Assessing the digital literacy competence of pre-service English teacher in Indonesia and Thailand

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Article Info

ABSTRACT

The notion of digital literacy has become the trend in any field, including this research. This research aimed to find the level of digital literacy and adequate and inadequate domains in each pre-service teachers of English education digital literacy group. Quantitative research with digital competence framework or DCF then adjusted and validated through the expert judgment by Aiken V as the main questionnaire occurred to measure the level of digital literacy. Indonesia and Thailand pre-service teacher in various universities participated in this research. The research found that: i) The most level of digital literacy whether in Indonesia and Thailand, the pre-service teacher has an intermediate level followed by basic and advanced and ii) The researcher claims 'information' as an inadequate domain and 'implement tech to learning' as the adequate domain in each level of digital literacy. Further research is needed to examine effectiveness of project-based learning, problem-based learning, and case study in enhancing digital literacy through qualitative and quantitative research.

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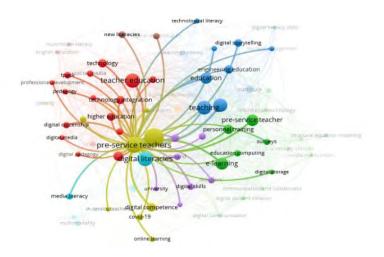Halmahera Street, Tegal, Central Java, Indonesia
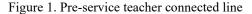Email: husainduta@gmail.com

1. INTRODUCTION

Technologies used in the teaching process are optional and aim to foster students' perception in their learning process. However, the learning process since the COVID-19 required all of the elements in education systems to use internet and communication technology (ICT) [1]. Then the world was shocked by the forces shifting into a new environment of digital in education [2]. Thus, those aware of adapting faster will find the concept of digital learning and train themselves to use digital media. Meanwhile, their digital literacy competence will influence the teaching process. The numerous teachers and students who are aware of integrated ICT in their learning process reach a success story [2]–[6]. Dozens of researches also take part to determine the best way to reach the aims of each learning. Previous research [7] also provided the summarized framework of teacher digital capability development to use ICT in each learning process, such as technological, pedagogical, and content knowledge or TPACK, technological pedagogical knowledge or TPK, pedagogical content knowledge or PCK, and technological content knowledge or TCK.

TPACK is one of the most used by the teacher to implement ICT into the learning process. The TPACK agreement on the conceptual model, which underpins many teacher education 'digital literacy' programs and ICT components within disciplines, aids students in understanding the relationship between

technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK) in developing and instructing technology-enhanced curricula. Outlines important theoretical concepts that have a bearing on how effectively technology is used in curricula and how they relate to one another but does not identify the corresponding abilities, aptitudes, or behaviors that are necessary to put them into practice [7]. Furthermore, due to the culture shock of fully digital integration in education, the future teacher (pre-service teacher) must be competent to use ICT in their teaching process.

Competence generally refers to how far is the competence mastered, and the digital literacy assessment can answer it. The study of Ussarn *et al*. [8] reveal the result moderate level of digital literacy skill in Thailand for task community college in semester II. Those results are quite sharp, focusing on each technical subskill in digital literacy such as Microsoft PowerPoint, Excel, and Word. Unfortunately, the researcher does not acquire the other subskill of digital literacy in a universal setting. In addition, the elderly in Thailand to use technology also need: i) Use of mobile operating systems; ii) Data file management; iii) Cloud data management; iv) Use of support applications; v) Use of communication applications; and vi) Use of technology for security to develop online media literacy to safety [9]–[12]. Therefore the digital literacy assessment also being a trend in Indonesia that already did by Durriyah and Zuhdi [13] which focuses on perception of the integrating of ICT in learning. Different with Durriyah and Zuhdi, Nabhan [14] focused on the mix dimension of digital literacy for pre-service teacher such as critical thingking, online safety skills, digital culture, collaboration and creativity, finding information, communication, and functional skills. The findings revealed that the pre-service teachers' ideas of digital literacy were primarily linked to the limited proficiency in using online tools and technology gadgets and neglected a critical mentality. It align with Livingstone and Irawan [15], [16], students in social sciences tend to possess stronger communication, critical thinking, problem-solving, and technical digital skills compared to students in other fields. On the other hand, humanities students tend to have higher levels of creativity and information-related digital skills. Additionally, the study revealed that students' education levels had a significant impact on their digital skills, except for creativity and problem-solving-related skills. Those studies represent the deeper analyzed of digital literacy framework in education and their impacted. It refers the positive impact of digital literacy in education. Moreover, this research uses Vosviewer to understand the present landscape of digital literacy research. The researcher use co-occurrence analysis to determine the publication trend in Scopus database. We search with <digital>, <literacy>,<pre-service> as the "Title", "Abstract", and "Keyword". It found 235 documents with 70 treshold keywords.

Figure 1 gives an a clear present publication of digital literacy and pre-service teacher. The result of co-occurance analysis provided eight clusters and found pre-service, pre-service teacher, pre-service teachers, pre-service teacher education, pre-service teacher training as the same terms of pre-service Teacher. According the Figure 1 with 40 occurances and 121 total link strength and 47 links, studies digital literacy in education and pre-service teacher concentrated on students' perception, teacher digital literacy, technical competence, one group research. However, the figure also shows how far digital literacy research is in a couple of years. Similar research acquired in Europe, comparing the two countries of digital literacy, they compare digital literacy competence in aims to show the landscape of future teacher competence to master digital devices [17]. Moreover, the comparison study of digital literacy also occurred during COVID-19 in Europe. Their attention was directed towards their experience with the worldwide lockdown scenario, emphasizing their efforts in enhancing digital skills and literacy [18].

Figure 1. Pre-service teacher connected line

Assessing the digital literacy competence of pre-service English teacher in Indonesia … (Yuvita Yuvita)

Although considerable research has been devoted to digital literacy and pre-service teacher, rather less attention has been paid to comparing digital literacy in Asia, neither for pre-service teachers nor teachers. This reason made this research possible to fill the gap of knowledge to expand and explore how far digital literacy skills are in both countries in Indonesia and Thailand especially in specific fields of bachelor in English education. This latter point was realizing if digital literacy in Indonesia and Thailand strongly needs to be compared. It aims to create a comparison result between the pre-service Teacher in Indonesia and Thailand. The research analyze the digital literacy competence of pre-service students in Indonesia and Thailand. This research used digital competence framework (DCF) from Vuorikari et al. [19] with an adjustment for pre-service teachers in the English language field. Then analyze it with the mean score of each level. The research questions guiding the current research are as: i) What is the percentage of students in each level of digital literacy in the survey sample? and ii) What is the highest and lowest domain in each level?

2. RESEARCH METHOD

This is a comparative study with quantitative research to determine the level of digital literacy of pre-service teachers in English education. The research was conducted during the 2022–2023 academic year. A revised questionnaire refered to DCF revised. It aims to determine the domains of digital literacy for 76 participants in both countries. The questionnaire DCF was used as a data collection tool. Five domain was constructed DCF [19]. However, the DCF need to be adjusted by the author to create a specific question in English education. The adjustment of the DCF was called DCF revised. To ensure the validity construct of the questionnaire, DCF revised was validated through expert judgment. The validity construct used Aikens V as seen in (1) and followed by logical validity to enhance the validity of questionnaire [19].

$$V = \sum S/[n(c-1)]$$
$$S = r - lo$$

(1)

Description
Lo = lowest rating score
C = highest rating score
R = number given by rateri

The experts suggest shortening the questionnaire, sharpening each domain statement and adding the 'implement tech in learning' as the additional domain to explore how far the participant implements their ICT in the teaching and learning process. Table 1 shows the result of Aikens V validity construct, which concluded that 24 number of question with six domains in DLC revised was valid. Participants of this research consist of 42 participants from random sampling of the English education field from Universitas Pancasakti Tegal, Universitas Kuningan, Universitas Sarjanawiyata Taman Siswa, Indonesia and 34 participants from various university in Thailand such as Bansomdej Chaopraya Rajabhat University, Hatyai University, Kasetsart University, Mahidol University, Prince of Songkhla, Thaksin University, and Yala Rajabhat University from the English education field. Participants must be in or ever to be a pre-service teacher in English education.

Table 1. Construct validity Aikens V

No. item	V	Validity	No. item	V	Validity
1	0.50	Valid	13	0.67	Valid
2	0.50	Valid	14	0.83	Valid
3	0.58	Valid	15	0.83	Valid
4	0.67	Valid	16	1.00	Valid
5	0.67	Valid	17	1.00	Valid
6	0.67	Valid	18	0.83	Valid
7	0.83	Valid	19	0.92	Valid
8	0.83	Valid	20	0.92	Valid
9	0.67	Valid	21	0.75	Valid
10	0.83	Valid	22	0.87	Valid
11	0.75	Valid	23	0.67	Valid
12	0.92	Valid	24	0.78	Valid

Figure 2 clearly illustrates the procedure of the research. The first stage begins with the reconstruction of a questionnaire of DCF from Vuorikari et al. [19]. Expert judgment in digital literacy, the

English language field, and assessment experts performed the reconstruction. The expert judgment ran through Aikens V to find the validity construct [19]. Then the next process is sampling process for both participant in Indonesia (IND) and Thailand (THA). The researcher explained the aims of this research to both participants. In aims to measure the level of digital literacy easier, the researcher was used [20] to convert the level of DCF revised into the score of digital literacy. In addition, the researcher used the theory from [20] to determine the range score of digital literacy level. The most obvious limitation of this research was a small sample size, a time limitation, and networking of the sample or population. Therefore this research decide to use DCF revised that adjust the sample in specific field, in English education field. It brings a strong result for digital literacy of pre-service teacher in English education field to determine the result.
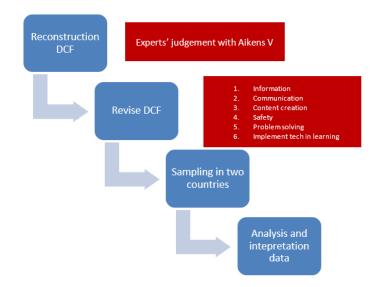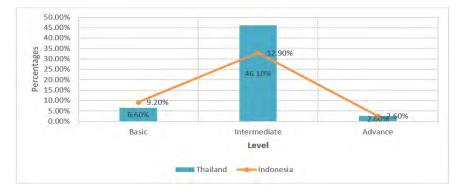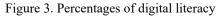

Figure 2. Research procedure

3.   RESULTS AND DISCUSSION
3.1.   What is the percentage of students in each level of digital literacy?

Analyzing the data using the DLC revised and the mean calculation in each country, the pre-service Teacher in English education in Indonesia and Thailand reach a different level of digital literacy. Figure 3 shows the percentage of digital literacy level participants. About IND (46.10%) and THA (32.90%) have an intermediate level of digital literacy. What is more noteworthy is that most of sample located in the intermediate level. Morever the rest of the sample has a basic and advanced level in both countries as seen in Figure 3. Basic level it is especially alarming in this regard that this research result amount of sample has sufficient digital literacy to support their teaching practice in the near future. The percentage in Figure 3 also revealed that either Indonesia or Thailand has to hold workshops or methods to enhance digital literacy for pre-service teachers in English education. Digital literacy comprises various cognitive skills utilized in executing tasks in digital environments [21].

Figure 3. Percentages of digital literacy

3.2. What is the highest and lowest domain in each level?

Figure 4 shows basic level of digital literacy in Indonesia and Thailand for pre-service teachers in the English education departments. As can be seen, it covers six elements of digital literacy competence in education. Information is the lowest element of digital literacy IND (38.33) and THA (30.95). However, the higher domain in a basic level of digital literacy belongs to 'implement tech in learning' with IND (60) and THA (53.97). This result indicates that the group of a basic level of digital literacy has the insufficient skill to browse and filter information digitally.
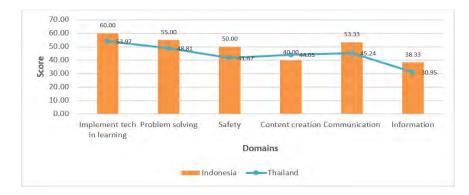

Figure 4. Basic level of digital literacy

As the most dominant digital literacy level in both countries of pre-service teachers in English education, the highest score for IND participants belongs to 'implement tech in learning' (72.06) as seen in Figure 5. Moreover, the highest score for THA participants belongs to 'safety' (67). However, the lowest domain score in both countries is information, IND (53.09) and THA (47). Note that the inconsistent highest domain occurred in both levels of digital literacy, the basic and intermediate levels. The intermediate level of digital literacy possess safety for THA participants. It indicates the THA and IND participants in the most dominant group of digital literacy level have different skills to become the intermediate level. In fact, THA student more aware to protect their personal data, malware issue, and environmental issue regarding the ICT used.

Figure 5. Intermediate level of digital literacy

There was a rise in the domain digital literacy Figure 6. Which indicate by the highest score of digital literacy for IND participants. It rises in 'problem-solving' (87.5) and THA participant in 'implement to tech' (83.3) as can be seen from Figure 6. In contrast, the lowest score of digital literacy of THA belongs to 'information' (70.83) and IND for 'implement tech to learning' (72.2). In summary, Table 2 shows the mapping of highest and lowest domain in each group for two countries.

Figure 6. Advance level of digital literacy

Tables 2. Domains mapping of highest and lowest digital literacy

| | Thailand | | Indonesia | |
	Highest	Lowest	Highest	Lowest
Basic	Implement tech to learning	Informaton	Implement tech to learning	Information
Intermediate	Safety	Informaton	Implement tech to learning	Information
Advance	Implement tech to learning	Informaton	Problem solving	Implement tech to learning

The notion of digital literacy has begun in 1997 and summarized by Martinez Bravo *et al*. [22] that state the frameworks have been changed followed by the era [21]–[33]. The researcher realizes the framework of digital literacy does not freeze in one theory. DCF was chosen as the theory to measure the digital literacy in pre-service teachers in English education for this research for any reason. The first thing that could be bear in mind is the background. This framework was developed through conceptual mapping, case studies analysis, online consultation, expert workshops, and stakeholder consultation to address the issues raised by the European Parliament and Council's recommendations. They recognized eight key competence for lifelong learning. Therefore it is similar with present study in aims to answer the challenges and prepare the future teacher to literate digitally.

The present study found the difference possess in each domains for each group of digital literacy level. It begins with the basic level, either THA and IND participants have a lowest score in 'information' domain. However they force theirself to use ICT in learning. It indicates by the highest level of 'implement to tech' domain as the highest score. Therefore the researcher claim the group of basic level even they were not competent in information domains, they still try and force themselves to use their skill. The lack of information domains could be less of understanding to search and browse the information from credible information. In other hand it also related with how they store the data, they prefer to use the conventional drive to store their data rather than cloud drive. It aligns with Oseghale [31] which revealed the less of information in digital literacy and found inadequate training on e-resources utilization as the factor that influenced it. Not only how to utilize e-resources but also Bugre and Wedlak [32] discovered that the problematic information-related lessons were compartmentalized from other lessons on social media or internet searching and that these curricula relied on outdated information literacy models rather than the most recent best practices for analyzing information. However, Vuorikari *et al*. [19] provide the cross-reference to enhance the information domains, such as interacting through technologies, sharing information and content, integrating the ICT in daily activities, and protecting their device by arranging the storing data.

The second group, the intermediate of digital literacy level becomes the dominant percentage of a participant in both countries. It has 46.10% from IND and 32.90% from THA. Moreover the research found deeper in each domain for intermediate group has differenciate between two country. THA has a highest level in domains of 'safety'. Otherwise, IND has a 'implement tech in learning' as the highest level in domains of digital literacy. It indicate if the THA group of intermediate mostly understand and has a high awareness to keep their privacy and security in their control. However, the lowest score of digital literacy domains possess to 'information' domains. It means both the basic and intermediate level of digital literacy must be paid attention to enhance their information domains. In contrast with Tomczyk [34] which found 'safety' as the lowest domain of digital literacy as the result. This is similiar with Tomczyk in 2022 [17] which reveal compared to their Italian counterparts, Polish students know more theoretically about e-risks

and the potential of the digital world. In this research, THA participants have a higher score of safety in scope to protect the data, privacy, healthy issue regarding the use of ICT and the environment awareness regarding the use of ICT rather than IND participants.

The last group of digital literacy level is advance level. It has a highest score of digital literacy score in different domain, IND has a highest score in 'problem solving' and THA has a highest score in 'implement tech in learning'. It means the advance level group of digital literacy focused their digital literacy skill to solve their problem. In fact, they integrated digital environment to solve their live problem, solve their digital issue independently, and recognize their needs of digital device to fill their gap of competence. However, it similar with THA participant which focused on their way to implement ICT in their learning or teaching process. Moreover, the lowest domain of digital literacy skill in advance level belongs to 'information' for THA and 'implement to tech' for IND. Therefore the difference domain of the lowest and highest score of digital literacy level indicate the differenciate digital literacy skill between pre-service teacher of English education department in Indonesia and Thailand. Align with it many previous research to increase the ability to solve problems though digital literacy innovation occurred, such as Siswanto et al. [35] conduct the digital learning integrated the local wisdom to enhance it. Then use the science-math stories based on digital learning to increase problem-solving domain.

Information as the consistent domain of the lowest score in each group indicates the tendency of less of awareness toward the importance of information whether in Indonesia or Thailand. It can be seen in Table 2 as the mapping of domains in each group of digital literacy domains. Then the rest of the domains especially implementing tech in learning could be claimed if it reaches a sufficient score. It indicates by the consistency of the domains to fill in the highest score of a domain multiple time in each group. But unfortunately, it was a drop in the advances group in Indonesia as the lowest domain.

In conclusion, the research shows the lack in detail of digital literacy domains in aims to create a strong reference and literature. Therefore, based on the result, the information domain is the lowest domain that existed among the groups of level digital literacy in Indonesia and Thailand. It was related to the skills of how they find, store, validate, and manage their information. The study's practical implications suggest that the university or the stakeholder must focus on developing information skills as the lack domains in digital literacy skills. Moreover, the research proposed a training program or practical activity among the pre-service teacher, which required a deep search of information, organising and presenting it as their result. In short, based on observation, it can be acquired through the approach of learning such as project-based learning, problem-based learning and case study as the most learning approach in their preparation time to do a pre-service. Further research is needed, however, before the use of a learning approach can be recommended as the solution to enhance the lack of information.

4. CONCLUSION

This study aimed to measure digital literacy in pre-service teachers in English education using the revised DCF. The researcher found that the DCF theory was chosen because it aligns with the goal of preparing future teachers to be digitally literate. The study found that most of the participants from THA and IND have been digitally literate the in the intermediate level. Therefore the information domains exist as the lack of domains of digital literacy in both countries. It indicates the consistency of the information domain in the lowest score for each level of digital literacy. However, the implement tech in learning is noticeable as the adequate domain by appearing multiple times as the highest domain score in each digital literacy group. Further research needs to be done to investigate deeper through qualitative or quantitative research to explore the effectiveness of project-based learning, problem-based learning, and case study to enhance the information domain in digital literacy.

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