

Challenges of mastering information and communication technology literacy competence for teachers in the age of digital learning

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ABSTRACT: In today's digital era, there are still many teachers who are not literate in information technology and do not yet have information and communication technology (ICT) literacy competence. So teachers are required to carry out learning innovations. This study aims to identify, analyze, and interpret all challenges to ICT literacy competencies in the digital learning era faced by teachers. This study uses a qualitative method with a systematic literature review (SLR). The stages in the SLR method are reviewing, identifying, and analyzing journal articles with certain themes on the Google Scholar platform systematically, and in each process following the steps or procedures that have been set. The results of the research show several challenges for teachers in mastering ICT literacy competencies in learning: (1) Teachers are not proficient in using IT-based learning tools. (2) Information and communication technology literacy is a new competency that is a necessity in teaching and learning activities in the digital era. (3) Teachers need to improve ICT literacy competence by training and competency development through digital literacy training programs. The synthesis in this research found the biggest challenge for teachers – having to master digital literacy competency procedures, namely: accessing, selecting, understanding, analyzing, verifying, evaluating, distributing, producing, participating, and collaborating in utilizing the information obtained in learning, so that teachers are able to innovate learning.

Keywords: teacher, teacher competency, digital literacy, information and communication technology, digital era

1 INTRODUCTION

Currently, in the all-digital era, it cannot be denied that in the world of education, the challenges faced are becoming increasingly complex because education is required to adapt to the challenges of an era of technological advancement and technological integration. Therefore, digital literacy learning needs to be implemented to build digital literacy competencies for teachers and students to form Human Resources (HR) who have information and communication technology literacy competencies to advance education. (Kominfo 2020:<https://gln.kemdikbud.go.id>). According to Asari *et al.* (2019) and Dhimas *et al.* (2021), in the era of digital learning, teachers need to be literate in digital literacy competencies because teachers and students still do not understand how to effectively use digital information media. In addition, teachers in Indonesia still have problems making technology-based learning media because of internal and external factors. According to Priyanto (2020), with the changes in the current era of Industry 4.0, there is a need for modernization of

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education by revitalizing various things, and one of them is the teacher aspect. Teachers are required to master digital technology competencies. According to Maulana (2020), teachers are required to be able to adapt to technology that is currently growing rapidly. In addition, teachers must be able to innovate and be creative in developing learning tools in the classroom. (Kominfo 2020:<https://gln.kemdikbud.go.id>)

Regarding information and communication technology literacy in education, some researchers (Agus Sulistyono & Ismarti 2022; Anggeraini *et al.* 2019; Ashari 2019; Djaja *et al.* nd.) concluded that teachers were still lacking in mastering ICT competencies in learning and were ill-prepared for the changes brought about by the digitalization of education.

The research conducted by Djaja *et al.* nd, about online learning does not discuss in detail teachers' challenges in mastering ICT literacy in the digital era. However, the research by Agus Sulistyono and Ismarti (2022) was more focused on the challenges of Islamic education in the 4.0 era. Apart from that, the research also examines the urgency of media literacy. However, it does not discuss the stages of digital literacy in learning in detail, which should also be included.

Ashari (2019) discussed more about student challenges and changes in attitudes they experienced in entering the 4.0 era and did not focus on discussing teacher challenges in the digital learning era. However, the research also included what researchers will look for and discuss regarding challenges faced by teachers in mastering ICT literacy and the procedures for the stages of ICT literacy competency in learning. Accordingly, this study supports the findings of Adam-Turner (2017). This study shows how digital literacy is a solution to challenges for teachers in the digital era. This research also supports the theory given by Schield (2013), Ridsdale *et al.* (2015), Grillenberger and Romeike (2018), Spengler (2015), and Listiaji and Subhan (2021) in response to challenges in the 4.0 era regarding ICT literacy. In their findings, they stated that the current educational environment offers access opportunities, such as information, tools, and learning resources for teachers to educate and teach using digital literacy to face the challenges of the 4.0 era. With some of the reasons that were found, the systematic literature review (SOR) with the theme, *The Challenges of Mastering Information and Communication Technology Literacy Competencies for Teachers in the Digital Learning Era*, is interesting and relevant for study.

2 METHODS

This research uses the library research method with SLR. The data collection technique in this research involves five stages: (1) finding relevant literature data (search process) (Randolph, 2009); (2) evaluating data, theory, information, and research results; (3) identifying themes and gaps between theory and conditions in the field, if any, and analyzing them according to the research questions (Randolph 2009); (4) constructing the concept and structure of the results of the theme study; and (5) compiling the findings from the literature review.

The research procedure is as follows:

(1) First Stage – Creating research question:

RQ 1: *What are some teacher challenges in mastering competence for teachers in the era of digital learning?*

RQ 2: *How do teachers improve their mastery in the era of digital learning?*

(2) Second Stage – Search process: At this stage, the researcher tries to determine a clear topic and seeks to collect and search for data using a search engine, such as www.google.com with the site address www.google.scholar.com. as the main research data to be able to answer research questions.

(3) Third Stage – Appropriate and inappropriate (inclusion and exclusion) criteria: (i) Data used is the 2018–2021 timeframe; (ii) Data obtained using keywords according to the title; (3) The data is obtained from www.google.scholar.com.

- (4) Fourth Stage – Quality assessment (QA): The QA is done from a list of problem formulations. This stage is used to evaluate the data that has been found based on the question of quality assessment criteria.
- (5) Fifth Stage – Data analysis: Evaluating data, theory, information, and research results.

3 RESULTS

The results of the SLR regarding how teachers challenge the competence of information and communication technology literacy in the digital learning era are found. There are 28 articles that can be used as material for analysis in this study. Furthermore, using a content analysis study, it was shown that as many as 7 research articles stated that not all teachers in schools had information and communication technology literacy skills; 9 articles stated that literacy on information technology is now a basic literacy that has become a necessity in teaching and learning activities; and 12 articles stated that teachers need to improve their technological literacy competencies with training and development in the ICT field.

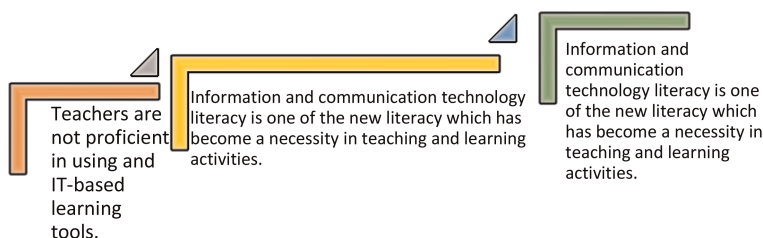


Figure 1. Research findings.

3.1 *Teachers are not proficient in using IT-based learning tools*

According to Asari *et al.* (2019) there are still many teachers who have not mastered digital literacy because teachers and students do not understand how to effectively utilize digital information media in learning. Djaja *et al.* nd; Dhimas Arsyad Arrajiv, Miftahul Arifah, & Tyas Wahyuningsih (2021), in their findings, show that individual skills in information technology literacy need to be improved in the world of education. Studies by Maulana (2020) and Priyanto (2020) state that teachers have not mastered literacy and technology competencies. Retnaningsih (2019) and Amirudin (2019) said in their findings that the big challenge for teachers today is IT mastery, professionalism, learning creativity, time mismatch with learning load, and teacher monotony.

3.2 *Information and communication technology literacy is a new competency that has now become a necessity in teaching and learning activities*

Helaludin (2019), Susilo (2019), and Astini (2019) state that the current need of teachers in the digital era is mastering ICT literacy. According to Maulana (2020) teachers not only need to master the ability to operate digital devices and software, but also complex skills, such as production skills, photovisual skills, hypertextuality skills, etc. Bahri *et al.* (2021), in their study, showed that it is imperative for teachers to optimize literacy development in the classroom and its integration into subjects. The findings of Agus Sulistyo and Ismarti (2022) state that the biggest challenge for a teacher is to be literate in technological literacy. (Riadi 2019). Ashari (2019) mentioned that in dealing with changes in student behavior in the 4.0 era, teachers must be literate in digital literacy.

3.3 Teachers need to improve ICT competence by training and participating in workshop activities

Teachers need to improve their digital literacy skills by upgrading themselves, one of which is developing themselves by participating in training and workshops. This is to create a social order with critical and creative mindsets and views, collaboration, communication, innovation, and problem solving. Ariyati (2020) and Roman (2019) state that the competency needed by teachers and students is ICT literacy and is improved by means of teachers having to take part in digital literacy training. According to Anggeraini *et al.* (2019) and Rachmawati *et al.* (2021), teacher ICT skills can be improved with training on ICT. In their findings, Zulfa Hazizah and Henry Aditia Rigianti (2021) and Adam-Turner (2017) mentioned that teachers need to increase their own capacity in the field of ICT literacy by participating in training and workshops.

4 DISCUSSION

The lack of teacher expertise in using IT-based learning tools is a problem not only in Indonesia. This also happens in countries such as Malaysia (Kaur & Singh 2014). Teachers in Malaysia are still experiencing difficulties mastering ICT and require intensive training in the use of ICT. Apart from Malaysia, teacher problems in mastering ICT also occur in countries such as Spain, in cities such as Carrascal, Cantilan, Madrid, Carmen, and Lanuz. Teachers in several of these cities experience difficulties using ICT in language subjects. (Correos 2014). Correos recommends that teachers be given intensive training on ICT.

In mastering ICT competencies comprehensively, teachers are not only required to be able to present, filter, process, and evaluate data and information, but are also required to be more creative, active, collective, and build knowledge through digital media (Janíková & Kowaliková 2018; Savage 2006; Schield 2013). Ferrari (2013) mentions five stages in mastering digital literacy competencies: (1) Identify, find, retrieve, store, organize, and analyze digital information and assess its relevance and purpose; (2) Communication through digital or online tools; (3) Content creation, which includes creating and editing new content; (4) Security, which includes personal protection, data protection, digital identity, and security measures; (5) Problem-solving, which includes identifying needs, making the right decisions according to goals or needs, etc.

Skantz-åberg *et al.* (2022) mention seven aspects related to teachers' professional digital competence: (1) technological competence; (2) content knowledge; (3) attitude toward the use of technology; (4) pedagogical competence; (5) cultural awareness; (6) critical approach; and (7) professional engagement, with technological and pedagogical competence being the most prominent. According to Asari *et al.* (2019), there are different stages of digital literacy competencies for teachers: (1) accessing; (2) selecting; (3) understanding; (4) analyzing; (5) verifying; (6) evaluating; (7) distributing; (8) producing; (9) participating; and (10) collaborating. According to Gündüzalp (2021), these digital literacy competencies can be divided into basic and advanced levels. The two levels are summarized in ten stages: (1) accessing; (2) selecting; (3) understanding; (4) analyzing; (5) verifying; (6) evaluating; (7) distributing; (8) producing; (9) participating; and (10) collaborating.

In facing the challenges of information and communication technology literacy competencies for teachers in the digital learning era, teachers must improve competence by participating in training related to data and information literacy (Spengler 2015). In line with this view, Adam-Turner (2017) mentioned that there are a number of things that must be done by teachers in Malaysia, such as teachers must use the computer often and practice and keep abreast of information. This needs to be done so that students can use any technology in teaching. With the application of ICT literacy in learning, student learning outcomes can improve.

5 CONCLUSION

The findings from the SLR research show that the biggest challenge for teachers today is that they do not yet have ICT competence or digital literacy and mastery of procedures. In addition,

it is no less important that teachers attend ICT competency training and development. Teachers and students need to be given education regarding procedures for implementing digital literacy in everyday life. From these challenges, the main causal factors were found, namely the lack of facilities and infrastructure used in learning and the indifferent attitude of teachers toward the development of learning systems in the digital era. However, the analysis in this study found that the ICT literacy competency procedures that must be mastered by teachers are accessing, selecting, understanding, analyzing, verifying, evaluating, distributing, and producing.

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