asks about how it is used in learning new technologies. Question 2 asks ownership of technology devices and functions that are often used in everyday life. On this question is provided a list of some of the most popular technology devices nowadays (e.g., smartphones, laptops/PCS, cameras, printers, notes/Netbooks) and a selection of frequently used functions (e.g., work, learning, social media up to All aspects of life). Registered devices can be used individually or simultaneously with friends, teachers, and even parents. Question 3 asks about the most viral (app) digital account ownership in the world today. Similar to item 2, the most impressive function follows the account that belongs. A list of accounts is an account of several apps that can be usage and helpful in work, learning, and social media.

## 3. Findings

Figure 1 reports the result of question 1, how to study technology, which shows the percentage of pre-service science teachers who choose each item as a way of learning technology. For all the pre-service science teachers (N = 400), some of the most popular ways to learn techniques are online tutorials (57.9%), trial or self-taught (50.6%), friends, and family (34.4%) and other students (27.7%). The most unpopular way is training from the campus (17.3%) and technician assistance (5.6%). Some participants also answered with other options, namely teachers or lecturers (0.2%), books, articles and social media (0.2%) And friends and the Internet (0.2%).



**Figure 1.** Percentage of pre-service science teachers learn new technologies

Table 1 reports the results of question 2, a digital device owned by pre-service science teachers, and what functions are frequently use. For all pre-service science teachers (N = 400), the most popular digital devices are smartphones (98%) followed by PC/Laptop (83%), Printer (53%), Notebook (43%), Scanner (38%), camera (30%), and last Tablet (24%). The interesting finding is on the possession of smartphones where nine science teachers do not have them, with eight participants from the village, and one participant from the city. Another unique thing is the function of the smartphone. Although participants prefer to use smartphones for all aspects of life (61.5%), recorded data shows smartphones are more widely used as social media (21.5%) than as learning (13%). Also, some data may be considered "abnormal" as the presence of printers and scanners used as social media. They certainly have their reasons to explain the "abnormalities."

Table 2 reports the results of question 3, a digital account owned by pre-service science teachers and the most frequently used functions. Based on the data, the accounts most commonly held by successive science teachers are emails (98.75%) and Instagram (95.5%) while digital accounts that are not popular enough for pre-service science teachers are LinkedIn (19.5%) and Dropbox (28%). For pre-service science teachers, learning should have the most significant function of other functions unless they use it in conjunction with other aspects. Email accounts are a pleasure for participants because they have multiple tasks at once. Being interesting when a LinkedIn account is the least-owned account of a participant, though LinkedIn can join professionals in all areas, including the job search that best suits their interests and ability.

**Table 1.** Data ownership of digital technology devices pre-service science teachers and their functions.

Device	Function	Village		Comb.	City		Comb.	Total	
		Men	Women		Men	Women		Men	Women
PC/Laptop	Do not have	9	41	50	5	14	19	54 (14%)	277 (69%)
	Social Media	7	16	23	1	9	10		
	Job	0	1	1	0	0	0		
	Learning	20	103	123	9	60	69		
	All aspects	10	48	58	7	40	47		
	Total	37	168	205	17	109	126		
Smartphone	Do not have	2	6	8	0	1	1	66 (17%)	325 (81%)
	Social Media	1	5	6	0	1	1		
	Job	8	39	47	1	38	39		
	Learning	10	29	39	2	11	13		
	All aspects	25	130	155	19	72	91		
	Total	44	203	247	22	122	144		
Tablet	Do not have	33	175	208	15	80	95	20 (5%)	77 (19.25%)
	Social Media	1	5	6	0	3	3		
	Job	1	6	7	1	16	17		
	Learning	7	15	22	2	12	14		
	All aspects	4	8	12	4	12	16		
	Total	13	34	47	7	43	50		
Printer	Do not have	24	121	145	9	37	46	35 (9%)	174 (44%)
	Social Media	9	17	26	2	27	29		
	Job	0	1	1	0	0	0		
	Learning	11	49	60	9	42	51		
	All aspects	2	21	23	2	17	19		
	Total	22	88	110	13	86	99		
Scanner	Do not have	30	149	179	14	54	68	24 (6%)	129 (32%)
	Social Media	4	15	19	0	20	20		
	Job	0	0	0	0	2	2		
	Learning	10	34	44	6	32	38		
	All aspects	2	11	13	2	15	17		
	Total	16	60	76	8	69	77		
Camera	Do not have	33	159	192	15	73	88	20 (5%)	100 (25%)
	Social Media	4	15	19	0	5	5		
	Job	1	8	9	1	15	16		
	Learning	2	9	11	1	6	7		
	All aspects	6	18	24	5	24	29		
	Total	13	50	63	7	50	57		
Notebook	Do not have	30	124	154	14	61	75	24 (6%)	147 (36.75%)
	Social Media	1	6	7	1	3	4		
	Job	1	3	4	0	1	1		
	Learning	10	52	62	2	29	31		
	All aspects	4	24	28	5	29	34		
	Total	16	85	101	8	62	70		

Comb. = Combined

**Table 2.** Data ownership accounts for digital pre-service science teachers and their functions.

Account	Function	Village		Comb.	City		Comb.	Total	
		Men	Women		Men	Women		Men	Women
Blog	Do not have	22	125	147	14	65	79	32 (8%)	142 (36%)
	Social Media	0	4	4	1	1	2		
	Job	2	16	18	0	9	9		
	Learning	19	53	72	6	37	43		
	All aspects	3	11	14	1	11	12		
	Total	24	84	108	8	58	66		
Dropbox	Do not have	25	167	192	13	86	99	30 (8%)	79 (20%)
	Social Media	5	2	7	6	7	13		
	Job	2	6	8	0	4	4		
	Learning	11	21	32	0	17	17		
	All aspects	3	13	16	3	9	12		
	Total	21	42	63	9	37	46		
Email	Do not have	3	1	4	1	0	1	64 (16%)	331 (82.75%)
	Social Media	7	10	17	1	11	12		
	Job	7	22	29	1	16	17		
	Learning	20	91	111	8	34	42		
	All aspects	9	85	94	11	62	73		
	Total	43	208	251	21	123	144		
Facebook	Do not have	3	20	23	6	25	31	59 (15%)	287 (72%)
	Social Media	0	4	4	0	1	1		
	Job	39	162	201	13	79	92		
	Learning	0	4	4	0	5	5		
	All aspects	4	19	23	3	13	16		
	Total	43	189	232	16	98	114		
Twitter	Do not have	22	131	153	13	60	73	33 (8%)	141 (35%)
	Social Media	0	0	0	1	0	1		
	Job	19	68	87	6	50	56		
	Learning	1	3	4	0	1	1		
	All aspects	4	7	11	2	12	14		
	Total	24	78	102	9	63	72		
Instagram	Do not have	5	12	17	1	2	3	62 (16%)	318 (79.5%)
	Social Media	1	6	7	1	1	2		
	Job	32	148	180	13	87	100		
	Learning	4	6	10	0	2	2		
	All aspects	4	37	41	7	31	38		
	Total	41	197	238	21	121	142		
Google	Do not have	11	39	50	5	14	19	52 (13%)	279 (69.75%)
	Social Media	1	1	2	2	2	4		
	Job	9	28	37	2	20	22		
	Learning	15	64	79	2	40	42		
	All aspects	10	77	87	11	47	58		
	Total	35	170	205	17	109	126		

Table 2 Continued

Linkedin	Do not have	33	173	206	14	101	115	21 (5%)	58 (14.5%)
	Social Media	1	0	1	2	0	2		
	Job	3	6	9	1	7	8		
	Learning	9	21	30	3	10	13		
	All aspects	0	9	9	2	5	7		
	Total	13	36	49	8	22	30		
Slideshare	Do not have	24	139	163	12	77	89	32 (8%)	116 (29%)
	Social Media	0	0	0	1	3	4		
	Job	4	3	7	0	6	6		
	Learning	16	55	71	7	30	37		
	All aspects	2	12	14	2	7	9		
	Total	22	70	92	10	46	56		
YouTube	Do not have	8	32	40	3	13	16	57 (14%)	287 (71.75%)
	Social Media	0	2	2	1	1	2		
	Job	13	55	68	2	29	31		
	Learning	14	41	55	3	23	26		
	All aspects	11	79	90	13	57	70		
	Total	38	177	215	19	110	129		

Comb. = Combined

Given the importance of digital competence as part of 21<sup>st</sup>-century skills for pre-service science teachers, this research was conducted to examine the views of pre-service science teachers on the latest technological developments. How new technology is learning to what digital technology devices and accounts are own and what functions are frequently use. Fortunately, participants who as candidates for science teachers in the future that have a digital competence is widely enabled in the field of learning.

Nevertheless, at the same time, other functions are more often liked than on learning, such as all aspects and tasks for work and social media. The research also shows that the curiosity of pre-service science teachers can be said to be quite high. They are open to the use of new technologies [18]. This fact is evident from how they learn new technology with online tutorials and try or self-taught [15]. The selection of such ways is also apparent that they (more than 50%) are aware of the importance of new technology, in other words, have a better digital competence than just the help of technicians or training [6], [19]. They are also shown to have the essential ability to use digital technology. One of the reasons is because they dare to try so that it has experience from a variety of previous tutorials [20] – [22]. The findings also become novelty from this research that pre-service science teachers are promoting digital technology as a tool or media in learning that can be learned by yourself through online tutorials such as YouTube.

The difference between prospective male and female science teachers is also noticeable. Although the number of female participants is relatively more, by the ratio in

some digital technology accounts, there are differences such as Dropbox, LinkedIn, and SlideShare account functions. Prospective male science teachers prefer using such digital accounts as social media than on other services. Compared to male science teachers, many more female sciences teachers who do not have all types of digital accounts are exempt from email accounts of only a unit. Digital competence between men and women is different [23]. Many factors that affect women's digital ability are lower when compared to men, one of which is the cultural norm [24]. Women need to be explicitly empowered to familiarize themselves with cultural norms in the use of technology in everyday life [24].

Pre-service science teachers from the village (N = 255) also have slightly different preferences with prospective teachers coming from the city (N = 145) but covering each other. For example, a digital notebook device and a PC/Laptop, both of them almost have similar functions but a second version notebook from PC/Laptop. Pre-service science teachers from villages have a PC/Laptop for learning while Pre-service science teachers from the city prefer notebooks to help with learning. Likewise, with the ownership of digital technology accounts, the preference of a digital account must be sufficiently influenced by access to the internet. Nevertheless, this should not be a serious problem considering that Internet access is evenly distributed to all corners of the area. The important thing that distinguishes Pre-service science teachers from villages and cities is its value, ideology, and culture [25].

## 4. Conclusions

Based on the exposure to the data and the above discussion, it shows that the most popular way to learn by pre-service science teachers is to study technology online and trial or self-taught. It is indirectly already proved that they have digital competence. The most owned digital technology devices are smartphones and PCS/laptops, with the most frequently used functions as learning. The most-owned digital technology account of email and Instagram with the most commonly used features in all aspects of life.

However, if Pre-service science teachers already have a basic digital competency, there is no reason not to learn more about the devices and accounts of digital technologies that correspond to their functions. Fortunately, pre-service science teachers have digital technology devices that are widely used as aids in learning. However, for those who do not yet maximize their proper functioning, it needs to be directed and explained. Like the LinkedIn digital account, the technology can connect hundreds of thousands of professionals who are ready to cooperate and collaborate in their respective fields. It is unfortunate if pre-service science teachers do not understand and exploit them.

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