The Role Digital Competence for Pre-Service Teachers in Indonesia

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The Role Digital Competence for Pre-Service Teachers in Indonesia

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Abstract

Progress in the digital era has accelerated in the past few years, including its impact on the world of education, which must prepare competent human resources. Teachers are expected to have competencies that can meet the demands of the times. The purpose of this study iis study aims to describe the effect of digital competence on pre-service teachers in Indonesia. By uUsing the Systematic Literature Review (SLR), this article examines the results of research related to Digital Competence which raises the subject of students taking educational studies programs in Indonesia. The literature review was obtained from the lens.org website with a filter for the 2015-2021 range using the keyword digital competenceusing the keyword digital competence to filter for the 2015-2021 range. After that, it is filtered with the open-access journal option and language restriction in English and Indonesian.

Abstrak

Kemajuan dalam era Digital semakin pesat dalam beberapa tahun kebelakang, termasuk dampaknya pada dunia pendidikan yang harus menyiapkan Sumber Daya yang berkompeten. Diharapkan guru dapat memiliki Kompetensi yang dapat memenuhi tuntutan perkembagan zaman. Tujuan dari penelitian ini adalah mendeskripsikan pengaruh kompetensi digital terhadap mahasiswa calon guru di Indonesia. Dengan menggunakan *Systematic Literature Review* (SLR), artikel ini mengkaji hasil penelitian terkait Kompetensi Digital yang mengangkat subjek mahasiswa yang mengambil progam studi pendidikan di Indonesia. Kajian Pustaka tersebut didapatkan dari situs lens.org dengan filter rentang tahun 2015-2021 menggunakan kata kunci kompetensi digital dan "digital competence. Setelah itu di filter dengan piihan open acces journal dan batasan bahasa Inggris dan Indonesia.

INTRODUCTION

While the emergence of COVID-19 is disrupting all aspects of everyday life around the worldworldwide, education is one of the sectors worst affected by the sudden need to move to teaching and learning teach and learn from face-to-face interactions to remote small structures. Within weeks, and with little public discussion, digitally supported teaching and learning at primary, secondary, and tertiary levels was established in many countries (Sá et al., 2021).

When we enter today's today's world of work, digitalization is emerging as a key in maintaining the link between the needs and nature of our education system to fulfill life skills. The ability to use digital technology is also considered an essential life skill for every citizen when they are present as

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part of a digital society. Therefore, education faces a challenge to provide individuals with the life necessary to survive and be expected to thrive in society (Cristiana, 2021). Education has challenges and opportunities that are believed to be strongest in aspects of the use of technology in learning (Khotimah et al., 2020).

To ~~To pp~~roduc~~e e~~ progress in terms of national education,~~,~~ so the digitalization of education is expected ~~to be able~~ to assist education actors in the continuity of the teaching and learning process in an even and optimal manner. Following the times, the digitalization of education is presented and implemented with the intention that education can still produce learning ~~that~~ under its direction and purpose. Managing digitalization intelligently and appropriately is one of the new challenges ~~that are~~ present in the world of education so that learning activities can still be carried out, especially during the distance learning period (Cristiana, 2021).

The digital learning environment is a contemporary learning and learning need. The utilization of technology in the field of education makes learning activities more effective and efficient ~~so that it can~~to attract interest in learning. Current and future learning increasingly lead ~~to the use of~~ to digital devices (Purwodani & Praherdhiono, 2018).

Technology does ~~not only have~~have not only a positive impact on schools~~,~~ but also a negative impact. This digitalization era requires online integration between several entities~~, and this online integration will provide room for individual violations, even substantially harm producers, and can even damage the reputation of the institu~~. This online integration will provide room for individual violations, even substantially harm producers, and even damage the institution's reputation (Muktiarni et al., 2019)~~. B~~ because it needs education for digital users ~~in~~ of all users. The use of digital tools can also cause anxiety and self-efficacy levels. Computer anxiety and high levels of computer self-efficacy are important affective factors that drive ~~students'~~ students' academic success in ~~today's~~ today's digital era (Katsarou, 2021). Therefore, it is necessary to have mastery ~~in of the field of~~ digital technology.

Introducing new technologies in modern education is not just distributing information but also changing learning methods. The support of these statements ~~once again emphasizes the need for implementing~~again emphasizes the need to implement educational activities in new and different ways. This technology allows quick access and easy access to information, but the efficiency of research, selection, evaluation, and use of appropriate ~~information~~ details requires additional abilities (Grncharovska et al., 2016). In 2017 the European Commission published a digital competency framework ~~with the aim of creating~~to create standards for evaluating digital competencies of educators in Europe(Muktiarni et al., 2019). DigComp is a flexible reference framework that can be adapted to support the development and understanding of digital competence in any setting. DigComp can be used by educators and any other actors interested in the development and understanding of digital competences by people (Comisión Europea, 2019). The rapid increase in the number of different digital competency frameworks, models, and strategies has ~~greatly~~ dramatically shifted the focus from the operational aspects of measuring and interpreting digital competencies to ~~aspects~~ factors related to definitions, indicators, and indexes (Sillat et al., 2021).

Another important thing is to prepare human resources, especially teacher candidates. This is because ~~the majority of students are now inhabited by Generation Z. Generation Z~~Generation Z. Generation Z now inhabits the majority of students is closely related to digital devices that are not compatible with the previous generation (Br Sitepu et al., 2020). It is most effective when providing digital education to Generation Z and newer generations. That is why researchers recommend that pre-~~servise~~ service teacher education programs should be concentrated on digital competence (Reisoğlu & Çebi, 2020).

This review aims to get an overview of the development and influence of digital competence with a focus on pre-service teachers candidates in higher education in Indonesia systematically through research questions:

RQ 1. What dimensions are used in the application of digital competence?

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RQ 2. What is the purpose of the study on digital competency research with the subject of pre-service teachers in Indonesia?
RQ 3. What are the results of digital competency research in the context of pre-service teachers in Indonesia?

METHODS

This study uses a Systematic Literature Review (SLR) with a meta-synthesis model. This systematic literature review uses the lens.org, scholar.google.com, and eric.ed.gov website databases. The keywords used in the search are ""kompetensi digital", " and the keyword ""digital competence" " with limitations on the type of document journal articles and conference proceedings articles. As well as open access restrictions, . Wwe limit the article year to the last 7 years, namely between 2015-2021. This limitation is a strategy to focus publication articles for reading and increase the accuracy of information search. The search results are then filtered using several research criteria, including the existence of sentences that discuss digital competence and there is a relationship with teacher preservation in Indonesia. F—furthermore, filtering of 11 articles that are relevant to the criteria.

FINDING AND DISCUSSION

From the results of filtering, it waThe filtering results found that 5 five articles in the last 7 years were included in the criteria because they raised the topic of digital competence and topics issues related to pre-service teachers in Indonesia. Publications that do not define digital competence are generally not completed. O of the 5 articles obtained then read and analyzed. In this section, we presentThis section presents 3 three results that are followingfollow the research question.

- "*What dimensions are used in the application of digital competence?*"

~~What dimensions are used in the application of digital competence?~~

The various instruments selected according to the dimensions of digital competence are included in the following tTable 1.

Table 1. Dimension of Digital Competence Uses in Selected Article

Author	Title	Dimension of Digital Competence				
		Information and Data Literacy	Communication and Collaboration	Digital Content Creation	Safety	Problem Solving
Makiyah, Y. Nana Mahmudah, I, R.	Korelasi antara kompetensi digital dan keterampilan berpikir kreatif mahasiswa pendidikan fisika			✓		
Cahyani, V. Ilhamsyah. Mutiah, N.	Analisis Tingkat Literasi Digital pada Generasi Z dengan Menggunakan Digital Competence Framework 2.1 (Studi Kasus: Mahasiswa FMIPA UNTAN)	✓				

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Prayogi, R, D. Estetika, Rio	Kecakapan Abad 21: Kompetensi Digital Pendidik Masa Depan~~KECAKAPAN ABAD 21: KOMPETENSI DIGITAL PENDIDIK MASA DEPAN~~	✓	✓	✓	✓	✓
Shomedran	Menakar Kompetensi dan Profesi Lulusan Pendidikan Luar Sekolah di Era Digital~~MENAKAR KOMPETENSI DAN PROFESI LULUSAN PENDIDIKAN LUAR SEKOLAH DI ERA DIGITAL~~	✓	✓	✓	✓	✓
Andina, D, M. Cahyono, B, Y. Widiati, U.	How English Foreign Language ~~Students'~~ Students' Autonomy and Digital Competence Relate to Their Writing Achievement	✓				

A Makiyah (2020) use~~d~~s digital competence with digital content creation dimensions by measuring ~~4~~ four aspects of the assessment, namely, (1) the use of digital applications to carry out learning to students, (2) the use of digital applications to create media and evaluation, (3) developing an understanding of the use of digital applications for school administration work, ~~and~~ (4) ~~an~~ understanding sense of ethics related to the use of social media (Makiyah et al., 2020).

In ~~Cahyani's~~ Cahyani's paper (2021), the eight dimensions of information data and literacy are used to map indicators based on digital literacy levels starting from Foundation, namely level 1 to High Specialized, namely level 8 (Cahyani et al., 2021).

In his paper, Prayogi (2019) researches 21st-century skills and their relationship with educators and raises various dimensions of digital competence in teaching to be associated with 21st-century skills (Prayogi & Estetika, 2019).

Shomedran (2020) discusses digital competence ~~is~~ as one of the competencies that ~~must be possessed by graduates of Out of School Education~~graduates of Out of School Education must possess by ~~discussing~~ examining the five dimensions of digital competence.

In the article written by Andina (2020) was mentioned that it was students who integrated the use of technology in writing. It can be said that the writer uses the digital literacy dimension (Andina et al., 2020)

What is the purpose of the study on digital competency research with the subject of pre-service teachers in Indonesia?

Furthermore, reviewing and analyzing the research objectives of the selected publications. The various objectives of the selected manuscripts are grouped into the following ~~3~~ three categories: ~~1~~First:, ~~I~~involvement of digital competencies in the teaching process, two, ~~2. I~~involvement of digital competence in pedagogy, three. ~~3. , D~~digital competence as an indicator. The results are presented in Table 2.

Table 2. Results of Category Research Objectives

Indicator	Learning Achievement	Teaching process
20%	40%	40%

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The digital competence used as an indicator has ~~1~~ one writing. ~~The research objective of Cahyani (2021)~~Cahyani's (2021) research objective is to measure ~~the level of literacy skills possessed by Generation Z~~Generation Z's level of literacy skills through the digital competence framework 2.1 indicator (Cahyani et al., 2021).

Then two publications stated goals related to learning achievement. First, the research is written by Makiyah (2020) then aims to determine the relationship between digital competence and creative thinking skills (Makiyah et al., 2020).

The research written by Andina (2020) has two objectives that discuss digital competence, namely to prove a correlation between the digital competence of English Foreign Language students and their writing achievement. ~~ and t~~The second objective is to determine the relationship between the combination of the level of autonomy of English Foreign Language students and competence in digital and writing their English Foreign Language (Andina et al., 2020).

Finally, the ~~researcher's~~ researcher's goal in investigating the importance of digital competence for teaching is that ~~two~~2 of ~~the 5~~ five publications were selected in this category. ~~Shomedran's~~ Shomedran's (2020) Perception provides an overview of the competencies and professions of Out School Education graduates in ~~today's~~ today's digital era (Shomedran, 2020). Paper by Prayogi (2019) aims to ~~find out the discourse of 21st-century skills comprehensively~~comprehensively find the discourse of 21st-century skills and its interrelationships as the basis for the teacher development profession in teaching students according to the demands of the times (Prayogi & Estetika, 2019).

What are the results of digital competency research in the context of pre-service teachers in Indonesia?

First, analyze articles related to indicators (Table 2). The results of the discussion report that the digital literacy of pre-service teachers is based on the digital competence indicator from the DigCom 2.1 European Commission. The results show that the response to measuring digital literacy from students from various levels is the most striking at the advanced-intermediate level. Cahyani (2021) also make ~~recommendations for various levels of~~s recommendations for different digital literacy Digital Competence 2.1. ~~This~~ It also relates to literacy and data information from one of the digital competence fields (Cahyani et al., 2021). ~~This~~ It can be used as a reference for pre-service teachers in deepening and improving their digital literacy skills.

Next, two studies discuss the relationship of digital competence with learning achievement. First, an article ~~that~~ discusses the correlation between digital competence and the thinking skills of pre-service teachers. ~~the~~ The higher the digital competence of pre-service teachers, the higher their creative thinking skills (Makiyah et al., 2020). Being able to use various digital applications can help pre-service teachers ~~in creating~~create more diverse teaching content.

~~Andina's~~ Andina' 2020) research explains ~~that there is~~ a relationship between ~~students'~~ students' ability to use technology and their writing scores. It is assumed that digitally literate students ~~are students who~~ can use appropriate technology to assist them in writing a composition. This suggests that students who can navigate educational technology for writing are more likely to achieve ~~great~~ understanding achievements in writing. Given the correlation between ~~students'~~ students' independence and writing achievement, the moderate correlation between digital competence and writing achievement, and the significant relationship between ~~the combination of~~ learner autonomy and digital competence on writing achievement indicate that ~~when~~ students get better with digital tools. ~~ t~~They can experiment more ~~with~~ with the writing style and thus become a better writer (Andina et al., 2020).

Subsequent research showed results related to teaching. ~~Shomedran's~~ Shomedran's analysis (2020) s~~aid~~ays that information and data literacy competence is ~~very helpfu~~beneficial for pre-service teacher graduates ~~where everyone can process information and data in general and correctly so that it can be used to support aspects of life in a positive and targeted~~. Everyone can process information and data in general and correctly to support aspects of life in a positive and targeted way sense~~ t, the~~

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importance of information and communication skills. ~~literacy~~ Literacy in the world of work ~~because it~~ produces information in the form of ~~very~~ many documents per year, world publications continue to increase, and in general, every worker must have time to read (Shomedran, 2020)~~.~~.

Furthermore, in communication and collaboration competencies, each pre-service teacher has competence in communicating, conveying something, processing messages, interacting, and collaborating with others when entering the world of work. Then the ability to create digital content, where pre-service teachers are required to ~~be able and~~ understand how to use digital devices ~~to our ability~~ to ~~create~~ make ~~learning digital~~digital learning content. Next, competencies related to security include ensuring the protection of data and confidentiality, health, and the environment that must be owned. Pre-service teachers are required ~~to be able~~ to provide data confidentiality, protect personal data and be responsible for paying attention to environmental aspects for teaching. Finally, problem-solving competence is where cognitive abilities and skills contribute to solving problems by formulating several rules, which are more than just simple applications of previously learned ~~rules~~ practices in a rational, straightforward and thorough manner. It ~~, which~~ requires ~~students'~~ studentsability to ~~master concepts, principles and generalizations and insights using scientific methods or thinking systematically, logically, regularly and thoroughly on digital sources~~systematically, logically, regularly, and thoroughly on digital sources to master concepts, principles and generalizations and insights using scientific methods or thinking (Shomedran, 2020).

Research from Prayogi (2019) ~~which~~ presents the ~~results of aligning~~alignment of digital profiles and competencies in the learning process. By looking at the design of 21st-century learning based on products and problem solving, it is ~~very necessary~~essential for active collaborations of students, especially in creating and innovating high-value product creativity and systematic and easy problem solving for students. From this, through the profile of 21st-century educators and their alignment with digital competencies, which then leads to the formation of product creativity and problem-solving, it is very young to provide digital-based learning by fulfilling the skills of 21st-century students (Prayogi & Estetika, 2019).

CONCLUSION

This Systematic Literature Review provides an overview of developments ~~that have occurred~~ in Indonesia by selecting the subject of pre-service teachers in the last 7 years. We chose the subject of pre-service teachers because most of the students are Generation Z, who are easy-to-use digital tools and teachers are the vanguard who are very influential and need to be prepared to face the digitalization of education. In this review, ~~5~~ five articles are analyzed through the digital competence frame of the European Commission.

First, the most widely used dimension of digital competence in digital literacy is as many as ~~4~~ four articles, secondly content creation as many as ~~3~~ three articles, and the other dimensions as many as ~~2~~ two articles. Based on this, researchers from Indonesia ~~mostly~~ mainly discussed the issue of digital literacy.

In the discussion of objectives, ~~articles~~ papers are grouped into ~~3~~ three parts~~, f.~~ Firstly objectives are related to indicators by 20%, secondly, goals ~~related to~~associated with learning achievement by 40%, third, objectives related to the teaching process by 40%.

The results of the selected articles found that the digital literacy of prospective teacher students was still ~~mostly~~ mainly at the advanced-intermediate level. The indicators ~~used can be used as a reference for prospective teachers in improving~~can be used as a reference for prospective teachers to improve literacy understanding. Further stated that the level of digital competence can affect thinking skills. Then there is a significant relationship between the combination of learner autonomy and digital competence on writing achievement. Digital competence also affects the improvement of the teaching profession, because the five dimensions of digital competence are indispensable for the world of education~~, as well as~~ and support~~ing~~ 21st-century learning design that leads to the formation of product creativity and problem-solving.

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This systematic review identifies digital competence from the European Commission. Hence, ; further research can be done by comparing other definitions of digital competence to get more views.

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