Digital Literacy Competencies for Teacher Education Students

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Abstract

As a generation that lives in the millennium, students must be able to utilize information and communication technology (ICT). They are not only expected to master ICT for their own needs in absorbing knowledge, but they must also be able to use ICT to support their profession as educators. This means that students must have good digital literacy competencies. However, is the mastery of Indonesian students' digital literacy sufficient to support their role as educators? This study aims to describe and analyze digital literacy competencies of students at the tertiary level. This includes students' digital literacy levels and the obstacles they experience in mastering and empowering them in education. This research was conducted with a case study method with instruments in the form of questionnaires and interview guidelines. The research correspondents are language students at two universities in West Sumatra. Data analysis showed that digital literacy competencies of educational students tended to be medium to good. However, these competencies are still at the level of knowledge. For the competency level and creativity of students tend to insufficient. In addition, they have become familiar with ICT as a new digital literacy base since entering college. Although students' digital literacy competencies are good, the utilization of these competencies has not been optimally utilized for learning purposes. It is recommended that teacher-education students be trained to master ICT as a course to prepare skilled education students to deal with the work environment.

Keywords: digital literacy, competence, social media, teacher education students, ICT

Introduction

Governments and policy makers recognize the importance of digital technology for educational purposes. The national literacy movement has been planned for Indonesian education. One of the literacy which becomes an important indicator for the advancement of education is digital literacy. The growing impact of digital resources with opportunities for broad access and openness is an important indicator for promoting the quality of education (Altınay et al., 2016). Technology changes and information explosion have changed the dimensions of the learning process (Çam & Kiyici, 2017). It encourages many people to grow with digital capabilities to be able to manage productively in a multi-dimensional digital world that is rapidly changing, especially for the millennial generation (Kirchoff, 2017).

With the advent of mobility, digital tools have become an integral part of human life and it also enhances three important factors such as speed, virtuality, and networks (Özdamar Keskin, Özata, Banar, & Royle, 2015). These digital products are believed to make a positive contribution to the practice of better teaching and learning (Robertson, Fluck, Webb, & Loechel, 2004; Wang, 2008)). Students use these digital technologies for learning activities such as reading and sending messages, accessing learning management systems, reading e-books and journals, participating in discussion forums, and so on (Jones, Ramanau, Cross, & Healing, 2010). Even though today's students are generally considered technology-savvy, many of them still find it difficult to utilize technology effectively (Tang & Chaw,

2015). As users of digital products, students are the most active technology users, but they are also the most vulnerable (Gruszczynska, Merchant, & Pountney, 2013).

The use of digital media for educational purposes is considered as a step to prepare and improve the younger generation in the era of globalization (Ismail, 2015). Digital literacy, media literacy and information literacy play important roles in primary, secondary and high education (Koltay, 2011). To realize these objectives, skills are needed, especially literacy, because literacy has played an important role in the education system in many countries through curriculum formation, goals and objectives (Çam & Kiyici, 2017). Therefore, the education sector throughout the world starts to incorporate digital literacy into the curriculum (Chan, Churchill, & Chiu, 2017).

Perceptions of digital literacy are often limited to the practical use of digital products such as smartphones, tablets, computers, and several other supporting applications (Kennedy, Judd, Churchward, Gray, & Krause, 2016). The experts stated the notion of digital literacy with a slightly different concept. Given different definitions, digital literacy can be regarded as the ability to read, write, view, listen to, and communicate information (Lankshear & Knobel, 2008). The plurality of the word 'literacy' is a deliberate step to expand the concept of literacy to include several semiotic systems (Song, 2017). In the field of educational technology, the sub-discipline area of digital literacy includes computer literacy, technology literacy, information literacy, media literacy, visual literacy, and communication literacy (Goodfellow, 2011; Simsek & Simsek, 2013).

Digital literacy is defined as the general ability to use computers in addition to a set of skills such as the ability to use word processing or database software, without reference to the socio-cultural dimensions of digital literacy (Gruszczynska et al., 2013). Literacy involves a learning continuum that allows individuals to achieve goals, develop knowledge, potential, and to participate fully in the wider community and society (Çam & Kiyici, 2017). Being digitally literate means having access to a variety of cultural practices and resources that can be applied to digital tools (Hague & Payton, 2010). This is the ability to make and share meanings in various modes and formats; to create, collaborate and communicate effectively and to understand how and when digital technology can be used (Son, Park, & Park, 2017).

The term "digital literacy," was introduced by Paul Gilster in 1977 (English, 2016). Technology has become an integral part of student life, but digital competence is not always introduced in higher education classrooms (Nelson, Courier, & Joseph, 2011). Digital competency development will not occur naturally (English, 2016). Therefore, it is important to develop digital competencies so that students can communicate and express their ideas effectively using digital media (Chan et al., 2017). One way to start this is to incorporate the use of digital products into literacy compositions and instructions, which will help drive digital literacy (Traxler, 2018).

By recognizing student involvement with digital culture, and literacy technology, educators consider students as expert users in the use of digital media (Buckingham, 2007). Students can regularly interact with certain digital tools, but more often this interaction does not translate into understanding, critical thinking, and problem solving (Chan et al., 2017). Given the importance of fostering the 21st century literacy citizens, it is important for educators to rethink their instructions to be in line with digital literacy requirements and student literacy practices (Lea, 2013). People usually make and share information by collecting, filtering, and adjusting digital content, educators must give students the opportunity to master these skills (Mills, 2003).

Providing the knowledge and skills that students need for their future professional life is one of the core tasks of higher education (Laakkonen, 2015). Of the many knowledge and skills, one of the elements needed by students is the ability to use information communication technology (JISC, 2015). Technology enables more people to access learning resources and contribute to increasing the number of students to complete tertiary education (Khalid, Pedersen, & Lykkegaard, 2016). Students must be encouraged to use digital technology proficiently and reflect on their experiences to consider the impact of these technologies on their learning and life (Biasini & Proudfoot, 2018).

Consequently, at the higher education level, it is an important element for students to know the importance of digital literacy competencies (Biasini & Proudfoot, 2018). At that level, students are users of digital products that are useful as a learning tool for students and those abilities can be applied to their future in the world of work. Teacher education students, in particular, can apply their digital competencies when they become teachers. Teachers use technology not only for practical use, but they must also use the technology to develop a set of skills in the learning process (English, 2016).

At present there is no standard concept for what is called "digital competence"(Ilomäki, Paavola, Lakkala, & Kantosalo, 2016; Riehemann & Jucks, 2017). Although students today generally do not face difficulties in using technology for social activities and daily entertainment, but that cannot be understood if students can use technology effectively for learning purposes (Tang & Chaw, 2015). This implies that despite being able to use digital products, students fail to understand the importance of developing digital literacy (Biasini & Proudfoot, 2018). To make effective use of technology for learning, one needs to have a certain level of digital literacy. Digital literacy for learning is more than just knowing how to operate technology, but also having the right information management and critical thinking skills, such as the right online behavior (Tang & Chaw, 2015).

Based on these explanations, the purpose of this study was to determine the digital literacy competencies of teacher education students at the higher education level in West Sumatra, Indonesia. Literacy competencies in this study are seen based on four components of literacy. First, the basics of the ability to read and write and use software packages and computers. Second, background knowledge—an understanding of how digital information is made from various forms of resources and communicated. Third, central competence—the ability to gather knowledge from various sources. Fourth, attitudes and perspectives—the ability to learn independently and show good behavior in a digital environment (Bawden, 2007).

Method

This study uses a survey method. The instrument used was a questionnaire consisting of 40 statements with details of 8 statements to determine the competence of using digital devices; 10 statements to find out the competence of finding digital information from various resources; 10 statements to find out the knowledge competencies using digital products; and 12 statements to find out attitudes and perspectives that show behavior in a digital environment. In addition, this research instrument is also in the form of an interview guide sheet consisting of eight questions which generally cover the four components of digital competence to be studied. The research correspondents comprise 48 Indonesian Language Education Departmen Universitas Negeri Padang graduate students who come from various regions in West Sumatra and 32 STKIP PGRI Padang students.

Results and Discussion

The results of this study are described based on digital literacy competency indicators which consist of four competencies, namely the competency of using digital devices; competence in finding digital information from various resources; knowledge and skills competencies using digital products; and competency attitudes and perspectives that show behavior in a digital environment. Based on this, the results of this study are described as follows.

1. Competence Using Digital Devices

Digital technology includes a variety of computer hardware and software, for example, mobile devices, web tools, application software, communication and storage services, etc. (Tang & Chaw, 2015). In order for someone to be said to be competent in using digital devices, he/she must be able to use diverse digital technologies. This competency is an initial competency that must be possessed for digital literacy. This competency is a framework for access, skills and practice in digital literacy. This

includes functional access to networks, devices, services, software, and content that individuals need to develop their competencies (Gruszczynska et al., 2013). Based on the results of the research conducted, the competence of using digital devices in language teacher education students is as follows.

Table 1. Competence Using Digital Devices

No.	Statement	1	2	3	4	5	6
1.	Able to use computer and cellular hardware correctly.	30.00%	56.25%	13.75%	0	0	0
2.	Install and uninstall the required application software.	25.00%	37.50%	23.75%	7.50%	2.50%	3.75%
3.	Understand the basic functions of the components of digital devices that you use.	22.50%	35,00%	21.25%	11.25%	5.00%	5.00%
4.	Scan disks to find and clean viruses.	26.25%	42.50%	18.75%	6.25%	2.50%	3.75%
5.	Move files through various devices, for example CD, DVD, USB, smartphone.	45.00%	33.75%	16.25%	2.50%	1.25%	1.25%
6.	Save files online.	26.25%	41.25%	22.50%	7.50%	1.25%	1.25%
7.	Create and update web pages.	22.50%	32.50%	31,.5%	10.00%	1.25%	2.50%
8.	Understand various types of digital devices.	28.75%	52.50%	12.50%	3.75%	1.25%	1.25%

Description: 1 = very good; 2 = good; 3 = acceptable; 4 = bad; 5 = very bad; 6 = don't know.

Based on the data obtained, it can be seen that students assess their ability to use dominant digital devices with acceptable values to be very good in almost all aspects of competency assessed. The data shows that students have competence in using digital devices, although there are still some students who do not yet have these competencies. However, the interviews found out that the students' understanding of digital devices is limited to hardwares, such as mobile phones, smartphones, computers, and tablets. From their answers, they seem to lack the understanding of softwares such as web, applications, communications services, storate, and so on (Tang & Chaw, 2015).

2. **Competence Finding Digital Information from Various Resources**

Gilster (1997) supports the idea that for digital literacy, a person not only knows how to find information from the web, but also has the ability to understand and gather information from different print or digital sources (Tang & Chaw, 2015). Based on the results of the research conducted, the competence to find digital information from various resources in students of language teacher education is as follows.

Table 2. Competence Finding Digital Information

No.	Statement	1	2	3	4	5	6
1.	Search for various learning resources through digital devices.	43.75%	43.75%	7.50%	2.50%	1.25%	1.25%
2.	Has a mobile application for learning.	33.75%	38.75%	16.25%	8.75%	1.25%	1.25%
3.	Use an online dictionary.	33.75%	43.75%	15.00%	5.00%	1.25%	1.25%
4.	Using the Mendeley application, Zotero etc. to quote information.	2.50%	6.25%	16.25%	28.75%	12.50%	33.75%
5.	Get learning material through wikipedia and blogs.	52.50%	27.50%	15.00%	5.00%	0	0

6.	**Download E-books for learning purposes.**	**10.00%**	**15.00%**	**40.00%**	**15.00%**	**7.50%**	**12.50%**
7.	Read scientific articles to get information about the latest research.	3.75%	6.25%	25.00%	27.50%	23.75%	13.75%
8.	Read news through several online sites	55.00%	31.25%	6.25%	3.75%	3.75%	0
9.	Get information about daily activities through popular articles.	50.00%	36.25%	6.25%	2.50%	5.00%	0
10.	Use various social media to socialize and get various information shared by fellow users.	68.75%	25.00%	6.25%	0	0	0

Description: 1 = very good; 2 = good; 3 = acceptable; 4 = bad; 5 = very bad; 6 = don't know.

Based on the data obtained, it can be seen that students assess their ability to find digital information from various dominant resources with acceptable values to very good in almost all aspects of competency assessed. Students today are familiar with digital technology and generally know how to access, create and share digital information. For digital literacy, a person not only needs to be able to search and manage, but also to research and integrate digital information (Tang & Chaw, 2015).

High ratings can be seen in the use of various social media to get information from fellow users. Based on interviews conducted, digital applications that are often used include Microsoft Office, WhatsUp, Instagram, Facebook, YouTube, online dictionary, anti-virus, web browser, Gmail, drive, Google, Google. Based on these data, the application is dominated by social media. Many people access information needed through websites such as Google, YouTube and Wikipedia. E-mail is the most popular tool among people to send and receive messages quickly (Riehemann & Jucks, 2017). Facebook, Twitter and YouTube are the dominant modes of communication (Chan et al., 2017)

The reason for using social media applications on students is that social media besides entertaining and fun to use, social media can be a source of various information such as the latest news. In addition, fellow users can share information and also as a place to express ideas and opinions to many people. Through digital content users can utilize digital devices in the form of audiovisuals, hyperlinked web pages, text messages and multimedia, to be used by writing tweets, and Facebook status updates (Mills, 2003).

Based on the data in table 2, the use of digital devices as a source of information in learning is still underutilized by students. Searching for e-books, scientific articles, is still rarely used compared to wikis and blogs. Based on the interviews conducted, students argued that the search for learning material through wikis and blogs was easier to find than e-books and scientific articles, so students tended to want easier information. In addition, there are still many students who have not been able to use supporting applications such as Mendeley and Zootero.

3. Knowledge and Skills Competencies Using Digital Devices

Digital literacy involves mastering ideas, and not just about using the technology itself (Tang & Chaw, 2015). When in higher education, as users of digital products are challenged to follow increasingly rapid technological innovations, especially when it comes to the implementation of digital media (Riehemann & Jucks, 2017). The implementation can be in the form of using digital products creatively for certain purposes. It includes the knowledge and skills of someone in using digital products. Based on the results of the research conducted, the competence of knowledge and skills in using digital devices in language teacher education students are as follows.

Table 3. Knowledge and Skills Competencies

No.	Statement	1	2	3	4	5	6
1.	Download, upload and edit photos.	33.75%	41.25%	21.25%	1.25%	0	2.50%
2.	Download, upload and edit audio.	32.50%	38.75%	22.50%	3.75%	0	2.50%
3.	Download, upload and edit video.	27.50%	30.00%	18.75%	15.00%	2.50%	6.25%
4.	Make presentations via power point.	51.25%	33.75%	8.75%	3.75%	2.50%	0
5.	Make mind mapping with the application.	18.75%	42.50%	20.00%	10.00%	0	8.75%
6.	Make videos for learning media.	20.00%	32.50%	22.50%	12.50%	3.75%	8.75%
7.	Make online games for learning.	10.00%	21.25%	20.00%	12.50%	13.75%	22.50%
8.	Create a blog to share your own work	32.50%	33.75%	20.00%	3.75%	6.25%	3.75%
9.	Change various desired data formats online (example: word. to pdf)	37.50%	42.50%	10.00%	3.75%	1.25%	5.00%
10.	Use various applications to create multimedia.	3.75%	6.25%	18.75%	25.00%	23.75%	22.50%

Description: 1 = very good; 2 = good; 3 = acceptable; 4 = bad; 5 = very bad; 6 = don't know.

Based on the data obtained, it can be seen that students assess their ability to use digital devices more in part the assessment with acceptable values to very good and some judgments with bad and very bad grades and there are judgments with dominant answers do not know. The values in the table show that the use of digital devices creatively for the benefit of learning still shows a low value. In the download, upload and edit photos, audio and video sections, it is still limited to use for entertainment purposes.

Based on the interviews conducted, students agreed that the use of digital devices can help improve learning outcomes. The teacher must be able to creatively utilize various media tools to uphold the learning that is done. Teachers must be able to use technology for learning for the purpose of advancing education by developing a range of skills (English, 2016). Students argue that factors that inhibit creativity in using technology because they are lazy, do not want to learn, do not want to try new things. There are teachers who refuse to include technology in their classrooms. They prefer to continue to use the 'chalk and talk' strategy (Ismail, 2015). In addition, the availability of facilities is also a determining factor in the use of technology. Lack of infrastructure and technical support, insufficient funds to obtain digital resources and inadequate opportunities to continue learning and developing technological knowledge (Elgali & M. Kalman, 2017)

4. Competence of Attitudes Using Digital Devices

This competence concerns the skills needed to search, evaluate, and synthesize digital information critically, and at the same time, to be aware of every ethical, moral and legal problem (Tang & Chaw, 2015). The increasing use of digital devices for various needs, one must understand that there are rules in the use of these devices that concern ethics and law. Errors carried out carrying this matter will have a big impact on the user. So this competence is a very important competency, especially for the education community. Based on the results of the research conducted, competency attitudes and perspectives that show behavior in the digital environment are as follows.

Table 4. Competence Attitute

No.	Statement	1	2	3	4	5	6
1.	Use digital devices for learning purposes.	40.00%	48.75%	6.25%	2.5%	1.25%	1.25%
2.	Know about the use of copyright.	37.50%	31.25%	21.25%	5.00%	1.25%	3.75%

Cont. Table 4.

3.	Evaluate various devices and information obtained from digital sources.	25.00%	46.25%	20.00%	7.50%	1.25%	0
4.	Express opinions, views, and perspectives through social media.	16.25%	41.25%	32.50%	6.25%	3.75%	0
5.	Knowing that technology is not always neutral and can create bias.	37.50%	36.25%	16.25%	5.00%	0	5.00%
6.	Find out about the dangers of illegal downloads.	46.25%	30.00%	16.25%	3.75%	0	3.75%
7.	Assess the reliability of information presented through media technology.	32.50%	43.75%	20.00%	1.25%	0	2.50%
8.	Knowing the age suitability of using digital devices.	41.25%	35.00%	16.25%	3.75%	0	3.75%
9.	Avoid cyberbullying behavior.	51.25%	32.50%	3.75%	3.75%	3.75%	5.00%
10.	Selecting information and content indicated as predators.	47.50%	32.50%	12.50%	3.75%	0	3.75%
11.	Knowing social responsibility when acting using various digital devices.	30.00%	45.00%	12.50%	8.75%	1.25%	2.50%
12.	Willing to learn more about digital technology.	51.25%	26.25%	16.25%	2.50%	3.75%	0

Description: 1 = very good; 2 = good; 3 = acceptable; 4 = bad; 5 = very bad; 6 = don't know.

Based on the data obtained, it can be seen that students assess their abilities in attitude and perspective that shows behavior in the dominant digital environment with values that are acceptable to very good in all aspects of the competency being assessed. Digital literacy encourages curiosity and allows individuals to evaluate information in a critical way. By increasing the ability to use digital resources, digital literacy helps individuals feel themselves relatively safe in using technology (Özdamar Keskin et al., 2015). However, currently there are still many people who need training so that they can use and manage information networks with the help of technology (Hague & Payton, 2010). Based on the results of interviews, students know about how to behave and ethics when using digital devices, but for further understanding students are willing to learn more to know more about the use of digital devices.

In addition to knowing the four aspects assessed regarding digital competencies, students were also given questions about digital literacy. The results of the interview are described as follows. First, important language teachers to have digital competencies in the development of science and technology require that all people strive to improve their competence in various fields, one of them being teachers. in learning activities, teachers must be more literate in developing digital literacy, because later the teacher will provide an understanding of the importance of digital literacy in learning to students. In addition, by having digital competence, teachers can teach with a variety of media, thus attracting students' attention to learning.

Second, students argue that teachers who do not have digital competencies will result in teachers not knowing new knowledge, information obtained is limited, and teachers cannot share their knowledge about digital literacy with students. Third, prospective teachers must learn technology for the benefit of learning while they are studying. In addition, to further strengthen its competence training needs to be done for prospective teachers. Students agree that studying digital devices cannot be self-taught.

Conclusions

Based on the results of research that has been done shows that students' digital literacy competencies tend to be good. However, these competencies are still at the knowledge stage. As prospective teacher students, students must be able to take advantage of various ICTs for the benefit of learning, both as students and for the benefit of the work environment after completing education. Knowing digital literacy competencies is important so that all parties can make improvements in all aspects of education. As prospective teachers, prospective teacher students have the responsibility to introduce digital literacy to students when they have become teachers. Teachers who do not have competence result in limited information and skills that are not qualified for the 21st era.

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